

PROJECT MANUAL

**QUONSET HUT RENOVATION AT NORTHVIEW
HEIGHTS FACILITY SERVICES SITE (AMP-09)**

IFB for Contract No. 600-22-18

GENERAL CONSTRUCTION

ELECTRICAL CONSTRUCTION

MECHANICAL CONSTRUCTION

Bids Due

June 28, 2018

2:00 pm

**Procurement Dept. 100
Ross St.
2nd FL. Suite 200
Pittsburgh, PA 15219**

**Attn:
Mr. Kim Detrick,
Director of
Procurement**

CONSULTANT: D&D Engineering, Inc.

Issued: May 28, 2018

Caster D. Binion
Executive Director

Housing Authority of the City of Pittsburgh

Point of Contact: Kim.Detrick@hacp.org
or 412-456-5116 Opt 1



Procurement Department
100 Ross Street, Suite 200
Pittsburgh, PA 15219
Phone: (412) 456-5116
Fax: (412) 456-5007
www.hacp.org

NOTICE TO PROSPECTIVE BIDDERS

May 28, 2018

INVITATION FOR BIDS (IFB)

QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS FACILITY SERVICES SITE (AMP-09)

The HOUSING AUTHORITY OF THE CITY OF PITTSBURGH will receive separate sealed bids for QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS FACILITY SERVICES SITE (AMP-09) ; for the following contracts:

GENERAL CONSTRUCTION
ELECTRICAL CONSTRUCTION
MECHANICAL CONSTRUCTION

The estimated values of the project per contract noted above are in the following ranges:

GENERAL CONSTRUCTION	\$ 102,000.00	\$ 150,000.00
ELECTRICAL CONSTRUCTION	\$ 16,000.00	\$ 24,000.00
MECHANICAL CONSTRUCTION	\$ 42,000.00	\$ 62,000.00

Bid documents will be available on **May 28, 2018** . A Pre-Bid Conference will be held on **June 6, 2018** at **10:00 am** , at 533 Mt. Pleasant Road, Pittsburgh, PA 15214 in the Facility Services site.

A site visit of the property will be conducted thereafter. Bidders shall be prepared to review all aspects of the site necessary to prepare a bid. The last day for submission of written questions will be **June 12, 2018** until **2:00 pm** Bids will be received at the HACP Procurement Department, 100 Ross Street – Suite 200 (2nd Floor), Pittsburgh, PA, 15219 until **2:00 pm** on **June 28, 2018** , at which time and place all bids will be publicly opened and read aloud.

The work must be substantially complete within 180 calendar days of the Notice to Proceed.

Point of contact for the Housing Authority is Mr. Kim Detrick at (412) 456-5116 Opt 1.

TO VIEW AND OBTAIN DOCUMENTS

Bid Documents, including the Bid Forms, Project Manual, and Drawings, may be obtained from the Business Opportunities Section of the HACP website, www.hacp.org. Prospective Bidders may register as a vendor on the website and download the documents free of charge. Electronic versions of the Bid Documents may also be obtained in person, Monday through Friday 8:30 a.m. to 4:30 p.m. at the Housing Authority of the City of Pittsburgh's Procurement Department, located at 100 Ross Street, Suite 200, Pittsburgh, PA 15219.

AWARD OF CONTRACT (S):

It is the intention of the Authority to award a contract to the lowest responsive and responsible bidder.

All bids shall remain open for the period specified in the IFB, which in no case shall be less than sixty (60) calendar days from the bid opening.

All bids of \$10,000 or more must be accompanied by a negotiable bid guarantee that shall not be less than 5% of the amount of the bid. No bid guarantee is required for bids under \$10,000. In accordance with 2 CFR 200.318(h) formerly 24 CFR Section 85.36(b)(8), the Authority is permitted to make awards only to responsible bidders possessing the ability to perform successfully under the terms and conditions of the proposed contract. Prior to award of any contract, the Authority shall conduct a pre-contract survey. Consideration will be given to such matters as bidder integrity, compliance with public policy, record of past performance, and financial and technical resources.

All bids must include a completed and signed Form of Agreement (Form 00500) as part of the bid. If the bid is successful and approved by HACP Board of Commissioners (if applicable), HACP will also sign the Form of Agreement thus creating a binding contract.

The successful bidder will be required to furnish an assurance of completion (performance and payment bond) each equal to 100% of the contract price.

The Authority reserves the right to reject any or all bids or to waive any informality in the bidding.

EQUAL EMPLOYMENT OPPORTUNITY REQUIREMENTS:

The Contractor will be required to comply with all applicable Equal Employment Opportunity requirements for Federally-Assisted Construction Contracts. The Contractor must insure that employees and applicants for employment are not discriminated against because of race, color, religion, sexual preference, handicap or national origin.

A. Section 3 Participation

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 and with HUD's regulations set forth at 24 CFR Part 135 ("Section 3"). The purpose of Section 3 is to ensure that employment and other economic opportunities generated by HUD assistance shall be directed to low and very low-income persons, particularly persons who are recipients of HUD assistance for housing.

Please describe ways the Bidder will assist HACP to comply with HUD's Section 3 requirements for hiring HACP residents and/or local disadvantaged individuals and businesses by reviewing the Section 3 Clause and by completing **Document 00433 – Section 3 Form**.

Section 3 of the Housing and Urban Development Act of 1968, as amended (12 U.S.C. 1701, et seq.) (the “Act”) requires the Housing Authority of the City of Pittsburgh to ensure that employment and other economic and business opportunities generated by financial assistance from the Department of Housing and Urban Development (“HUD”), to the greatest extent feasible, are directed to public housing residents and other low income persons, particularly recipients of government housing assistance, and business concerns that provide economic opportunities to low and very low income persons.

To comply with the Act HACP requires its contractors to provide equal employment opportunity to all employees and applicants for employment without regard to race, color, religion, sex, national origin, disability, veteran’s or marital status, or economic status and to take affirmative action to ensure that both job applicants and existing employees are given fair and equal treatment.

The goal of this policy is to obtain a reasonable level of success in the recruitment, employment, and utilization of HACP residents and other eligible persons and/or businesses by contractors working on contracts partially or wholly funded with HUD monies. HACP shall examine and consider a contractor’s potential for success in providing employment and business opportunities to those covered under Section 3 prior to acting on any proposed contract award. In response to any RFP, RFQ or IFB HACP will require submission of the Section 3 Opportunities Plan and roster of current employees, and certification that the bidder will comply with the requirements of Section 3 either by hiring Section 3 employees to directly perform under the contract or by committing a dollar amount to HACP’s Section 3 program in an amount consistent with the chart below. Below are the HACP Section 3 Guidelines as listed in the HACP Section 3 Program Manual:

RESIDENT HIRING REQUIREMENTS / RESIDENT HIRING SCALE

TOTAL LABOR DOLLARS USE TOTAL CONTRACT AMOUNT FOR SERVICE CONTRACTS	RESIDENT LABOR AS A % OF TOTAL LABOR A. DOLLARS
Labor dollars \$25,000 but less than \$100,000	10% of the labor dollars
\$100,000, but less than \$200,000	9% of the labor dollars
At least \$200,000, but less than \$300,000	8% of the labor dollars
At least \$300,000, but less than \$400,000	7% of the labor dollars
At least \$400,000, but less than \$500,000	6% of the labor dollars
At least \$500,000, but less than \$1 million	5% of the labor dollars
At least \$1 million, but less than \$2 million	4% of the labor dollars
At least \$2 million, but less than \$4 million	3% of the labor dollars
At least \$4 million, but less than \$7 million	2% of the labor dollars
\$7 million or more	½ to 1 % of the labor dollars

****A copy of HACP’s Section 3 Program Manual is available for download at www.hacp.org**

A copy of HUD's Section 3 requirement is provided herein. If you have any questions regarding the Section 3 Requirements or would like to discuss goals and planning for Section 3 Requirements please contact Mr. Lloyd Wilson, Section 3 Coordinator, by e-mail at lloyd.wilson@hacp.org or by contacting him at the Housing Authority of the City of Pittsburgh, Resident Employment Program located at the Bedford Hope Center, 2305 Bedford Ave, Pittsburgh PA 15219, telephone (412) 395-3950, ext. 1048. Proposals must demonstrate how the Offeror intends to meet or exceed the Authority's Section 3 requirements. Proposals submitted without a Section 3 plan may be deemed nonresponsive. Also, please complete **Section 3 Opportunities Plan** and include with your proposal.

Any bid or proposal received from a contractor that does not contain a Section 3 Opportunities Plan or certification and back-up documentation acceptable to HACP shall be deemed non-responsive by HACP.

B. MBE/WBE Participation Plan

HACP MBE and WBE Goals. It is the policy of HACP to ensure that Minority Business Enterprises (MBEs) and Women-owned Businesses (WBEs) are provided maximum opportunity to participate in contracts let by HACP. In accordance with Executive Order 11625, HACP has established a minimum threshold of eighteen percent (18%) of the total dollar amount for MBE utilization in this contract. HACP has established a seven percent (7%) minimum threshold for participation of WBEs, and, HACP strongly encourages and affirmatively promotes the use of MBEs and WBEs in all HACP contracts. For these purposes, an MBE is defined as "any legal entity other than a joint venture, organized to engage in commercial transactions, that is at least fifty-one percent (51%) owned and controlled by one or more minority persons." Also, a minority person is defined as a member of a socially or economically disadvantaged minority group, which includes African-Americans, Hispanic-Americans, Native-Americans, and Asian-Americans. A WBE/MBE is defined as "any legal entity other than a joint venture, organized to engage in commercial transactions, that is at least fifty-one percent (51%) owned and controlled by a female.

Bids or proposals submitted in response to this solicitation MUST include an MBE/WBE participation plan which, at a minimum demonstrates "Best Efforts" have been taken to achieve compliance with MBE/WBE goals. HACP's Procurement Policy defines "Best Efforts" in compliance with MBE/WBE goals to mean that the contractor must certify and document with its bid or proposal that it has contacted in writing at least ten (10) certified MBE and ten (10) certified WBE subcontractors to participate in the proposed contract with or lesser number if the contractor provides documentation that ten (10) certified MBE/WBE contractors could not be identified. Each contractor shall certify as to same under penalty of perjury and shall submit the back-up documentation with its bid or proposal. Any bid or proposal received from a contractor that does not contain such certification and back-up documentation acceptable to HACP may be deemed non-responsive by HACP.

If you have any questions regarding the HACP MBE/WBE goals please contact Mr. Anthony Mannella, MBE/WBE Compliance Specialist, by e-mail at anthony.mannella@hacp.org or by contacting him at the Procurement Department, Housing Authority of the City of Pittsburgh, 100 Ross Street, Suite 200 Pittsburgh PA 15219, telephone (412) 456-5116 opt.1. Bids or proposals must demonstrate how the Offeror intends to meet or exceed these goals.

The Authority's Minority and Woman Business (MBE/WBE) participation goals are as follows:

- MBE Goal: 18%
- WBE Goal: 7%

Additionally, please be advised that participation credit will be applied in accordance with the following classifications, as follows:

- Broker: 10% of contract face value
- Supplier: 60% of contract face value
- Bona Fide Contractor: 100% of contract face value
- All Professional Service Firms: 100% of contract face value

Vendor definitions for the above classifications are to be referenced in either the respective vendor MBE/WBE certifications or as defined in 49 CFR Part 26.

Please describe ways the Bidder will utilize MBE/WBE businesses to meet the goals above by completing **Document 00434 – MBE/WBE Solicitation & Commitment Record**.

Caster D. Binion
Executive Director
Housing Authority of the City of Pittsburgh



Development & Modernization
100 Ross Street, Suite 200
Pittsburgh, PA 15219
(412) 456-5020
www.hacp.org

SPECIAL PROVISIONS

NOTICE TO ALL PROSPECTIVE BIDDERS

QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS FACILITY SERVICES SITE (AMP-09)

CONTRACT NO. 600-22-18

Each successful bidder(s) shall be required to comply with the following special provisions:

A. Required Documents/Information

After bid opening and determination of the responsive and responsible bidder, but prior to Notice to Proceed each successful bidder for this project shall provide the following documents/information to HACP within ten (10) business days of receiving written notice thereof:

- (1) Insurance
- (2) Payment and Performance Bonds
- (3) Construction Schedule
- (4) Submittal Log and Corresponding Submittals

Please accept these special provisions by completing the information requested below:

Signature of Authorized Officer: _____ Date: _____

Name of Contractor: _____

Address: _____

Telephone Number: _____

QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS FACILITY SERVICES SITE (AMP-09)

IFB CONTRACT NO. 600-22-18

**HOUSING AUTHORITY OF THE CITY OF PITTSBURGH
DEVELOPMENT & MODERNIZATION DEPARTMENT**

100 Ross Street, Suite 200

Pittsburgh, PA 15219

Phone: (412) 456-5020

Fax: (412) 456-5591

Issued: May 28, 2018

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH
**QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS
FACILITY SERVICES SITE (AMP-09)**

HACP Contract No. 600-22-18

**PROJECT MANUAL
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HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS
FACILITY SERVICES SITE (AMP-09)

HACP CONTRACT No. 600-22-18

INVITATION FOR BIDS
LIST OF DOCUMENTS

The HOUSING AUTHORITY OF THE CITY OF PITTSBURGH will receive separate sealed bids for QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS FACILITY SERVICES SITE (AMP-09) , for the following contracts:

GENERAL CONSTRUCTION
ELECTRICAL CONSTRUCTION
MECHANICAL CONSTRUCTION

A complete **Invitation for Bids (IFB)** consists of the following documents:

THE PROJECT MANUAL, dated May 28, 2018 consisting of:

Bidding Requirements, Contract Forms, Conditions of the Contract, Wage Determination, and the Specifications.

THE PROJECT DRAWINGS, as prepared by D&D Engineering, Inc., dated February 1, 2017.

THE BID PACKAGE, dated May 28, 2018 containing:

Blank bid document forms to be completed by the bidder.

ADDENDA will be issued as required.

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

IDENTIFICATION OF OWNER

The Owner of this project is the Housing Authority of the City of Pittsburgh, a body corporate and politic and created pursuant to the "Housing Authorities Law," an Act passed by the 1937 session of the Legislature of the Commonwealth of Pennsylvania, P.L. 955, approved May 28, 1937, hereinafter variously called the "Housing Authority of the City of Pittsburgh" (HACP), "The Authority," the "Local Housing Authority" (LHA), the "Public Housing Authority" (PHA), or the "Public Housing Authority/Indian Housing Authority" (PHA/IHA).

Caster D. Binion
Executive Director
Housing Authority of the City of Pittsburgh

James D. Harris, Esquire
General Counsel
Housing Authority of the City of Pittsburgh

Kim Detrick
Director of Procurement
Housing Authority of the City of Pittsburgh

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

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

Instructions to Bidders for Contracts

Public and Indian Housing Programs

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1. Bid Preparation and Submission

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

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

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

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

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

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

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

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

2. Explanations and Interpretations to Prospective Bidders

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

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

3. Amendments to Invitations for Bids

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

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

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

4. Responsibility of Prospective Contractor

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

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

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

5. Late Submissions, Modifications, and Withdrawal of Bids

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

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

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

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

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

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

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

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

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

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

6. Bid Opening

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

7. Service of Protest

(a) Definitions. As used in this provision:

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

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

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

Contracting Officer
Legal Department
Housing Authority of the City of Pittsburgh
200 Ross Street, 7th Floor
Pittsburgh, PA 15219

[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 (applicable to construction and equipment contracts exceeding \$25,000)

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

10. Assurance of Completion

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

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

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

☐ (3) a 20 percent cash escrow;

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

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

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

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

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

11. Preconstruction Conference (applicable to construction contracts)

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

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

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

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

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

corporations organized by Kenai, Juneau, Sitka, and Kodiak) as defined in the Alaska Native Claims Settlement Act, which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

**QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS
FACILITY SERVICES SITE (AMP-09)**

HACP CONTRACT NO. 600-22-18

**NOTICE OF
PRE-BID CONFERENCE**

A Pre-Bid Conference will be held on June 6, 2018

- A Pre-Bid Conference will be held on June 6, 2018 **at** 10:00 am, at the _____
533 Mt. Pleasant Road, Pittsburgh, PA 15214 in the Facility Services site. A site
visit of the property will be conducted thereafter. Bidders shall be prepared to review all
aspects of the site necessary to prepare a bid.
- Representatives of the Authority, the engineer and other interested parties will be in
attendance.

All bidders are urged to attend.

- Bidders are responsible for examining the construction site. (Refer to "Instructions to
Bidders for Contracts," Document HUD 5369, Clause 1, "Bid Preparation and
Submission.") Notwithstanding the above, lack of attendance will not be a basis for
rejecting a bid.
- Bidders are urged to examine the drawings and specifications prior to the Pre-Bid
Conference.
- Nothing at the Pre-Bid Conference will change the terms of the IFB unless a subsequent
Addendum is issued. (Refer to "Instructions to Bidders for Contracts," Document HUD
5369, Clause 2, "Explanations and Interpretations to Prospective Bidders.")

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

**QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS
FACILITY SERVICES SITE (AMP-09)**

HACP CONTRACT NO. 600-22-18

PROJECT SCHEDULE

NO LATER THAN
May 28, 2018

Invitation for Bids issued

June 6, 2018
10:00 am

Pre-Bid Conference (Followed by Site Visit)

June 12, 2018
2:00 pm

Last day to submit written questions

June 28, 2018
2:00 pm

Bids due

July 27, 2018
(estimated)

Notice of Award

August 14, 2018
(estimated)

Execution of Contracts

August 21, 2018
(estimated)

Pre-Construction Conference

September 3, 2018
(estimated)

Construction Start

180 calendar days
from effective date
of Notice to Proceed

All work required under this contract shall be complete

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

**QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS
FACILITY SERVICES SITE (AMP-09)**

HACP CONTRACT NO. 600-22-18

***SCOPE OF WORK FOR
GENERAL CONSTRUCTION***

The Contract for General Construction shall consist of the following component parts:

1. THE AGREEMENT

(Bound in the Project Manual)

THE BID	Document 00310 - Scope of Work for General Construction Document 00311 - Form of Bid for General Construction
THE FORM OF AGREEMENT	Document 00500 - Form of Agreement Document 00590 - Contracting Officer Certification
CONDITIONS OF THE CONTRACT	Document HUD - 5370 General Conditions HACP Document - Supplemental General Conditions Document 00830 - Wage Determination Schedule

2. PRIMARY SPECIFICATIONS FOR THE GENERAL CONSTRUCTION CONTRACT

(Bound in the Project Manual)

All Work contained in the Primary Specifications listed below is the Work of the Contractor for this General Construction Contract unless specifically indicated otherwise.

Any Reference in the Primary Specifications to the "Contractor," the "Prime Contractor," or the "General Contractor" shall be interpreted as meaning the Contractor for this General Construction Contract.

The General Contractor shall coordinate the schedule and activities of work performed by this and all other Prime Contracts, as identified by (G)-General, (P)-Plumbing, (H)-HVAC, and (E)-Electrical.

It is the contractual responsibility of the Contractor for General Construction to familiarize himself with the work of the other prime contractors so that the Project as a whole can proceed in an orderly fashion. Failure to familiarize work by other trades would not be an excuse for corrective measures at no cost to the City of Pittsburgh Housing Authority.

For example, the General Contractor shall coordinate installation of general construction work with the requirements of the Plumbing, Mechanical, and Electrical Contractors.

Reference Standard for Incidental Work: Incidental work, as used in this paragraph, is work which is not a basic part of other Prime Contracts but which is required by reference.

For example, the General Contractor is required by his Primary Specifications to install and repair all general work. In the event that the Plumbing Contractor disturbs the general work, the patching, repair shall be done and follow the same Specification requirements of the appropriate Specification Section by the Plumbing Contractor even if that specification section may not be part of the Plumbing Contractor's Primary Specification. The same applies to all trades where incidental work occurs.

TECHNICAL SPECIFICATIONS MAY BE FOUND AT PART FOUR
OF THE PROJECT MANUAL

PLEASE ALSO REFER TO DRAWINGS

3. PRIMARY DRAWINGS FOR THE GENERAL CONSTRUCTION CONTRACT
(Contained in the set of Project Drawings issued simultaneously with this Project Manual)

All Work contained in the Primary Drawings listed below is the Work of this Contractor unless specifically indicated otherwise.

Any Reference to the "Contractor," the "Prime Contractor," or the "General Contractor" shall be interpreted as meaning the Contractor for this General Construction Contract.

The Primary Drawings for this contract consist of all D&D Engineering, Inc. construction documents drawings, **dated** February 1, 2017 and specifications contained in this project manual.

In case of drawing conflict with specifications, it is understood that the specification shall supersede the drawings.

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH
**QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS
FACILITY SERVICES SITE (AMP-09)**

HACP Contract No. 600-22-18

**FORM OF BID
GENERAL CONSTRUCTION**

Contract No.: 600-22-18

TO: HOUSING AUTHORITY
CITY OF PITTSBURGH
(Hereinafter called the "Authority")
100 Ross Street, Suite 200
Pittsburgh, PA 15219

BIDDER:

(Bidder Name)

(Business Address)

(Telephone)

1. The undersigned Bidder, having visited the site, having become familiar with local conditions affecting the cost of the work, **including all City of Pittsburgh current code requirements**, and having become familiar with the Invitation for Bids (the IFB) issued by the Authority, which consists of the following:

- Project Manual, dated May 28, 2018 containing Bidding Requirements, Contract Forms, Conditions of the Contract, and Specifications
- Project Drawings, dated February 1, 2017
- Addenda (if any) as enumerated in this Form of Bid

hereby proposes to provide all supervision, technical personnel, labor, materials, machinery, tools, appurtenances, equipment and services required to construct and complete the General Construction Work as described in Document 00310 "Scope of Work for General Construction" and as indicated in the Drawings and Specifications, for the following Firm Fixed Price:

_____ Dollars (\$ _____)
(Insert Bid Price in words) *(Insert Bid Price in Figures)*

2. Bid security [☐ is [☐ is not submitted with this bid.
(Check one)

Bid Security is in amount of:

_____ % of the bid OR _____ Dollars (\$ _____)

Bid Security is in the form of:

☐	Certified Check	☐	Bank Draft
☐	U.S. Govt. Bond	☐	Bid Bond (Document 00410)

3. The Bidder hereby acknowledges receipt of the following Addenda, if any, as issued by the Authority:

Total number of Addenda _____ (if none, so state)

Addendum No. _____ dated _____ Addendum No. _____ dated _____

Addendum No. _____ dated _____ Addendum No. _____ dated _____

Addendum No. _____ dated _____ Addendum No. _____ dated _____

Addendum No. _____ dated _____ Addendum No. _____ dated _____

Addendum No. _____ dated _____ Addendum No. _____ dated _____

Addendum No. _____ dated _____ Addendum No. _____ dated _____

4. The Bidder attaches hereto the Special Provisions (Document 00021);
5. The Bidder attaches hereto the Statement of Bidder's Qualifications (Document 00420);
6. The Bidder attaches hereto the Section 3 Opportunities Plan (Document 00433), MBE/WBE Solicitation and Commitment Record (Document 00434), Bidder Manpower Plan (Document 00435), and Previous Related Experience (Document 00436);
7. The Bidder attaches hereto the Bidder's Representations, Certifications and Other Statements of Bidders (Document HUD 5369-A), Previous Participation Certificate (Document HUD-2530);
8. The Bidder attaches hereto the Bidder's Special Provisions – Notice to All Prospective Bidders (Document 00437), Non-Collusion Affidavit (Document 00485);
9. The Bidder attaches hereto the completed Form of Agreement (Document 00500);
10. The Bidder attaches hereto the Supplemental General Conditions (HACP Document).

PROPRIETORSHIP SIGNATURE PAGE

SHEET - FB-I

(To be used when the Bidder is an individual doing business as a Sole Proprietorship.)

THE BIDDER CERTIFIES THAT THE BIDDER IS:

- ☐ An individual doing business in his/her own name
☐ An individual doing business under a fictitious or assumed name
(Complete Proprietorship Fictitious Name Disclosure below)

SIGNED, SEALED AND DELIVERED

this _____ day of _____ 20 _____.

	_____ (Printed or Typed Name)		_____ (Printed or Typed Name)	
Witness		Principal		
	{		{	
	_____ (Signature and Date)		_____ (Signature and Date)	

PROPRIETORSHIP FICTITIOUS NAME DISCLOSURE

(To be used when the Bidder is an individual doing business under a fictitious or assumed name.)

_____ is an individual trading under a fictitious or
(Proprietor's Name)

assumed name of _____ and ☐ **has** ☐ **has not** registered under
(Fictitious or Assumed Name Used as Bidder's Name) (Check one)

the Fictitious Names Act of Pennsylvania, namely the Act of May 24, 1945, P.L. 967, as amended, 54 P.S. sec. 281.1 et seq.

	_____ (Printed or Typed Name)		_____ (Printed or Typed Name)	
Witness		Principal		
	{		{	
	_____ (Signature and Date)		_____ (Signature and Date)	

PARTNERSHIP SIGNATURE PAGE

SHEET - FB-P-1

(To be used when the Bidder is an individual doing business as a Partnership.)

THE BIDDER CERTIFIES THAT THE BIDDER IS:

- ☐ A General Partnership (Attach completed Sheet FB-P-3)
 - ☐ Doing business under Partnership Name
 - ☐ Doing business under a fictitious or assumed name
(Complete Partnership Fictitious Name Disclosure Sheet FB-P-2)
- ☐ A Limited Partnership (Attach completed Sheet FB-P-3)
 - ☐ Doing business under Partnership Name
 - ☐ Doing business under a fictitious or assumed name
(Complete Partnership Fictitious Name Disclosure Sheet FB-P-2)

SIGNED, SEALED AND DELIVERED

this _____ day of _____ 20 _____.

<i>Witness</i>	_____ (Printed or Typed Name)	<i>Partner *</i>	_____ (Printed or Typed Name)
{		{	
	_____ (Signature and Date)		_____ (Signature and Date)
<i>Witness</i>	_____ (Printed or Typed Name)	<i>Partner *</i>	_____ (Printed or Typed Name)
{		{	
	_____ (Signature and Date)		_____ (Signature and Date)

* If the Bidder is a partnership, the Bid and Contract must be signed in the name of the partnership by at least two general partners, and the names and addresses of all the partners must be listed on the certificate on Sheet FB-P-3.

PARTNERSHIP FICTITIOUS NAME DISCLOSURE

(To be used when the Bidder is a partnership doing business under a fictitious or assumed name.)

SHEET FB-P-2

_____ is a partnership trading under a fictitious or
(Partnership's Name)

assumed name of _____ and ☐ **has** ☐ **has not** registered under
(Fictitious or Assumed Name Used as Bidder's Name) *(Check one)*

the Fictitious Names Act of Pennsylvania, namely the Act of May 24, 1945, P.L. 967, as amended, 54 P.S. sec. 281.1 et seq.

<i>Witness</i>	_____ <i>(Printed or Typed Name)</i>	<i>Partner*</i>	_____ <i>(Printed or Typed Name)</i>
	{		{
	_____ <i>(Signature and Date)</i>		_____ <i>(Signature and Date)</i>

PARTNERSHIP CERTIFICATE
(To be used when the Bidder is a partnership.)

SHEET FB-P-3

I, as partner of _____,
(*Name of Partnership*)
certify that the following are the names and addresses of all the partners of said partnership.

Name: _____ Name: _____

Address: _____ Address: _____

City: _____ City: _____

Name: _____ Name: _____

Address: _____ Address: _____

City: _____ City: _____

Name: _____ Name: _____

Address: _____ Address: _____

City: _____ City: _____

Name: _____ Name: _____

Address: _____ Address: _____

City: _____ City: _____

(Use additional sheets as required.)

<i>Witness</i>	_____	<i>Partner*</i>	_____
	(<i>Printed or Typed Name</i>)		(<i>Printed or Typed Name</i>)
	{		{
	_____		_____
	(<i>Signature and Date</i>)		(<i>Signature and Date</i>)

CORPORATION SIGNATURE PAGE

(To be used when the bidder is a corporation.)

SHEET FB-C-1

THE BIDDER CERTIFIES THAT THE BIDDER IS:

- ☐ A corporation doing business in its own name
- ☐ A corporation doing business under a fictitious or assumed name
(Complete Corporation Fictitious Name Disclosure FB-C-2)

SIGNED, SEALED AND DELIVERED

this _____ day of _____ 20 _____.

(CORPORATE
SEAL)

(Corporate Name)

(Printed or Typed Name)

(Printed or Typed Name)

Witness

{

President

V.P. **

{

(Signature and Date)

(Signature and Date)

(Corporate Title)

(Corporate Title)

** If the bidder is a corporation, the Bid and the Contract must be executed in the Corporation's correct corporate name by its President or Vice President and attested to by its Secretary or Assistant Secretary or Treasurer or Assistant Treasurer, and the Certification of Corporate Principal (Doc. 00625) must be executed by the Secretary or Assistant Secretary.

CORPORATION FICTITIOUS NAME DISCLOSURE
(To be used when the Bidder is a corporation doing business under a fictitious or assumed name.)

SHEET FB-C-2

_____ is a corporation trading under a fictitious or
(Corporation's Name)

assumed name of _____ and ☐ **has** ☐ **has not** registered under
(Fictitious or Assumed Name Used as Bidder's Name) (Check one)

the Fictitious Names Act of Pennsylvania, namely the Act of May 24, 1945, P.L. 967, as amended, 54 P.S. sec. 281.1 et seq.

<i>Witness</i>	<i>(Printed or Typed Name)</i> { <i>(Signature and Date)</i>	<i>President</i> <i>V.P. **</i>	<i>(Printed or Typed Name)</i> { <i>(Signature and Date)</i>

****** If the bidder is a corporation, the Bid and the Contract must be executed in the Corporation's correct corporate name by its President or Vice President and attested to by its Secretary or Assistant Secretary or Treasurer or Assistant Treasurer, and the Certification of Corporate Principal (Doc. 00625) must be executed by the Secretary or Assistant Secretary.

CORPORATION CERTIFICATE

(To be used when the bidder is a corporation)

SHEET FB-C-3

_____ is a corporation organized and existing
(Corporate name used as Bidder name)

under the laws of the state of _____ with its principal place of business at:

_____, _____, _____
(Street Address) (City) (State)

and, if a non-Pennsylvania corporation ☐ **has** ☐ **has not** *(check one)* been granted a certificate of authority to do business in Pennsylvania as required by the Pennsylvania Business Corporation Law, approved May 5, 1933, P.L. 364, as amended, 15 P.S. sec.2005 et seq.

I, _____, certify that I am the ☐ **Secretary** ☐ **Assistant Secretary** of the
(check one)
Corporation named a Bidder herein; that _____ who signed
this Bid on behalf of the Corporation was then _____ of said Corporation that
*(President/V.P.) ***

I know his signature and his signature thereto is genuine; and that said Bid was duly signed, sealed and attested in behalf of said Corporation by authority of its governing body.

*(CORPORATE
SEAL)*

(Signature and Date)

**** If the bidder is a corporation, the Bid and the Contract must be executed in the Corporation's correct corporate name by its President or Vice President and its Secretary or Assistant Secretary or Treasurer or Assistant Treasurer, and the above Certificate must be executed by the Secretary or Assistant Secretary**

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

**QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS
FACILITY SERVICES SITE (AMP-09)**

HACP CONTRACT NO. 600-22-18

***SCOPE OF WORK FOR
ELECTRICAL CONSTRUCTION***

The Contract for Electrical Construction shall consist of the following component parts:

1. THE AGREEMENT
(Bound in the Project Manual)

THE BID	Document 00320 - Scope of Work for Electrical Construction Document 00321 - Form of Bid for Electrical Construction
THE FORM OF AGREEMENT	Document 00500 - Form of Agreement Document 00590 - Contracting Officer Certification
CONDITIONS OF THE CONTRACT	Document HUD - 5370 General Conditions HACP Document - Supplemental General Conditions Document 00830 - Wage Determination Schedule

2. PRIMARY SPECIFICATIONS FOR THE ELECTRICAL CONSTRUCTION CONTRACT
(Bound in the Project Manual)

All Work contained in the Primary Specifications listed below is the Work of the Contractor for this Electrical Construction Contract unless specifically indicated otherwise.

Any Reference in the Primary Specifications to the "Contractor," the "Prime Contractor," or the "Electrical Contractor" shall be interpreted as meaning the Contractor for this Electrical Construction Contract.

The Electrical Contractor shall coordinate the schedule and activities of work performed under this contract with that of those contracts identified as (G)-General, (P)-Plumbing, and (H)-HVAC.

It is the contractual responsibility of the Contractor for Electrical Construction to familiarize himself with the work of the other prime contractors so that the Project as a whole can proceed in an orderly fashion. Failure to familiarize work by other trades would not be an excuse for corrective measures at no cost to the City of Pittsburgh Housing Authority.

For example, the Electrical Contractor shall coordinate installation of electrical construction work with the requirements of the Plumbing, Mechanical, and General Contractors.

Reference Standard for Incidental Work: Incidental work, as used in this paragraph, is work which is not a basic part of other Prime Contracts but which is required by reference.

For example, the General Contractor is required by his Primary Specifications to install and repair all general work. In the event that the Plumbing Contractor disturbs the general work, the patching, repair shall be done and follow the same Specification requirements of the appropriate Specification Section by the Plumbing Contractor even if that specification section may not be part of the Plumbing Contractor's Primary Specification. The same applies to all trades where incidental work occurs.

TECHNICAL SPECIFICATIONS MAY BE FOUND AT PART FOUR
OF THE PROJECT MANUAL

PLEASE ALSO REFER TO DRAWINGS

3. PRIMARY DRAWINGS FOR THE ELECTRICAL CONSTRUCTION CONTRACT
(Contained in the set of Project Drawings issued simultaneously with this Project Manual)

All Work contained in the Primary Drawings listed below is the Work of this Contractor unless specifically indicated otherwise.

Any Reference to the "Contractor," the "Prime Contractor," or the "Electrical Contractor" shall be interpreted as meaning the Contractor for this Electrical Construction Contract.

The Primary Drawings for this contract consist of all D&D Engineering, Inc. construction documents drawings, **dated February 1, 2017** and specifications contained in this project manual.

In case of drawing conflict with specifications, it is understood that the specification shall supersede the drawings.

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH
**QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS
FACILITY SERVICES SITE (AMP-09)**

HACP Contract No. 600-22-18

FORM OF BID

ELECTRICAL CONSTRUCTION

Contract No.: 600-22-18

TO: HOUSING AUTHORITY
CITY OF PITTSBURGH
(Hereinafter called the "Authority")
100 Ross Street, Suite 200
Pittsburgh, PA 15219

BIDDER:

(Bidder Name)

(Business Address)

(Telephone)

1. The undersigned Bidder, having visited the site, having become familiar with local conditions affecting the cost of the work, **including all City of Pittsburgh current code requirements**, and having become familiar with the Invitation for Bids (the IFB) issued by the Authority, which consists of the following:

- Project Manual, dated May 28, 2018 containing Bidding Requirements, Contract Forms, Conditions of the Contract, and Specifications
- Project Drawings, dated February 1, 2017
- Addenda (if any) as enumerated in this Form of Bid

hereby proposes to provide all supervision, technical personnel, labor, materials, machinery, tools, appurtenances, equipment and services required to construct and complete the Electrical Construction Work as described in Document 00320 "Scope of Work for Electrical Construction" and as indicated in the Drawings and Specifications, for the following Firm Fixed Price:

_____ Dollars (\$ _____)
(Insert Bid Price in words) *(Insert Bid Price in Figures)*

2. Bid security [☐ is [☐ is not submitted with this bid.
(Check one)

Bid Security is in amount of:

_____ % of the bid OR _____ Dollars (\$ _____)

Bid Security is in the form of:

☐	Certified Check	☐	Bank Draft
☐	U.S. Govt. Bond	☐	Bid Bond (Document 00410)

3. The Bidder hereby acknowledges receipt of the following Addenda, if any, as issued by the Authority:

Total number of Addenda _____ (if none, so state)

Addendum No. _____ dated _____ Addendum No. _____ dated _____

Addendum No. _____ dated _____ Addendum No. _____ dated _____

Addendum No. _____ dated _____ Addendum No. _____ dated _____

Addendum No. _____ dated _____ Addendum No. _____ dated _____

Addendum No. _____ dated _____ Addendum No. _____ dated _____

Addendum No. _____ dated _____ Addendum No. _____ dated _____

4. The Bidder attaches hereto the Special Provisions (Document 00021);

5. The Bidder attaches hereto the Statement of Bidder's Qualifications (Document 00420);

6. The Bidder attaches hereto the Section 3 Opportunities Plan (Document 00433), MBE/WBE Solicitation and Commitment Record (Document 00434), Bidder Manpower Plan (Document 00435), and Previous Related Experience (Document 00436);

7. The Bidder attaches hereto the Bidder's Representations, Certifications and Other Statements of Bidders (Document HUD 5369-A), Previous Participation Certificate (Document HUD-2530);

8. The Bidder attaches hereto the Bidder's Special Provisions – Notice to All Prospective Bidders (Document 00437), Non-Collusion Affidavit (Document 00485);

9. The Bidder attaches hereto the completed Form of Agreement (Document 00500);

10. The Bidder attaches hereto the Supplemental General Conditions (HACP Document).

PROPRIETORSHIP SIGNATURE PAGE

SHEET - FB-I

(To be used when the Bidder is an individual doing business as a Sole Proprietorship.)

THE BIDDER CERTIFIES THAT THE BIDDER IS:

- ☐ An individual doing business in his/her own name
☐ An individual doing business under a fictitious or assumed name
(Complete Proprietorship Fictitious Name Disclosure below)

SIGNED, SEALED AND DELIVERED

this _____ day of _____ 20 _____.

	_____ (Printed or Typed Name)	Principal	_____ (Printed or Typed Name)
Witness	{		{
	_____ (Signature and Date)		_____ (Signature and Date)

PROPRIETORSHIP FICTITIOUS NAME DISCLOSURE

(To be used when the Bidder is an individual doing business under a fictitious or assumed name.)

_____ is an individual trading under a fictitious or
(Proprietor's Name)

assumed name of _____ and ☐ **has** ☐ **has not** registered under
(Fictitious or Assumed Name Used as Bidder's Name) (Check one)

the Fictitious Names Act of Pennsylvania, namely the Act of May 24, 1945, P.L. 967, as amended, 54 P.S. sec. 281.1 et seq.

	_____ (Printed or Typed Name)	Principal	_____ (Printed or Typed Name)
Witness	{		{
	_____ (Signature and Date)		_____ (Signature and Date)

PARTNERSHIP SIGNATURE PAGE

SHEET - FB-P-1

(To be used when the Bidder is an individual doing business as a Partnership.)

THE BIDDER CERTIFIES THAT THE BIDDER IS:

- ☐ A General Partnership (Attach completed Sheet FB-P-3)
 - ☐ Doing business under Partnership Name
 - ☐ Doing business under a fictitious or assumed name
(Complete Partnership Fictitious Name Disclosure Sheet FB-P-2)
- ☐ A Limited Partnership (Attach completed Sheet FB-P-3)
 - ☐ Doing business under Partnership Name
 - ☐ Doing business under a fictitious or assumed name
(Complete Partnership Fictitious Name Disclosure Sheet FB-P-2)

SIGNED, SEALED AND DELIVERED

this _____ day of _____ 20 _____.

<i>Witness</i>	_____ (Printed or Typed Name)	<i>Partner *</i>	_____ (Printed or Typed Name)
{	_____	{	_____
	(Signature and Date)		(Signature and Date)
<i>Witness</i>	_____ (Printed or Typed Name)	<i>Partner *</i>	_____ (Printed or Typed Name)
{	_____	{	_____
	(Signature and Date)		(Signature and Date)

* If the Bidder is a partnership, the Bid and Contract must be signed in the name of the partnership by at least two general partners, and the names and addresses of all the partners must be listed on the certificate on Sheet FB-P-3.

PARTNERSHIP FICTITIOUS NAME DISCLOSURE

(To be used when the Bidder is a partnership doing business under a fictitious or assumed name.)

SHEET FB-P-2

_____ is a partnership trading under a fictitious or
(Partnership's Name)

assumed name of _____ and [] **has** [] **has not** registered under
(Fictitious or Assumed Name Used as Bidder's Name) (Check one)

the Fictitious Names Act of Pennsylvania, namely the Act of May 24, 1945,P.L.967, as amended, 54 P.S.sec.281.1 et seq.

<i>Witness</i>	_____ (Printed or Typed Name)	<i>Partner*</i>	_____ (Printed or Typed Name)
{		{	
	_____ (Signature and Date)		_____ (Signature and Date)

PARTNERSHIP CERTIFICATE
(To be used when the Bidder is a partnership.)

SHEET FB-P-3

I, as partner of _____,
(Name of Partnership)
certify that the following are the names and addresses of all the partners of said partnership.

Name: _____ Name: _____

Address: _____ Address: _____

City: _____ City: _____

Name: _____ Name: _____

Address: _____ Address: _____

City: _____ City: _____

Name: _____ Name: _____

Address: _____ Address: _____

City: _____ City: _____

Name: _____ Name: _____

Address: _____ Address: _____

City: _____ City: _____

(Use additional sheets as required.)

<i>Witness</i>	_____ <i>(Printed or Typed Name)</i> { _____ <i>(Signature and Date)</i>	<i>Partner*</i>	_____ <i>(Printed or Typed Name)</i> { _____ <i>(Signature and Date)</i>

CORPORATION SIGNATURE PAGE

(To be used when the bidder is a corporation.)

SHEET FB-C-1

THE BIDDER CERTIFIES THAT THE BIDDER IS:

- ☐ A corporation doing business in its own name
☐ A corporation doing business under a fictitious or assumed name
(Complete Corporation Fictitious Name Disclosure FB-C-2)

SIGNED, SEALED AND DELIVERED

this _____ day of _____ 20 _____.

(CORPORATE
SEAL)

(Corporate Name)

(Printed or Typed Name)

(Printed or Typed Name)

Witness

{

President

V.P. **

{

(Signature and Date)

(Signature and Date)

(Corporate Title)

(Corporate Title)

** If the bidder is a corporation, the Bid and the Contract must be executed in the Corporation's correct corporate name by its President or Vice President and attested to by its Secretary or Assistant Secretary or Treasurer or Assistant Treasurer, and the Certification of Corporate Principal (Doc. 00625) must be executed by the Secretary or Assistant Secretary.

CORPORATION FICTITIOUS NAME DISCLOSURE
(To be used when the Bidder is a corporation doing business under a fictitious or assumed name.)

SHEET FB-C-2

_____ is a corporation trading under a fictitious or
(Corporation's Name)

assumed name of _____ and ☐ **has** ☐ **has not** registered under
(Fictitious or Assumed Name Used as Bidder's Name) (Check one)

the Fictitious Names Act of Pennsylvania, namely the Act of May 24, 1945, P.L. 967, as amended, 54 P.S. sec. 281.1 et seq.

<i>Witness</i>	_____ <i>(Printed or Typed Name)</i>		_____ <i>(Printed or Typed Name)</i>
	<i>President</i>		
	V.P. **		
	{		{
	_____ <i>(Signature and Date)</i>		_____ <i>(Signature and Date)</i>

** If the bidder is a corporation, the Bid and the Contract must be executed in the Corporation's correct corporate name by its President or Vice President and attested to by its Secretary or Assistant Secretary or Treasurer or Assistant Treasurer, and the Certification of Corporate Principal (Doc. 00625) must be executed by the Secretary or Assistant Secretary.

CORPORATION CERTIFICATE

(To be used when the bidder is a corporation)

SHEET FB-C-3

_____ is a corporation organized and existing
(Corporate name used as Bidder name)

under the laws of the state of _____ with its principal place of business at:

_____, _____, _____
(Street Address) (City) (State)

and, if a non-Pennsylvania corporation ☐ **has** ☐ **has not** *(check one)* been granted a certificate of authority to do business in Pennsylvania as required by the Pennsylvania Business Corporation Law, approved May 5, 1933, P.L. 364, as amended, 15 P.S. sec.2005 et seq.

I, _____, certify that I am the ☐ **Secretary** ☐ **Assistant Secretary** of the
(check one)
Corporation named a Bidder herein; that _____ who signed
this Bid on behalf of the Corporation was then _____ of said Corporation that
*(President/V.P.) ***

I know his signature and his signature thereto is genuine; and that said Bid was duly signed, sealed and attested in behalf of said Corporation by authority of its governing body.

*(CORPORATE
SEAL)*

(Signature and Date)

** If the bidder is a corporation, the Bid and the Contract must be executed in the Corporation's correct corporate name by its President or Vice President and its Secretary or Assistant Secretary or Treasurer or Assistant Treasurer, and the above Certificate must be executed by the Secretary or Assistant Secretary

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

**QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS
FACILITY SERVICES SITE (AMP-09)**

HACP CONTRACT NO. 600-22-18

***SCOPE OF WORK FOR
MECHANICAL CONSTRUCTION***

The Contract for Mechanical Construction shall consist of the following component parts:

1. THE AGREEMENT

(Bound in the Project Manual)

THE BID	Document 00340 - Scope of Work for Mechanical Construction Document 00341 - Form of Bid for Mechanical Construction
THE FORM OF AGREEMENT	Document 00500 - Form of Agreement Document 00590 - Contracting Officer Certification
CONDITIONS OF THE CONTRACT	Document HUD - 5370 General Conditions HACP Document - Supplemental General Conditions Document 00830 - Wage Determination Schedule

2. PRIMARY SPECIFICATIONS FOR THE MECHANICAL CONSTRUCTION CONTRACT

(Bound in the Project Manual)

All Work contained in the Primary Specifications listed below is the Work of the Contractor for this Mechanical Construction Contract unless specifically indicated otherwise.

Any Reference in the Primary Specifications to the "Contractor," the "Prime Contractor," or the "Mechanical Contractor" shall be interpreted as meaning the Contractor for this Mechanical Construction Contract.

The Mechanical Contractor shall coordinate the schedule and activities of work performed under this contract with that of those contracts identified as (G)-General, (E)-Electrical, and (P)-Plumbing.

It is the contractual responsibility of the Contractor for Mechanical Construction to familiarize himself with the work of the other prime contractors so that the Project as a whole can proceed in an orderly fashion. Failure to familiarize work by other trades would not be an excuse for corrective measures at no cost to the City of Pittsburgh Housing Authority.

For example, the Mechanical Contractor shall coordinate installation of mechanical construction work with the requirements of the Electrical, Plumbing, and General Contractors.

Reference Standard for Incidental Work: Incidental work, as used in this paragraph, is work which is not a basic part of other Prime Contracts but which is required by reference.

For example, the General Contractor is required by his Primary Specifications to install and repair all general work. In the event that the Plumbing Contractor disturbs the general work, the patching, repair shall be done and follow the same Specification requirements of the appropriate Specification Section by the Plumbing Contractor even if that specification section may not be part of the Plumbing Contractor's Primary Specification. The same applies to all trades where incidental work occurs.

TECHNICAL SPECIFICATIONS MAY BE FOUND AT PART FOUR
OF THE PROJECT MANUAL

PLEASE ALSO REFER TO DRAWINGS

3. PRIMARY DRAWINGS FOR THE MECHANICAL CONSTRUCTION CONTRACT
(Contained in the set of Project Drawings issued simultaneously with this Project Manual)

All Work contained in the Primary Drawings listed below is the Work of this Contractor unless specifically indicated otherwise.

Any Reference to the "Contractor," the "Prime Contractor," or the "Mechanical Contractor" shall be interpreted as meaning the Contractor for this Mechanical Construction Contract.

The Primary Drawings for this contract consist of all D&D Engineering, Inc. construction documents drawings, **dated February 1, 2017** and specifications contained in this project manual.

In case of drawing conflict with specifications, it is understood that the specification shall supersede the drawings.

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH
**QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS
FACILITY SERVICES SITE (AMP-09)**

HACP Contract No. 600-22-18

FORM OF BID

MECHANICAL CONSTRUCTION

Contract No.: 600-22-18

TO: HOUSING AUTHORITY
CITY OF PITTSBURGH
(Hereinafter called the "Authority")
100 Ross Street, Suite 200
Pittsburgh, PA 15219

BIDDER:

(Bidder Name)

(Business Address)

(Telephone)

1. The undersigned Bidder, having visited the site, having become familiar with local conditions affecting the cost of the work, **including all City of Pittsburgh current code requirements**, and having become familiar with the Invitation for Bids (the IFB) issued by the Authority, which consists of the following:

- Project Manual, dated May 28, 2018 containing Bidding Requirements, Contract Forms, Conditions of the Contract, and Specifications
- Project Drawings, dated February 1, 2017
- Addenda (if any) as enumerated in this Form of Bid

hereby proposes to provide all supervision, technical personnel, labor, materials, machinery, tools, appurtenances, equipment and services required to construct and complete the Mechanical Construction Work as described in Document 00340 "Scope of Work for Mechanical Construction" and as indicated in the Drawings and Specifications, for the following Firm Fixed Price:

(Insert Bid Price in words) Dollars (\$ _____)
(Insert Bid Price in Figures)

2. Bid security [☐ is [☐ is not submitted with this bid.
(Check one)

Bid Security is in amount of:

_____ % of the bid OR _____ Dollars (\$ _____)

Bid Security is in the form of:

☐	Certified Check	☐	Bank Draft
☐	U.S. Govt. Bond	☐	Bid Bond (Document 00410)

3. The Bidder hereby acknowledges receipt of the following Addenda, if any, as issued by the Authority:

Total number of Addenda _____ (if none, so state)

Addendum No. _____ dated _____	Addendum No. _____ dated _____

Addendum No. _____ dated _____	Addendum No. _____ dated _____

Addendum No. _____ dated _____	Addendum No. _____ dated _____

Addendum No. _____ dated _____	Addendum No. _____ dated _____

Addendum No. _____ dated _____	Addendum No. _____ dated _____

Addendum No. _____ dated _____	Addendum No. _____ dated _____

4. The Bidder attaches hereto the Special Provisions (Document 00021);

5. The Bidder attaches hereto the Statement of Bidder's Qualifications (Document 00420);

6. The Bidder attaches hereto the Section 3 Opportunities Plan (Document 00433), MBE/WBE Solicitation and Commitment Record (Document 00434), Bidder Manpower Plan (Document 00435), and Previous Related Experience (Document 00436);

7. The Bidder attaches hereto the Bidder's Representations, Certifications and Other Statements of Bidders (Document HUD 5369-A), Previous Participation Certificate (Document HUD-2530);

8. The Bidder attaches hereto the Bidder's Special Provisions – Notice to All Prospective Bidders (Document 00437), Non-Collusion Affidavit (Document 00485);

9. The Bidder attaches hereto the completed Form of Agreement (Document 00500);

10. The Bidder attaches hereto the Supplemental General Conditions (HACP Document).

PROPRIETORSHIP SIGNATURE PAGE

SHEET - FB-I

(To be used when the Bidder is an individual doing business as a Sole Proprietorship.)

THE BIDDER CERTIFIES THAT THE BIDDER IS:

- ☐ An individual doing business in his/her own name
☐ An individual doing business under a fictitious or assumed name
(Complete Proprietorship Fictitious Name Disclosure below)

SIGNED, SEALED AND DELIVERED

this _____ day of _____ 20 _____.

	_____ (Printed or Typed Name)		_____ (Printed or Typed Name)	
Witness		Principal		
{			{	
	_____ (Signature and Date)		_____ (Signature and Date)	

PROPRIETORSHIP FICTITIOUS NAME DISCLOSURE

(To be used when the Bidder is an individual doing business under a fictitious or assumed name.)

_____ is an individual trading under a fictitious or
(Proprietor's Name)

assumed name of _____ and ☐ **has** ☐ **has not** registered under
(Fictitious or Assumed Name Used as Bidder's Name) (Check one)

the Fictitious Names Act of Pennsylvania, namely the Act of May 24, 1945, P.L. 967, as amended, 54 P.S. sec. 281.1 et seq.

	_____ (Printed or Typed Name)		_____ (Printed or Typed Name)	
Witness		Principal		
{			{	
	_____ (Signature and Date)		_____ (Signature and Date)	

PARTNERSHIP SIGNATURE PAGE

SHEET - FB-P-1

(To be used when the Bidder is an individual doing business as a Partnership.)

THE BIDDER CERTIFIES THAT THE BIDDER IS:

- ☐ A General Partnership (Attach completed Sheet FB-P-3)
 - ☐ Doing business under Partnership Name
 - ☐ Doing business under a fictitious or assumed name
(Complete Partnership Fictitious Name Disclosure Sheet FB-P-2)
- ☐ A Limited Partnership (Attach completed Sheet FB-P-3)
 - ☐ Doing business under Partnership Name
 - ☐ Doing business under a fictitious or assumed name
(Complete Partnership Fictitious Name Disclosure Sheet FB-P-2)

SIGNED, SEALED AND DELIVERED

this _____ day of _____ 20 _____.

<i>Witness</i>	_____ (Printed or Typed Name)	<i>Partner *</i>	_____ (Printed or Typed Name)
{		{	
	_____ (Signature and Date)		_____ (Signature and Date)
<i>Witness</i>	_____ (Printed or Typed Name)	<i>Partner *</i>	_____ (Printed or Typed Name)
{		{	
	_____ (Signature and Date)		_____ (Signature and Date)

* If the Bidder is a partnership, the Bid and Contract must be signed in the name of the partnership by at least two general partners, and the names and addresses of all the partners must be listed on the certificate on Sheet FB-P-3.

PARTNERSHIP FICTITIOUS NAME DISCLOSURE

(To be used when the Bidder is a partnership doing business under a fictitious or assumed name.)

SHEET FB-P-2

_____ is a partnership trading under a fictitious or
(Partnership's Name)

assumed name of _____ and [] **has** [] **has not** registered under
(Fictitious or Assumed Name Used as Bidder's Name) (Check one)

the Fictitious Names Act of Pennsylvania, namely the Act of May 24, 1945,P.L.967, as amended, 54 P.S.sec.281.1 et seq.

<i>Witness</i>	_____ (Printed or Typed Name)	<i>Partner*</i>	_____ (Printed or Typed Name)
{		{	
	_____ (Signature and Date)		_____ (Signature and Date)

PARTNERSHIP CERTIFICATE
(To be used when the Bidder is a partnership.)

SHEET FB-P-3

I, as partner of _____,
(*Name of Partnership*)
certify that the following are the names and addresses of all the partners of said partnership.

Name: _____ Name: _____

Address: _____ Address: _____

City: _____ City: _____

Name: _____ Name: _____

Address: _____ Address: _____

City: _____ City: _____

Name: _____ Name: _____

Address: _____ Address: _____

City: _____ City: _____

Name: _____ Name: _____

Address: _____ Address: _____

City: _____ City: _____

(Use additional sheets as required.)

<i>Witness</i>	_____	<i>Partner*</i>	_____
	(<i>Printed or Typed Name</i>)		(<i>Printed or Typed Name</i>)
	{		{
	_____		_____
	(<i>Signature and Date</i>)		(<i>Signature and Date</i>)

CORPORATION SIGNATURE PAGE

(To be used when the bidder is a corporation.)

SHEET FB-C-1

THE BIDDER CERTIFIES THAT THE BIDDER IS:

- ☐ A corporation doing business in its own name
☐ A corporation doing business under a fictitious or assumed name
(Complete Corporation Fictitious Name Disclosure FB-C-2)

SIGNED, SEALED AND DELIVERED

this _____ day of _____ 20 _____.

(CORPORATE
SEAL)

(Corporate Name)

(Printed or Typed Name)

(Printed or Typed Name)

Witness

{

President
V.P. **

{

(Signature and Date)

(Signature and Date)

(Corporate Title)

(Corporate Title)

** If the bidder is a corporation, the Bid and the Contract must be executed in the Corporation's correct corporate name by its President or Vice President and attested to by its Secretary or Assistant Secretary or Treasurer or Assistant Treasurer, and the Certification of Corporate Principal (Doc. 00625) must be executed by the Secretary or Assistant Secretary.

CORPORATION FICTITIOUS NAME DISCLOSURE
(To be used when the Bidder is a corporation doing business under a fictitious or assumed name.)

SHEET FB-C-2

_____ is a corporation trading under a fictitious or
(Corporation's Name)

assumed name of _____ and ☐ **has** ☐ **has not** registered under
(Fictitious or Assumed Name Used as Bidder's Name) (Check one)

the Fictitious Names Act of Pennsylvania, namely the Act of May 24, 1945, P.L. 967, as amended, 54 P.S. sec. 281.1 et seq.

<i>Witness</i>	_____ <i>(Printed or Typed Name)</i>		_____ <i>(Printed or Typed Name)</i>
	<i>President</i>		
	V.P. **		
	{		{
	_____ <i>(Signature and Date)</i>		_____ <i>(Signature and Date)</i>

** If the bidder is a corporation, the Bid and the Contract must be executed in the Corporation's correct corporate name by its President or Vice President and attested to by its Secretary or Assistant Secretary or Treasurer or Assistant Treasurer, and the Certification of Corporate Principal (Doc. 00625) must be executed by the Secretary or Assistant Secretary.

CORPORATION CERTIFICATE

(To be used when the bidder is a corporation)

SHEET FB-C-3

_____ is a corporation organized and existing
(Corporate name used as Bidder name)

under the laws of the state of _____ with its principal place of business at:

_____, _____, _____
(Street Address) (City) (State)

and, if a non-Pennsylvania corporation ☐ **has** ☐ **has not** *(check one)* been granted a certificate of authority to do business in Pennsylvania as required by the Pennsylvania Business Corporation Law, approved May 5, 1933, P.L. 364, as amended, 15 P.S. sec.2005 et seq.

I, _____, certify that I am the ☐ **Secretary** ☐ **Assistant Secretary** of the
(check one)
Corporation named a Bidder herein; that _____ who signed
this Bid on behalf of the Corporation was then _____ of said Corporation that
*(President/V.P.) ***

I know his signature and his signature thereto is genuine; and that said Bid was duly signed, sealed and attested in behalf of said Corporation by authority of its governing body.

*(CORPORATE
SEAL)*

(Signature and Date)

****** If the bidder is a corporation, the Bid and the Contract must be executed in the Corporation's correct corporate name by its President or Vice President and its Secretary or Assistant Secretary or Treasurer or Assistant Treasurer, and the above Certificate must be executed by the Secretary or Assistant Secretary

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

BID BOND

KNOW ALL MEN BY THESE PRESENTS, that we,

_____, as Principal, and
(Insert name and address of Bidder exactly as it appears on Form of Bid)

_____, as Sureties, are
held and firmly bound unto the Housing Authority of the City of Pittsburgh, its certain attorney, successors, or assigns
(the Obligee, hereinafter called the "Authority") in the penal sum of

_____ Dollars (\$ _____)

lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our
heirs, personal representatives, successors, and assigns, jointly and severally, firmly by these presents:

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas, the Principal simultaneously submits to
the Authority the accompanying bid, dated

_____, 20_____ (the "Bid"), for construction of
(Insert date of bid)

(Insert name of project exactly as it appears on Form of Bid)
pursuant to specifications, drawings and other related documents constituting the Invitation for Bids (the "IFB").

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 Authority in accordance with the bid as accepted, and give
bonds with good and sufficient surety or sureties, as may be required for the faithful performance and proper
fulfillment of such contract and for the payment of labor and materialmen 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 bonds within the time specified, if
the Principal shall pay the Authority the difference between the amount specified in said bid and the amount for which
the 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.

SIGNED, SEALED AND DELIVERED IN _____ ORIGINAL COUNTERPARTS

this _____ day of _____ 20_____.

IF THE PRINCIPAL IS AN INDIVIDUAL, SIGN HERE

_____ <i>(Printed or Typed Name)</i>	_____ <i>(Printed or Typed Name)</i>
<i>Witness</i>	<i>Principal</i>
{	{
_____ <i>(Signature and Date)</i>	_____ <i>(Signature and Date)</i>

SURETY SIGN HERE

*(SURETY
SEAL)*

_____ <i>(Printed or Typed Name)</i>	_____ <i>(Printed or Typed Name)</i>
<i>Attest</i>	<i>Surety***</i>
{	{
_____ <i>(Signature and Date)</i>	_____ <i>(Signature and Date)</i>

*** Power of attorney must be attached to this Bid Bond.

SIGNED, SEALED AND DELIVERED IN _____ ORIGINAL COUNTERPARTS

this _____ day of _____ 20_____.

IF THE PRINCIPAL IS A PARTNERSHIP, SIGN HERE

	_____ (Printed or Typed Name)		_____ (Printed or Typed Name)
<i>Witness</i>	{	<i>Partner*</i>	{
	_____ (Signature and Date)		_____ (Signature and Date)
	_____ (Printed or Typed Name)		_____ (Printed or Typed Name)
<i>Witness</i>	{	<i>Partner*</i>	{
	_____ (Signature and Date)		_____ (Signature and Date)

* If the Bidder is a partnership, the Bond must be signed in the name of the partnership by at least two general partners, whose names and addresses must be listed on the certificate on page BF-3-P of the Bid.

SURETY SIGN HERE

	_____ (Printed or Typed Name)		_____ (Printed or Typed Name)
<i>Attest</i>	{	<i>Surety***</i>	{
	_____ (Signature and Date)		_____ (Signature and Date)

*** Power of attorney must be attached to this Bid Bond.

SIGNED, SEALED AND DELIVERED IN _____ ORIGINAL COUNTERPARTS

this _____ day of _____ 20_____.

IF THE PRINCIPAL IS A CORPORATION, SIGN HERE

(CORPORATE
SEAL)

(Corporate Name)

(Printed or Typed Name)

(Printed or Typed Name)

Attest

{

President
V.P. **

{

(Signature and Date)

(Signature and Date)

(Corporate Title)

(Corporate Title)

** If the bidder is a corporation, the Bond must be executed in the Corporation's correct corporate name by its President or Vice President and attested to by its Secretary or Assistant Secretary or Treasurer or Assistant Treasurer, and the Certification of Corporate Principal below must be executed by the Secretary or Assistant Secretary.

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the
[] **Secretary** [] **Assistant Secretary** of the Corporation named a Bidder herein; that
(check one)

_____ who signed this Bid on behalf of the

Corporation was then _____ of said Corporation that I know his signature and his signature thereto is genuine; and that said Bid was duly signed, sealed and attested in behalf of said Corporation by authority of its governing body.

(CORPORATE
SEAL)

(Signature and Date)

SURETY SIGN HERE

(SURETY
SEAL)

(Printed or Typed Name)

(Printed or Typed Name)

Attest

{

Surety***

{

(Signature and Date)

(Signature and Date)

*** Power of attorney must be attached to this Bid Bond.

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

STATEMENT OF BIDDER'S QUALIFICATIONS

QUONSET HUT RENOVATION AT NORTHVIEW
HEIGHTS FACILITY SERVICES SITE (AMP-09)

(Bidder's Name)

(Project Name)

(Address)

600-22-18

(HACP Project No.)

Names of not more than two principals to contact:

Name: _____

Name: _____

Title: _____

Title: _____

Telephone: _____

Telephone: _____

AUTHORIZATION:

Excerpt from HUD 7460.8-REV-1 AND 24 CFR 85.36(b)(8) & 24 CFR 905.160(a)(3):

"The evaluation of a contractor's ability to perform a contract is known as determining the contractor's responsibility. Has **shall** make awards only to **responsible** contractors possessing the ability to perform successfully under the terms and conditions of a proposed contract. Consideration **shall** be given to such matters as **contractor integrity, compliance with public policy, record of past performance, and financial and technical resources**.

"The award of a contract to an offeror **shall** not be made solely on the basis of the lowest evaluated price without considering the firm's ability to perform the required work. Some of the specific factors to consider include (1) whether the contractor performed satisfactorily on other HA Contracts, (2) is the contractor suspended or debarred from Federal Contracts, and (3) have other HAs has satisfactory performance from this contractor.

"A pre-award survey may entail an on-site inspection of the offeror's facilities, including a review of financial statements, record keeping, production capacity, or similar factors that impact on the ability to perform the contract.

"Recent unsatisfactory performance regarding either quality or timeliness of delivery is an example of a problem which the Contracting Officer **shall** consider and resolve as to its impact on the current procurement prior to making an affirmative determination of responsibility.

ORGANIZATION

THE BIDDER IS:

- ☐ An individual doing business in his/her own name
- ☐ An individual doing business under a fictitious or assumed name

- ☐ A General Partnership
 - ☐ Doing business under Partnership Name
 - ☐ Doing business under a fictitious or assumed name

- ☐ A Limited Partnership
 - ☐ Doing business under Partnership Name
 - ☐ Doing business under a fictitious or assumed name

- ☐ A corporation doing business in its own name
- ☐ A corporation doing business under a fictitious or assumed name

How many years has the bidder been in business as a Contractor? _____

How many years has the bidder been in business under its present business name? _____

Under what other or former names has the bidder operated?

PAST PERFORMANCE

CLAIMS AND SUITS. (If the answer to any of the questions below is yes, please attach explanation.)

☐ **Yes** ☐ **No** Has the Bidder ever failed to complete any work awarded to it?

☐ **Yes** ☐ **No** Are there any judgments, claims, arbitration proceedings or suits pending or outstanding against the bidder or its officers?

☐ **Yes** ☐ **No** Has the bidder filed any law suits or requested arbitration with regard to construction contracts within the last five years?

☐ **Yes** ☐ **No** Within the last five years, has any officer or principal of the bidder ever been an officer or principal of another organization when it failed to complete a construction contract? (If answer is yes, please attach details.)

State average annual amount of construction work performed during the past five years:
\$ _____

State total worth of work in progress and under contract: \$ _____

On a separate sheet, list major construction projects the bidder has in progress, giving the name of project, owner, architect, contract amount, percent complete and scheduled completion date.

On a separate sheet, list the major projects the bidder has completed in the past five years, giving the name of project, owner, architect, contract amount, date of completion and percentage of the cost of the work performed with your own forces.

FINANCIAL RESOURCES

Financial Statement.

Attach a financial statement (audited if available), including the bidder's latest balance sheet and income statement showing the following items:

Current Assets (e.g. cash, joint venture accounts, accounts receivable, notes receivable, accrued income, deposits, materials inventory and prepaid expenses);
Net Fixed Assets;
Other Assets;
Current Liabilities (e.g. accounts payable, notes payable, accrued expenses, provision for income taxes, advances, accrued salaries and accrued payroll taxes);
Other Liabilities (e.g. capital, capital stock, authorized and outstanding shares par values, earned surplus and retained earnings).

Name and address of firm preparing attached financial statement, and date thereof:

☐ **Yes** ☐ **No** Is the attached financial statement for the identical organization named on page one?

If not, explain the relationship and financial responsibility of the organization whose financial statement is provided (e.g., parent-subsiary).

☐ **Yes** ☐ **No** Will the organization whose financial statement is attached act as guarantor of the contract for construction?

TECHNICAL RESOURCES

Licensing:

List jurisdictions and trade categories in which the bidder is legally qualified to do business, and indicate registration or license numbers, if applicable.

Experiences:

List the categories of work that the bidder normally performs with its own forces.

On a separate sheet, list the construction experience and present commitments of the key individuals of the bidder.

REFERENCES

List Trade References (use separate sheet if necessary):

List Bank References (use separate sheet if necessary):

List previous HUD/USDA-FmHA projects and Section 8 Contracts (formerly Schedule A on HUD-2530). Applicable to construction contracts exceeding \$50,000. List each principals name, previous project, principal's participation role and interest, and disclose defaults, mortgage relief, assignments and foreclosures. **Note that having a Master Schedule on file with HUD will not meet this requirement.**

Certifications: I (meaning the individual who signs as well as the corporations, partnerships or other parties listed above who certify) hereby apply to HUD or USDA-FmHA, as the case may be, for approval to participate as a principal in the role and project listed above based upon my following previous participation record of this Certification.

I certify that all the statements made by me are true, complete and correct to the best of my knowledge and belief and are made in good faith, including the data contained in Schedule A and Exhibits, signed by me and attached to this form.

Warning: HUD and/or the Authority will prosecute false claims and statements. Conviction may result in criminal and/or civil penalties. (18 U.S.C. 1001, 1012; 31 U.S.C. 3729, 3802)

I further certify that:

1. The list of previous HUD/USDA-FmHA projects and Section 8 Contracts contains a listing of every assisted or insured project of HUD, which I have been or am now a principal.
2. For the period beginning 10 years prior to the date of this certification, and except as shown by me on the certification.
 - a. No mortgage on a project listed by me has ever been in default, assigned to the Government or foreclosed, nor has mortgage relief by the mortgagee been given;
 - b. I have not experienced default or noncompliance under any Conventional Contract or Turnkey Contract of Sale in connection with a public housing project;
 - c. To the best of my knowledge, there are no unresolved findings raised as a result of HUD audits, management reviews or other Governmental investigations concerning me or my projects;
 - d. There has not been a suspension or termination of payments under any HUD assistance contract in which I have had a legal or beneficial interest;
 - e. I have not been convicted of a felony and am not presently, to my knowledge, the subject of a complaint or indictment charging a felony. (A felony is defined as any offense punishable by imprisonment for a term exceeding one year, but does not include any offense classified as a misdemeanor under the laws of a State and punishable by imprisonment of two years or less);
 - f. I have not been suspended, debarred or otherwise restricted by any Department or Agency of the Federal Government or of a State Government from doing business with such Department or Agency.

- g. I have not defaulted on an obligation covered by a surety or performance bond and have not been the subject of a claim under an employee fidelity bond.
3. All the names of the parties, known to me to be principals in this project(s) in which I propose to participate, are listed above.
4. I am not a HUD/FmHA employee or a member of a HUD/FmHA employee's immediate household as defined in Standards of Ethical Conduct for Employees of the Executive Branch in 5 C.F.R. Part 2635 (57 FR 35006) and HUD's Standard of Conduct in 24 C.F.R. Part O and USDA's Standard of Conduct in 7 C.F.R. Part 9 Subpart B.
5. I am not a Housing Authority of the City of Pittsburgh employee or a member of an Authority employee's immediate family.
6. I am not a principal participant in an assisted or insured project as of this date on which construction has stopped for a period in excess of 20 days or which has been substantially completed for more than 90 days and documents for closing, including final cost certification have not been filed with HUD or FmHA.
7. To my knowledge I have not been found by HUD or FmHA to be in noncompliance with any applicable civil rights law.
8. I am not a Member of Congress or a Resident Commissioner nor otherwise prohibited or limited by law from contracting with the Government of the United States of America.
9. Statements above (if any) to which I cannot certify have been deleted by striking through the words with a pen. I have initialed each deletion (if any) and have attached a true and accurate signed statement (if applicable) to explain the facts and circumstances which I think helps to qualify me as a responsible principal for participation in this project.

(Signature and Date)

(Typed or Printed Name)

(Title)

(Company Name)

Subscribed and sworn to before me

this _____ day of _____, 20

My Commission expires _____, 20

All section 3 covered contracts shall include the following clause (referred to as the section 3 clause):

- A. The work to be performed under this contract is subject to the requirements of section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (section 3). The purpose of section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.
- B. The parties to this contract agree to comply with HUD's regulations in 24 CFR part 135, which implement section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the part 135 regulations.
- C. The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.
- D. The contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR part 135. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR part 135.
- E. The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR part 135 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR part 135.
- F. Noncompliance with HUD's regulations in 24 CFR part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.
- G. With respect to work performed in connection with section 3 covered Indian housing assistance, section 7(b) of the Indian Self- Determination and Education Assistance Act (25 U.S.C. 450e) also applies to the work to be performed under this contract. Section 7(b) requires that to the greatest extent feasible (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this contract that are subject to the provisions of section 3 and section 7(b) agree to comply with section 3 to the maximum extent feasible, but not in derogation of compliance with section 7(b).

Housing Authority City of Pittsburgh
Development and Modernization Department
Bidder's Section 3 Participation Form

A. Bidder's Section 3 Hiring Plan

Job Category	Total Estimated Positions Needed for Project	No. Positions Occupied by Permanent Employees*	Number of Positions Not Occupied	Number of Positions Available for Section 3 Residents
Trade:				
Journeyman				
Helper				
Apprentices				
Trainees				
Laborer				
Others				

* Please submit a list of current employees to be assigned to this project including Dates of Hire

B. Bidder's Section 3 Subcontracting Plan

SUB - CONTRACTOR'S NAME**	SUB - CONTRACTORS ADDRESS	PHONE NUMBER	FEDERAL TAX ID NO./ SS#	DESCRIPTION OF WORK	Sub - Contract Amount

** If the Bidder has not identified a Section 3 subcontractor, please indicate if there will be any Section 3 subcontracting opportunity and describe scope of work_____

Company Name

Project Name

Project Number

Name and Title of Person Completing this Form

Signature and Date

PLACE HOLDER FOR
ROSTER OF CURRENT EMPLOYEES

**Pursuant to Housing Authority of the City of Pittsburgh Section 3 Program Manual, Part I,
Section A - Section 3 Policy Statement (in part):**

“HACP shall examine and consider a contractor’s potential for success in providing employment and business opportunities to those covered under Section 3 prior to acting on any proposed contract award. In response to any RFP, RFQ or IFB HACP will require submission of the Section 3 Opportunities Plan and roster of current employees, and certification that the bidder will comply with the requirements of Section 3.”

Section 3 Participation

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

RESIDENT HIRING REQUIREMENTS / RESIDENT HIRING SCALE

TOTAL LABOR DOLLARS USE TOTAL CONTRACT AMOUNT FOR SERVICE CONTRACTS	RESIDENT LABOR AS A % OF TOTAL LABOR DOLLARS
Labor dollars \$25,000 but less than \$100,000	10% of the labor dollars
\$100,000, but less than \$200,000	9% of the labor dollars
At least \$200,000, but less than \$300,000	8% of the labor dollars
At least \$300,000, but less than \$400,000	7% of the labor dollars
At least \$400,000, but less than \$500,000	6% of the labor dollars
At least \$500,000, but less than \$1 million	5% of the labor dollars
At least \$1 million, but less than \$2 million	4% of the labor dollars
At least \$2 million, but less than \$4 million	3% of the labor dollars
At least \$4 million, but less than \$7 million	2% of the labor dollars
\$7 million or more	½ to 1 % of the labor dollars

A copy of HACP's Section 3 Program Manual is available for download at www.HACP.org.



SECTION 3 OPPORTUNITIES PLAN

Business Opportunities and Employment Training for Housing Authority of the City of Pittsburgh Low Income Public Housing Residents (LIPH) and Area Residents of Low and Very Low Income Status (ARLIS)

PRIME CONTRACTOR'S NAME: _____
SPECIFICATION OR RFP/IFB/RFQ NUMBER: _____
SPECIFICATION OR RFP/IFB/RFQ TITLE: _____

The Contractor hereby agrees to comply with all the provisions of Section 3 as set forth in 24 CFR 135.1 et seq. and the HACP Section 3 Policy and Program requirements. The Contractor hereby submits this document to identify employment opportunities for HACP residents (LIPH) and **Area Residents of Low and Very Low Income Status (ARLIS)** during the term of the contract between the Contractor and the HACP.

The preference of HACP is to ensure that as many HACP residents as possible are employed. In an effort to further that requirement, HACP has created a preference tier structure as outlined in the HACP Section 3 Policy and Program Manual which can be reviewed by visiting the "Vendor Services" section of www.hacp.org. Contractors are required to comply with Section 3 by first considering Tier I – Hiring. If the Contractor cannot meet its Section 3 requirement in Tier I and needs to move to Tier II or Tier III, that Contractor must document this inability to comply with the preference and the need to move to a lower tier. (Such inability **must** be documented for moves within tiers). The Contractor agrees to meet its Section 3 requirement following the Preferential Tier Structure as indicated by the selection below (check one or more tiers below):

[] Tier I – HIRING

The Contractor affirms that the jobs identified shall be for meaningful employment that may or may not be related to the scope of services covered under Contract/Purchase Order # _____. The Contractor has committed to employ _____ resident(s) in order to comply with its Section 3 requirements. A prime contractor may satisfy the HACP Resident Hiring Requirements through his/her subcontractors. **Contact the HACP Resident Employment Program for resident referrals at 412-395-3950, Ext 1048.**

When Tier I is selected, the Contractor shall complete the following table as instructed below:

- (1) Indicate each job title for all phases of this contract
- (2) The number of positions that will be needed in each category
- (3) How many of those positions are currently filled
- (4) The number currently filled by low and very low-income HACP residents
- (5) The number currently filled by City of Pittsburgh neighborhood area residents
- (6) How many positions need to be filled

Indicate your requirement for the number of positions you intend to fill with:

- (7) Low income HACP Residents (LIPH) and/or
- (8) Low and very low income City of Pittsburgh Neighborhood Area Residents (ARLIS)



SECTION 3 OPPORTUNITIES PLAN

Section 3 Labor Utilization Assessment and Plan							
SPEC or RFP TITLE:					SPEC or RFP NUMBER:		
JOB TITLE (1)	NUMBER OF POSITIONS					HIRING REQUIREMENT	
	# NEEDED (2)	CURRENTLY FILLED			TO BE FILLED (6)	LIPH (7)	ARLIS (8)
		TOTAL (3)	LIPH (4)	ARLIS (5)			

LIPH – HACP low income public housing resident

ARLIS - Area Residents of Low/Very Low Income Status – (Area is the Pittsburgh metropolitan area)

In the event the value of Section 3 resident hiring is less than the amount identified in the Resident Hiring Scale, vendors must contribute to the HACP Education Fund an amount not less than the difference between the value of Section 3 hiring and the amount identified in the Resident Hiring Scale, which funds shall be used to provide other economic opportunities.

Therefore, if it is anticipated that any position listed above shall be for less than the full term of the contract period, you must indicate on the lines below, the anticipated term for each position:



SECTION 3 OPPORTUNITIES PLAN

[] Tier II – CONTRACTING

The contractor has identified _____ HACP resident-owned business(es) or _____ Section 3 business(es) which is/are 51 percent or more owned by Section 3 residents or 30 percent or more of their permanent full-time workforce are Section 3 residents. This will satisfy the contractor's Section 3 requirement covered under Contract/Purchase Order # _____.

In a one (1) page letter on your firm's letterhead:

- 1) Indicate the requirements, expressed in terms of percentage, of planned contracting dollars for the use of Section 3 business concerns as subcontractors.
- 2) A statement of the total dollar amount to be contracted, total dollar amount to be contracted to Section 3 business concerns for building trades, and total dollar amount to be contracted to Section 3 business concerns for other than building trades work (maintenance, repair, modernization, and development).
- 3) A description of the method used to develop the requirements above and the efforts to be undertaken by the contractor to meet those requirements.

[] Tier III - OTHER ECONOMIC OPPORTUNITIES

Firms may provide other economic opportunities to train and employ Section 3 residents or make a direct cash contribution to the HACP Education Fund. HACP has established the following minimum threshold requirements for provision of training or contribution to the HACP fund that provides other economic opportunities:

- a) Contractor incurs the cost of providing skilled training for residents in an amount commensurate with the sliding scale set forth in the Resident Hiring Scale; or,
- b) Contractor makes a contribution to the HACP Education Fund at Clean Slate E3 to provide assistance to residents to obtain training. The level of contribution would be commensurate with the sliding scale set forth in the Resident Hiring Scale.

Contractor shall provide, in a letter on firm letterhead:

- 1) Indication of the skilled training to be provided, the number of persons to be trained, the training provider, the cost of training, and the trainee recruitment plan; or,
- 2) Provide the amount of planned contribution to be made in relation to percentage of the contract labor hours costs. (Contribution checks should be made payable to: Clean Slate E3 Education Fund and mailed to Clean Slate E3, C/O Housing Authority of the City of Pittsburgh, Finance Department, 200 Ross Street, 9th Floor, Pittsburgh, PA 15219.

[] Tier IV – No New Hire Opportunity

If awarded this contract, the contractor will be able to fulfill the requirements of the IFB/RFP/RFQ with the existing work force. No new hires will be employed as a result of this award. If this position changes and hiring opportunities become necessary, the HACP Resident Employment Program will be notified.



SECTION 3 OPPORTUNITIES PLAN

By signing below, the Contractor hereby agrees to comply with the selected Section 3 requirements indicated above. To the extent that the completion of this form is contingent upon future information, for example price negotiations, request for specific services, etc., the undersigned hereby affirms and agrees to fully adhere to the spirit and intent of the HACP Section 3 Policy.

Furthermore, the undersigned acknowledges and affirms responsibility for completion and submission of this form as part of the response documentation for this Invitation for Bid or Request for Proposal. Failure to submit this form may jeopardize the responsiveness of your submission.

Company Name: _____

Name: _____

Title: _____

Signature: _____ Date: _____

Witness Name: _____

Witness Signature: _____ Date: _____

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH
MBE/WBE SOLICITATION AND COMMITMENT RECORD

SOLICITATION AND COMMITMENT STATEMENT
MINORITY (MBE) AND FEMALE (WBE) OWNED BUSINESS ENTERPRISES

BID NUMBER	NAME OF BIDDER	ADDRESS		PHONE	
List below All MBE/WBE's that were solicited - whether or not a commitment was obtained -- Copy this form as necessary					
____ MBE ____ WBE	TYPE OF SUBCONTRACT WORK OR MATERIALS	____ DATE SOLICITED BY PHONE BY MAIL		____ COMMITMENT MADE YES NO (IF YES, GIVE DATE)	GIVE REASON(S) IF NO COMMITMENT MADE
COMPANY NAME					
ADDRESS		QUOTE RECEIVED		AMOUNT COMMITTED	
CONTACT PERSON PHONE		YES	NO	DOLLAR AMOUNT \$	
				PERCENT OF TOTAL BID %	
____ MBE ____ WBE	TYPE OF SUBCONTRACT WORK OR MATERIALS	____ DATE SOLICITED BY PHONE BY MAIL		____ COMMITMENT MADE YES NO (IF YES, GIVE DATE)	GIVE REASON(S) IF NO COMMITMENT MADE
COMPANY NAME					
ADDRESS		QUOTE RECEIVED		AMOUNT COMMITTED	
CONTACT PERSON PHONE		YES	NO	DOLLAR AMOUNT \$	
				PERCENT OF TOTAL BID %	
____ MBE ____ WBE	TYPE OF SUBCONTRACT WORK OR MATERIALS	____ DATE SOLICITED BY PHONE BY MAIL		____ COMMITMENT MADE YES NO (IF YES, GIVE DATE)	GIVE REASON(S) IF NO COMMITMENT MADE
COMPANY NAME					
ADDRESS		QUOTE RECEIVED		AMOUNT COMMITTED	
CONTACT PERSON PHONE		YES	NO	DOLLAR AMOUNT \$	
				PERCENT OF TOTAL BID %	

Prepared by:

Title:

Phone:

NOTE: Certification and letters of intent for each MBE/WBE commitment must accompany this document.

MBE/WBE Participation Plan

I. SMALL BUSINESS PARTICIPATION

Is the Bidder a Small Business as defined by the size and standards in 13 CFR 121?

Yes _____ No _____

II. MINORITY BUSINESS PARTICIPATION

Is the Bidder classified as a Minority Business Enterprise?

Yes _____ No _____

If “No”, are any Subcontractors classified as Minority Business enterprises?

Yes _____ No _____

If “Yes”, please fill in the following chart:

Consulting Firm(s) (MBE)	\$ Value Contract	% of Fee

III. WOMEN-OWNED BUSINESS PARTICIPATION

Is the Bidder classified as a Woman-Owned Business Enterprise?

Yes _____ No _____

If “No”, are any Subcontractors classified as Women-Owned Business Enterprises?

Yes _____ No _____

If “Yes”, please fill in the following chart:

Consulting Firm(s) (WBE)	\$ Value Contract	% of Fee

****All MBE/WBE firms must be certified.**

In order for the MBE/WBE participation plan to be complete, copies of MBE/WBE certification must be included for all firms listed.

BIDDERS NAME: _____
 ADDRESS: _____
 TELEPHONE: _____
 CONTACT PERSON: _____
 PROPOSAL AND BID FOR: _____

[illegible]

Phone:

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH
MBE/WBE SOLICITATION AND COMMITMENT STATEMENT
ADDITIONAL INFORMATION SHEET

The bidder presents the following as additional and supplemental
information to its MBE/WBE Solicitation and
Commitment Statement.

Prepared by:

Title:

Phone:

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH
MBE/WBE EXHIBIT

MBE/WBE COMMITMENT WAIVER REQUEST FORM

BIDDER'S FIRM: _____
ADDRESS: _____
TELEPHONE: _____
CONTACT PERSON: _____
PROPOSAL AND BID FOR: _____

Waiver of the MBE/WBE participation requirement is requested for the following reasons:

Prepared by: _____ Title: _____ Phone: _____

NOTE: The fully completed MBE/WBE Solicitation and Commitment Statement must accompany this waiver request.

**Notice of Requirement for Affirmative Action
to Ensure Equal Employment Opportunity
(Executive Order 11625)**

1. The Offeror's or Bidder's attention is called to the "Equal Opportunity Clause" and the "Standard Federal Equal Employment Specifications" set forth herein.
2. The goals for minority and female participation at the Housing Authority of the City of Pittsburgh are pursuant to the Mayor's promulgated Executive Order, and the action of the Housing Authority Board. Expressed in percentage terms for the Contractor's aggregate workforce in each trade on all construction work in the covered area, these goals are seventeen percent (18%) of the total cost of the contract to be expended for minority participation and six percent (7%) for women participation. These goals are applicable to all the Contractor's construction work (whether or not it is Federal or federally assisted) performed in the covered area. If the contractor performs construction work in a geographical area located outside of the covered area, it shall apply the goals established for such geographical area where the work is actually performed. With regard to this second area, the contractor also is subject to the goals for both its federally involved and nonfederally involved construction.

The Contractor's compliance with the Executive Order and the regulations in Section 41 CFR Part 60-4 shall be based on its implementation of the Equal Opportunity Clause, specific affirmative action obligations required by the specifications set forth in Section 41 CFR Part 60-4.3(a), and its efforts to meet the goals. The hours of minority and female employment and training must be substantially uniform throughout the length of the contract, and in each trade, and the contractor shall make a good faith effort to employ minorities and women evenly on each of its projects. The transfer of minority or female employees or trainees from Contractor to Contractor or from project to project for the sole purpose of meeting the Contractor's goals shall be a violation of the contract, the Executive Order and the regulations in Section 41 CFR Part 60-4. Compliance with the goals will be measured against the total work hours performed.

3. The Contractor shall provide written notification, within 10 working days of award of any construction subcontract in excess of \$10,000 at any tier for construction work under the contract resulting from this solicitation, to:

LaVaris Ross, Labor Relations Specialist
U.S. Department of Housing and Urban Development
Office of Labor Relations
City Crescent Building
10 S. Howard Street, 5th Floor
Baltimore, MD 21201

The notification shall list the name, address and telephone number of the subcontractor; employer identification number of the subcontractor; estimated dollar amount of the subcontract; estimated starting and completion dates of the subcontract; and the geographical area in which the subcontract is to be performed.

4. As used in this Notice, and in the contract resulting from this solicitation, the "covered area" is within the Commonwealth of Pennsylvania, County of Allegheny, City of Pittsburgh.



Development & Modernization
100 Ross Street, Suite 200
Pittsburgh, PA 15219
(412) 456-5020
www.hacp.org

NOTICE TO ALL PROSPECTIVE BIDDERS

**REQUEST FOR MANPOWER PLAN
QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS FACILITY
SERVICES SITE (AMP-09)**

HACP CONTRACT No. 600-22-18

Each bid must include a separate Manpower Plan and Major Equipment List for this Invitation for Bids. The Manpower Plan must include (1) the names of the bidder's personnel to be assigned to the Project, (2) trade/position, (3) Social Security Number or Driver's License Number and (4) Employee Date of Hire.

In the event you are bidding on multiple HACP construction work, each bid must include a separate Manpower Plan and Major Equipment List that clearly demonstrates that the bidder has the capacity and will not use the same personnel and equipment on more than one HACP construction work that are being executed simultaneously within the next 180 days.

HACP will use this information to determine whether the bidder has the capacity to perform the work.

Please acknowledge receipt of this Notice by completing the information below and the attached and including copies in your bid.

Bidder's Name: _____

Name of the Person Signing the Bid: _____

Signature of the Person Signing the Bid: _____

Bid Due Date: _____



Development & Modernization
100 Ross Street, Suite 200
Pittsburgh, PA 15219
(412) 456-5020
www.hacp.org

Bidder's Planned Manpower

Provide Employee Name, Trade/Position, Social Security Number or Driver's License Number and Date of Hire for each employee:
(use additional sheets if necessary).

Name	Position	Social Security No. or Driver's License No.		Date of Hire



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SPECIAL PROVISIONS
FOR INVITATION FOR BIDS (IFB)

REQUEST FOR INFORMATION

Each bidder must submit the following information to assist the Owner to determine if the Bidder has the capacity to perform the required work under this **Project Name:** _____ **IFB No.** _____.

Bidder's Capacity

Provide information demonstrating the Bidder's ability to provide the resources necessary for the timely and efficient implementation of the construction work. Due to the nature of this procurement, capacity will also be evaluated based on the Bidder's ability to complete the work on time and within budget, therefore, please describe the Bidder's Capacity as follows:

1. Manpower Plan and Major Equipment List (Please complete **Form 00435-1 & 2**).
2. List a maximum of three-(3) current or completed *Housing Authority of the City of Pittsburgh* related projects, the **Initial Contract Value, Change Orders, if any, and Final Contract Value**. If the project was not completed within budget and on time, please explain the circumstances and/or justification for the change order(s): Please attach a separate sheet if you do not have sufficient space.

<u>Project #</u>	<u>Initial Contract Value</u>	<u>Change Order(s)</u>	<u>Final Contract Value</u>

- a.
- b.
- c.

Justification for Change Orders/Schedule: _____

3. List at least three-(3) other Owners including one current or completed project plus the following information:

<u>Vendor's Name & Contact #</u>	<u>Initial Contract Value</u>	<u>Change Order(s)</u>	<u>Final Contract Value</u>

- a.
- b.
- c.

Justification for Change Orders/Schedule: _____

The Bidder hereby certifies that the information provided above is accurate/correct and provision of false information can be a basis for the rejection of this bid:

Bidder's Name: _____ Bidder's Signature: _____
Date: _____



Development & Modernization
100 Ross Street, Suite 200
Pittsburgh, PA 15219
(412) 456-5020
www.hacp.org

NOTICE TO ALL PROSPECTIVE BIDDERS

**Previous Related Experience
for**

QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS FACILITY SERVICES SITE (AMP-09)

HACP CONTRACT NO. 600-22-18

The bidder shall list three (3) firms, governmental units, or persons for whom the bidder has previously performed work of the nature requested under this IFB. Bidder shall list as references all housing authorities, including HACP, for whom the bidder has previously performed work of the nature requested under this IFB. HACP reserves the right to contact such persons at anytime prior to award and the bidder agrees that HACP may rely on information provided by such persons to determine the bidder's responsibility.

In addition to the references, all bidders will provide the last three jobs they performed, contact information from the job and all change orders related to the job and the reason for each.

All bidders will provide information on the most recent HACP job to include all change order information and the reason for each. The most recent HACP job can be one of the 3 last jobs performed if that is the case.

Reference 1			
Project:			
Contact:			
Contact Telephone Number:			
Contract Amount:			
Change Orders			
Number	Total \$ Value per Change	Description of Change	Reason for Change
1			
2			
3			
4			
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10			



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In addition to the references, all bidders will provide the last three jobs they performed, contact information from the job and all change orders related to the job and the reason for each.

All bidders will provide information on the most recent HACP job to include all change order information and the reason for each. The most recent HACP job can be one of the 3 last jobs performed if that is the case.

Reference 2			
Project:			
Contact:			
Contact Telephone Number:			
Contract Amount:			
Change Orders			
Number	Total \$ Value per Change	Description of Change	Reason for Change
1			
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4			
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In addition to the references, all bidders will provide the last three jobs they performed, contact information from the job and all change orders related to the job and the reason for each.

All bidders will provide information on the most recent HACP job to include all change order information and the reason for each. The most recent HACP job can be one of the 3 last jobs performed if that is the case.

Reference 3			
Project:			
Contact:			
Contact Telephone Number:			
Contract Amount:			
Change Orders			
Number	Total \$ Value per Change	Description of Change	Reason for Change
1			
2			
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In addition to the references, all bidders will provide the last three jobs they performed, contact information from the job and all change orders related to the job and the reason for each.

All bidders will provide information on the most recent HACP job to include all change order information and the reason for each. The most recent HACP job can be one of the 3 last jobs performed if that is the case.

Reference 4			
Project:			
Contact:			
Contact Telephone Number:			
Contract Amount:			
Change Orders			
Number	Total \$ Value per Change	Description of Change	Reason for Change
1			
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In addition to the references, all bidders will provide the last three jobs they performed, contact information from the job and all change orders related to the job and the reason for each.

All bidders will provide information on the most recent HACP job to include all change order information and the reason for each. The most recent HACP job can be one of the 3 last jobs performed if that is the case.

Reference 5			
Project:			
Contact:			
Contact Telephone Number:			
Contract Amount:			
Change Orders			
Number	Total \$ Value per Change	Description of Change	Reason for Change
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In addition to the references, all bidders will provide the last three jobs they performed, contact information from the job and all change orders related to the job and the reason for each.

All bidders will provide information on the most recent HACP job to include all change order information and the reason for each. The most recent HACP job can be one of the 3 last jobs performed if that is the case.

Reference 6			
Project:			
Contact:			
Contact Telephone Number:			
Contract Amount:			
Change Orders			
Number	Total \$ Value per Change	Description of Change	Reason for Change
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In addition to the references, all bidders will provide the last three jobs they performed, contact information from the job and all change orders related to the job and the reason for each.

All bidders will provide information on the most recent HACP job to include all change order information and the reason for each. The most recent HACP job can be one of the 3 last jobs performed if that is the case.

Reference 7			
Project:			
Contact:			
Contact Telephone Number:			
Contract Amount:			
Change Orders			
Number	Total \$ Value per Change	Description of Change	Reason for Change
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***All contractors MUST submit 3 references and most recent HACP Job if applicable.**

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

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

Representations, Certifications, and Other Statements of Bidders

Public and Indian Housing Programs

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1. Certificate of Independent Price Determination

(a) The bidder certifies that--

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

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

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

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

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

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

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

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

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

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

☒ [Contracting Officer check if following paragraph is applicable]

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

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

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

2. Contingent Fee Representation and Agreement

(a) Definitions. As used in this provision:

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

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

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

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

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

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

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

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

(a) The definitions and prohibitions contained in Section 1352 of title 31, United States Code, are hereby incorporated by reference in paragraph (b) of this certification.

(b) The bidder, by signing its bid, hereby certifies to the best of his or her knowledge and belief as of December 23, 1989 that:

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

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

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

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

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

4. Organizational Conflicts of Interest Certification

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

(a) Result in an unfair competitive advantage to the bidder; or,
(b) Impair the bidder's objectivity in performing the contract work.
[] In the absence of any actual or apparent conflict, I hereby certify that to the best of my knowledge and belief, no actual or apparent conflict of interest exists with regard to my possible performance of this procurement.

5. Bidder's Certification of Eligibility

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

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

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

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

6. Minimum Bid Acceptance Period

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

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

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

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

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

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

7. Small, Minority, Women-Owned Business Concern Representation

The bidder represents and certifies as part of its bid/ offer that it --

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

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

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

(Check the block applicable to you)

[] Black Americans	[] Asian Pacific Americans
[] Hispanic Americans	[] Asian Indian Americans
[] Native Americans	[] Hasidic Jewish Americans

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

The bidder represents and certifies that it:

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

(b) [] is, [] is not an Indian organization. "Indian organization," as used in this provision, means the governing body of any Indian tribe or entity established or recognized by such governing body. Indian "tribe" means any Indian tribe, band, group, pueblo, or

community including Native villages and Native groups (including corporations organized by Kenai, Juneau, Sitka, and Kodiak) as defined in the Alaska Native Claims Settlement Act, which is recognized by the Federal Government as eligible for services from the Bureau of Indian Affairs.

9. Certification of Eligibility Under the Davis-Bacon Act (applicable to construction contracts exceeding \$2,000)

- (a) By the submission of this bid, the bidder certifies that neither it nor any person or firm who has an interest in the bidder's firm is a person or firm ineligible to be awarded contracts by the United States Government by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
- (b) No part of the contract resulting from this solicitation shall be subcontracted to any person or firm ineligible to be awarded contracts by the United States Government by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).
- (c) The penalty for making false statements is prescribed in the U. S. Criminal Code, 18 U.S.C. 1001.

10. Certification of Nonsegregated Facilities (applicable to contracts exceeding \$10,000)

- (a) The bidder's attention is called to the clause entitled **Equal Employment Opportunity** of the General Conditions of the Contract for Construction.
- (b) "Segregated facilities," as used in this provision, means any waiting rooms, work areas, rest rooms and wash rooms, restaurants and other eating areas, time clocks, locker rooms and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees, that are segregated by explicit directive or are in fact segregated on the basis of race, color, religion, or national origin because of habit, local custom, or otherwise.
- (c) By the submission of this bid, the bidder certifies that it does not and will not maintain or provide for its employees any segregated facilities at any of its establishments, and that it does not and will not permit its employees to perform their services at any location under its control where segregated facilities are maintained. The bidder agrees that a breach of this certification is a violation of the Equal Employment Opportunity clause in the contract.
- (d) The bidder further agrees that (except where it has obtained identical certifications from proposed subcontractors for specific time periods) prior to entering into subcontracts which exceed \$10,000 and are not exempt from the requirements of the Equal Employment Opportunity clause, it will:
 - (1) Obtain identical certifications from the proposed subcontractors;
 - (2) Retain the certifications in its files; and
 - (3) Forward the following notice to the proposed subcontractors (except if the proposed subcontractors have submitted identical certifications for specific time periods):

Notice to Prospective Subcontractors of Requirement for Certifications of Nonsegregated Facilities

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

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

11. Clean Air and Water Certification (applicable to contracts exceeding \$100,000)

The bidder certifies that:

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

12. Previous Participation Certificate (applicable to construction and equipment contracts exceeding \$50,000)

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

13. Bidder's Signature

The bidder hereby certifies that the information contained in these certifications and representations is accurate, complete, and current.

(Signature and Date)

(Typed or Printed Name)

(Title)

(Company Name)

(Company Address)

Previous Participation Certification

OMB Approval No. 2502-0118
(Exp. 05/31/2019)

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

US Department of Agriculture Farmers Home Administration

Part I to be completed by Controlling Participant of Covered Projects (See instructions) Reason for submission:		For HUD HQ/FmHA use only	
1. Agency name and City where the application is filed		2. Project Name, Project Number, City and Zip Code	
3. Loan or Contract amount \$	4. Number of Units or Beds	5. Section of Act	6. Type of Project (check one) ☐ Existing ☐ Rehabilitation ☐ Proposed (New)

7. List all proposed Controlling Participants and attach organization chart for all organizations

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

Certifications: The controlling participants(s) listed above hereby apply to HUD or USDA FmHA, as the case maybe, for approval to participate as controlling participant(s) in the role(s) and project listed above. The controlling participant(s) each certify that all the statements made on this form are true, complete and correct to the best of their knowledge and belief and are made in good faith, including any Exhibits attached to this form.

Warning: HUD will prosecute false claims and statements. Conviction may result in criminal and/or civil penalties. The controlling participants(s) further certify that to the best of their knowledge and belief:

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

Name of Controlling Participant	Signature of Controlling Participant	Certification Date (mm/dd/yyyy)	Area Code and Tel. No.
This form prepared by (print name)		Area Code and Tel. No.	

Previous Participation Certification

OMB Approval No. 2502-0118

(Exp. 05/31/2019)

Schedule A: List of Previous Projects and Section 8 Contracts. Below is a complete list of the controlling participants' previous participation projects and participation history in multifamily Housing programs of HUD/FmHA, State and local Housing Finance Agencies. **Note:** Read and follow the instruction sheet carefully. Make full disclosure. Add extra sheets if you need more space. Double check for accuracy. If no previous projects, write by your name, **"No previous participation, First Experience"**.

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

Part II- For HUD Internal Processing Only

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

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

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

Carefully read these instructions and the applicable regulations. A copy of those regulations published at 24 C.F.R. part 200, subpart H, can be obtained on-line at www.gpo.gov and from the Account Executive at any HUD Office. Type or print neatly in ink when filling out this form. Mark answers in all blocks of the form. If the form is not filled completely, it will delay approval of your application.

Attach extra sheets as you need them. Be sure to indicate "Continued on Attachments" wherever appropriate. Sign each additional page that you attach if it refers to you or your record. **Carefully read the certification before you sign it.** Any questions regarding the form or how to complete it can be answered by your HUD Account Executive.

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

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

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

Who Must Sign and File Form HUD-2530: Form HUD-2530 must be completed and signed by all Controlling Participants of Covered Projects, as such terms are defined in 24 CFR 200.212, and as further clarified by the Processing Guide referenced in 24 CFR 200.210(b) and made available on the HUD website at: http://portal.hud.gov/hudportal/HUD?src=/program_offices/housing/mfh/prevparticipation.

Where and When Form HUD-2530 Must Be Filed: The original of this form must be submitted to the HUD Office where your project application will be processed at the same time you file your initial project application. This form must be filed with applications for projects listed in 24 CFR 200.214 and for the Triggering Events listed at 24 CFR 200.218.

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

Specific Line Instructions are set forth in the Processing Guide.

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

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

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

A response is mandatory. Failure to provide any of the information will result in your disapproval of participation in this HUD program.

SPECIAL PROVISIONS

NOTICE TO ALL PROSPECTIVE BIDDERS

QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS FACILITY SERVICES SITE (AMP-09)

Documents Required for Payment
HACP Contract No.: 600-22-18

Pursuant to Sections 27, 38, 40 and 46 of the General Conditions for this Contract, each contractor must submit the following required documents with each Payment Estimate (“PE”) in order for HACP to process a PE as follows:

A. Periodic Estimate – HUD 51001

B. Schedule of Stored Materials – HUD 51003 (if applicable)

C. Summary of Stored Materials – HUD 51004 (if applicable)

D. Schedule of Change Orders – HUD 51002 (if applicable)

E. Progress Payment Certification

F. Current/Approved Certified Payrolls (submitted to HACP’s Davis-Bacon Wage Clerk).

G. MBE/WBE Utilization Report

H. Section 3 Summary Report

Signature of Authorized Officer: _____

Date: _____

THIS DOCUMENT MUST BE SIGNED.

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

**NON-COLLUSION
AFFIDAVIT**

State of _____

County of _____

_____, being first duly sworn, deposes and says:
(Printed or Typed Name)

That he/she is
(Proprietor, General Partner, President or Vice President)

of _____; and having submitted the foregoing Bid for
(Bidder Name)

QUONSET HUT RENOVATION AT
NORTHVIEW HEIGHTS FACILITY
SERVICES SITE (AMP-09)
(Project Name)

600-22-18
(HACP Contract No.);

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

(Signature and Date)

Subscribed and sworn to before me

this _____ day of _____, 20__

My Commission expires _____, 20__

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

FORM OF AGREEMENT

THIS AGREEMENT, made this ____ day of _____ in the year Two Thousand ____ (20) by and between:

- ☐ An individual doing business in his/her own name
- ☐ An individual doing business under a fictitious or assumed name
- ☐ A partnership
- ☐ A Corporation

(Hereinafter called the Contractor)

AND

The Housing Authority of the City of Pittsburgh (hereinafter called the Authority)
200 Ross Street
Pittsburgh, PA 15219

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

ARTICLE 1, STATEMENT OF WORK

The Contractor shall provide all labor, materials and equipment, and services necessary to perform and complete all work required in accordance with D&D Engineering, Inc. drawings for QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS FACILITY SERVICES SITE (AMP-09) dated February 1, 2017 and Project Manual dated May 28, 2018 regarding:

CONTRACT NO. 600-22-18

and addenda thereto numbered _____, all as prepared by _____, which said specifications, drawings, and addenda are incorporated herein by reference and are a part hereof.

The work shall begin at the time stipulated in the NOTICE TO PROCEED and in no event exceeding 180 consecutive calendar days from notice to proceed.

ARTICLE 2, THE CONTRACT PRICE

The Authority shall pay the contractor for the performance of the Contract in current fund, subject to additions and deductions as provided in the specifications.

_____ (\$ _____)

ARTICLE 3, CONTRACT DOCUMENTS

The Contract shall consist of the following component parts:

- a. This Agreement
- b. Project Manual (including all component parts) dated May 28, 2018.
- c. Project Drawings issued by D&D Engineering, Inc. dated February 1, 2017.

This Agreement, 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 subsequent parts may establish more specific criteria or language in which case these criteria and language shall govern. The various provisions in Addenda shall be construed in the order of preference of the component part of the Contract which each modified.

SIGNED, SEALED AND DELIVERED IN _____ ORIGINAL COUNTERPARTS

this _____ day of _____ 20____.

IF THE PRINCIPAL IS AN INDIVIDUAL, SIGN HERE

By signing this Form of Agreement, if the Housing Authority accepts and signs Contract No. 600-22-18 this contract shall be binding on both parties.

(Printed or Typed Name)

(Printed or Typed Name)

Witness

{

(Signature and Date)

Principal

{

(Signature and Date)

IF THE PRINCIPAL IS A PARTNERSHIP, SIGN HERE

By signing this Form of Agreement, if the Housing Authority accepts and signs Contract No. 600-22-18
this contract shall be binding on both parties.

<i>(Printed or Typed Name)</i>	<i>(Printed or Typed Name)</i>
<i>Witness</i>	<i>Partner*</i>
{	{
<i>(Signature and Date)</i>	<i>(Signature and Date)</i>

<i>(Printed or Typed Name)</i>	<i>(Printed or Typed Name)</i>
<i>Witness</i>	<i>Partner*</i>
{	{
<i>(Signature and Date)</i>	<i>(Signature and Date)</i>

* If the Bidder is a partnership, the Form of Agreement must be signed in the name of the partnership by at least two general partners, whose names and addresses must be listed on the certificate on page BF-3-P of the Bid.

IF THE PRINCIPAL IS A CORPORATION, SIGN HERE

By signing this Form of Agreement, if the Housing Authority accepts and signs Contract No. 600-22-18 this contract shall be binding on both parties.

(CORPORATE
SEAL)

(Corporate Name)

(Printed or Typed Name)

(Printed or Typed Name)

Witness

{

President
V.P. **

{

(Signature and Date)

(Signature and Date)

(Corporate Title)

(Corporate Title)

** If the bidder is a corporation, the Form of Agreement must be executed in the Corporation's correct corporate name by its President or Vice President and attested to by its Secretary or Assistant Secretary or Treasurer or Assistant Treasurer, and the Certification of Corporate Principal (Doc. 00625) must be executed by the Secretary or Assistant Secretary.

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the
Secretary/Assistant Secretary of the Corporation named a Bidder herein; that
(Circle one)

_____ who signed this Bid on behalf of the

Corporation was then _____ of said Corporation that I know his
signature and his signature thereto is genuine; and that said Bid was duly signed, sealed and
attested in behalf of said Corporation by authority of its governing body.

(CORPORATE
SEAL)

(Signature and Date)

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

Secretary

Kim Detrick, Contracting Officer

Attest

Principal

{

{

(Signature and Date)

(Signature and Date)

Darrell Davis, Chief Development Officer

Approved as to

Contents and Costs

{

(Signature and Date)

Associate Counsel

Approved as to

Form

{

(Signature and Date)

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

CONTRACTING OFFICER CERTIFICATION

I _____ certify that I am the Recording Secretary of the Housing Authority of the City of Pittsburgh; that _____, who signed this Contract on behalf of the Housing Authority, was then Contracting Officer of said Authority; that the said Contract was duly signed for and on behalf of the Housing Authority of the City of Pittsburgh.

Secretary (SEAL)

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

PERFORMANCE BOND

THIS BOND IS ISSUED SIMULTANEOUSLY WITH PAYMENT BOND IN FAVOR OF THE
AUTHORITY CONDITIONED ON THE FULL AND FAITHFUL PERFORMANCE OF THE CONTRACT.

KNOW ALL MEN BY THESE PRESENTS, that we,

_____, as Principal, and
(Insert name and address of contractor exactly as it appears on Form of Agreement)

_____, as Sureties, are
held and firmly bound unto the **Housing Authority of the City of Pittsburgh**, its certain attorney, successors, or assigns
(the Obligee, hereinafter called the "Authority") in the penal sum of

_____ Dollars (\$_____)

lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our
heirs, personal representatives, successors, and assigns, jointly and severally, firmly by these presents:

WHEREAS, the Principal heretofore has submitted to the said Authority a certain bid, dated

_____, 20_____ (the "Bid"), for construction of
(Insert date of bid)

(Insert name of project exactly as it appears on Form of Agreement)

pursuant to specifications, drawings and other related documents constituting the Invitation for Bids (the "IFB"); and

WHEREAS, the said Authority is a "Contracting body" under provisions of Act No. 385 of the General Assembly
of the Commonwealth of Pennsylvania, approved by the Governor on December 20, 1967, known and cited as the
"Public Works Contractors' Bond Law of 1967" (8 P.S. 191-202) (the "Act"); and

WHEREAS, the Act, in Section 3 (a), requires that, before an award shall be made to the Principal shall furnish this
Bond to the said Authority, with this Bond to become binding upon the award of a Contract to the Principal by the said
Authority in accordance with the Bid; and

WHEREAS, it also is a condition of the IFB that this Bond shall be furnished by the Principal to the said Authority;
and

WHEREAS, Under the Invitation for Bids, it is provided, inter alia, that if the Principal shall furnish this Bond to
the said Authority, and if the said Authority shall make an award to the Principal in accordance with the Bid, then the
Principal and the said Authority shall enter into a contract with respect to performance of such work (the "Contract"), the
Form of Agreement for which is set forth in the IFB.

NOW, therefore, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the principal shall faithfully perform the Contract on his part as of the time and in the manner therein provided and satisfy all claims and demands incurred in or for the same, or growing out of the same, or for injury or damages to persons or property in the performance thereof, and shall fully indemnify and save harmless the said Authority from any and all cost and damage which the said Authority may suffer by reason of the principal's failure to do so, and shall fully reimburse and repay the said Authority any and all outlay and expense which it incurs by reason of any such default, then this obligation shall be null and void, otherwise it shall remain in full force and virtue.

It is further understood and agreed that the principal shall guarantee for a period of one (1) year from completion date of the contract against defects in workmanship or materials in accordance with the terms of the Contract.

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

SIGNED, SEALED AND DELIVERED IN _____ ORIGINAL COUNTERPARTS
(2 required by Authority)

this _____ day of _____ 20____.

IF THE PRINCIPAL IS AN INDIVIDUAL, SIGN HERE

_____ (Printed or Typed Name)	_____ (Printed or Typed Name)
<i>Witness</i>	<i>Principal</i>
{	{
_____ (Signature and Date)	_____ (Signature and Date)

IF THE PRINCIPAL IS A PARTNERSHIP, SIGN HERE

	<i>(Printed or Typed Name)</i>		<i>(Printed or Typed Name)</i>
<i>Witness</i>		<i>Partner*</i>	
	{		{
	<i>(Signature and Date)</i>		<i>(Signature and Date)</i>

	<i>(Printed or Typed Name)</i>		<i>(Printed or Typed Name)</i>
<i>Witness</i>		<i>Partner*</i>	
	{		{
	<i>(Signature and Date)</i>		<i>(Signature and Date)</i>

* If the Bidder is a partnership, the Bond must be signed in the name of the partnership by at least two general partners, whose names and addresses must be listed on the certificate on page BF-3-P of the Bid.

IF THE PRINCIPAL IS A CORPORATION, SIGN HERE

(CORPORATE
SEAL)

(Corporate Name)

(Printed or Typed Name)

(Printed or Typed Name)

Witness

President
V.P.**

{

{

(Signature and Date)

(Signature and Date)

(Corporate Title)

(Corporate Title)

** If the bidder is a corporation, the Bond must be executed in the Corporation's correct corporate name by its President or Vice President and attested to by its Secretary or Assistant Secretary or Treasurer or Assistant Treasurer, and the Certification of Corporate Principal below must be executed by the Secretary or Assistant Secretary.

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the
Secretary/Assistant Secretary of the Corporation named a Bidder herein; that
(Circle one)

_____ who signed this Bid on behalf of the

Corporation was then _____ of said Corporation that I know his signature and his
signature thereto is genuine; and that said Bid was duly signed, sealed and attested in behalf of said Corporation by
authority of its governing body.

(CORPORATE
SEAL)

(Signature and Date)

SURETY SIGN HERE

(SURETY
SEAL)

(Printed or Typed Name)

(Printed or Typed Name)

Attest
{

(Signature and Date)

Surety ***
{

(Signature and Date)

***Power of attorney must be attached to this Bid Bond.

The rate of premium charged is \$ _____ per thousand.
(To be filled in by Surety)

The total amount of premium charged is \$ _____
(To be filled in by Surety)

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

PAYMENT BOND
(Labor and Materialmen's Bond)

THIS BOND IS ISSUED SIMULTANEOUSLY WITH PERFORMANCE BOND IN FAVOR OF THE
AUTHORITY CONDITIONED ON THE FULL AND FAITHFUL PERFORMANCE OF THE CONTRACT.

KNOW ALL MEN BY THESE PRESENTS, that we,

_____, as Principal, and
(Insert name and address of Contractor exactly as it appears on Form of Agreement)

_____, as Sureties, are
held and firmly bound unto the **Housing Authority of the City of Pittsburgh**, its certain attorney, successors, or assigns
(the Obligee, hereinafter called the "Authority") in the penal sum of

_____ Dollars (\$_____)

lawful money of the United States, for the payment of which sum well and truly to be made, we bind ourselves, our
heirs, personal representatives, successors, and assigns, jointly and severally, firmly by these presents:

WHEREAS, the Principal heretofore has submitted to the said Obligee a certain bid, dated

_____, 20_____ (the "Bid"), for construction of
(Insert date of bid)

(Insert name of project exactly as it appears on Form of Agreement)

pursuant to specifications, drawings and other related documents constituting the Invitation for Bids (the "IFB"); and

WHEREAS, the said Authority is a "Contracting body" under provisions of Act No. 385 of the General Assembly
of the Commonwealth of Pennsylvania, approved by the Governor on December 20, 1967, known and cited as the
"Public Works Contractors' Bond Law of 1967" (8 P.S. 191-202) (the "Act"); and

WHEREAS, the Act, in Section 3 (a), requires that, before an award shall be made to the Principal shall furnish this
Bond to the said Authority, with this Bond to become binding upon the award of a Contract to the Principal by the said
Authority in accordance with the Bid; and

WHEREAS, it also is a condition of the IFB that this Bond shall be furnished by the Principal to the said Authority;
and

WHEREAS, Under the Invitation for Bids, it is provided, inter alia, that if the Principal shall furnish this Bond to the said Authority, and if the said Authority shall make an award to the Principal in accordance with the Bid, then the Principal and the said Authority shall enter into a contract with respect to performance of such work (the "Contract"), the Form of Agreement for which is set forth in the IFB.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH that if said principal and all subcontractors to whom any portion of the work provided for in said contract is sublet and all assignees of said principal and of such subcontractors shall promptly make payment 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 services enter into and become component parts of the work or improvement contemplated in said contract, or in any amendment or extension of or addition to said Contract, then the above obligation shall be void; otherwise to remain in full force and effect. PROVIDED, however, that this bond is subject to the following conditions and limitations.

(a) All persons who have performed labor, rendered services or furnished materials or machinery, shall have direct right of action against the principal and surety on this bond, which right of action shall be asserted in proceedings instituted in the State in which such labor was performed, services rendered or materials furnished (or where labor has been performed, services rendered or materials furnished under said Contract is more than one State, then in any such State). Insofar as permitted by the laws of such State, such right of action shall be asserted in a proceeding instituting such action and any or all other persons having claims hereunder, and any other person having a claim hereunder shall have the right to be made a party to such proceeding (but not later than one year after the complete performance of said Contract and final settlement thereof) and to have such claim adjudicated in such action and judgment rendered thereon.

(b) The surety shall not be liable hereunder for any damages or compensation recoverable under any workmen's compensation or employer's liability statute.

(c) In no event shall the surety be liable for a greater sum than the penalty of this bond, or subject to any suit, action or proceeding thereon that is instituted later than one year after the complete performance of said contract and final settlement thereof.

(d) As used herein: The term "person" refers to any individual, firm or corporation who have furnished materials or machinery or public utility services to be used on or incorporated in the work or the prosecution thereof provided for in said Contract or in any amendment or extension of or addition to said Contract, and/or to any person engaged in the prosecution of the work provided for in said Contract or in any amendment or extension of or addition to said Contract, who is an agent, servant or employee of the principal, or of any subcontractor, or of any assignee of said principal or of any subcontractor and also anyone so engaged who performs the work of a laborer or of a mechanic regardless of any contractual relationship between the principal, or any sub-contractor, or any assignee of said principal or of said subcontractor, and such laborer or mechanic, but shall not include office employees not regularly stationed at the site of the work.

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

SIGNED, SEALED AND DELIVERED IN _____ ORIGINAL COUNTERPARTS
(2 required by Authority)

this _____ day of _____ 20_____.

IF THE PRINCIPAL IS AN INDIVIDUAL, SIGN HERE

	_____ (Printed or Typed Name)		_____ (Printed or Typed Name)
<i>Witness</i>		<i>Principal</i>	
{		{	
	_____ (Signature and Date)		_____ (Signature and Date)

IF THE PRINCIPAL IS A PARTNERSHIP, SIGN HERE

	<i>(Printed or Typed Name)</i>		<i>(Printed or Typed Name)</i>
<i>Witness</i>		<i>Partner*</i>	
{		{	
	<i>(Signature and Date)</i>		<i>(Signature and Date)</i>

	<i>(Printed or Typed Name)</i>		<i>(Printed or Typed Name)</i>
<i>Witness</i>		<i>Partner*</i>	
{		{	
	<i>(Signature and Date)</i>		<i>(Signature and Date)</i>

* If the Bidder is a partnership, the Bond must be signed in the name of the partnership by at least two general partners, whose names and addresses must be listed on the certificate on page BF-3-P of the Bid.

IF THE PRINCIPAL IS A CORPORATION, SIGN HERE

*(CORPORATE
SEAL)*

(Corporate Name)

(Printed or Typed Name)

(Printed or Typed Name)

Witness

President

{

*V.P.***

{

(Signature and Date)

(Signature and Date)

(Corporate Title)

(Corporate Title)

** If the bidder is a corporation, the Bond must be executed in the Corporation's correct corporate name by its President or Vice President and attested to by its Secretary or Assistant Secretary or Treasurer or Assistant Treasurer, and the Certification of Corporate Principal (Doc. 00625) must be executed by the Secretary or Assistant Secretary.

CERTIFICATE AS TO CORPORATE PRINCIPAL

I, _____, certify that I am the
Secretary/Assistant Secretary of the Corporation named a Bidder herein; that
(Circle one)

_____ who signed this Bid on behalf of the

Corporation was then _____ of said Corporation that I know his
signature and his signature thereto is genuine; and that said Bid was duly signed, sealed and
attested in behalf of said Corporation by authority of its governing body.

*(CORPORATE
SEAL)*

(Signature and Date)

SURETY SIGN HERE

(SURETY
SEAL)

	(Printed or Typed Name)		(Printed or Typed Name)
Attest		Surety	
	{		{
	(Signature and Date)		(Signature and Date)

The rate of premium charged is \$ _____ per thousand.
(To be filled in by Surety)

The total amount of premium charged is \$ _____
(To be filled in by Surety)

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. 3/31/2020)

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

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

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

Public reporting burden for this collection of information is estimated to average 1.0 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Responses to the collection of information are required to obtain a benefit or to retain a benefit.

The information requested does not lend itself to confidentiality.

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

Clause		Page	Clause		Page
1.	Definitions	2	Administrative Requirements		
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1. Definitions

- (a) "Architect" means the person or other entity engaged by the PHA to perform architectural, engineering, design, and other services related to the work as provided for in the contract. When a PHA uses an engineer to act in this capacity, the terms "architect" and "engineer" shall be synonymous. The Architect shall serve as a technical representative of the Contracting Officer. The Architect's authority is as set forth elsewhere in this contract.
- (b) "Contract" means the contract entered into between the PHA and the Contractor. It includes the forms of Bid, the Bid Bond, the Performance and Payment Bond or Bonds or other assurance of completion, the Certifications, Representations, and Other Statements of Bidders (form HUD-5370), these General Conditions of the Contract for Construction (form HUD-5370), the applicable wage rate determinations from the U.S. Department of Labor, any special conditions included elsewhere in the contract, the specifications, and drawings. It includes all formal changes to any of those documents by addendum, change order, or other modification.
- (c) "Contracting Officer" means the person delegated the authority by the PHA to enter into, administer, and/or terminate this contract and designated as such in writing to the Contractor. The term includes any successor Contracting Officer and any duly authorized representative of the Contracting Officer also designated in writing. The Contracting Officer shall be deemed the authorized agent of the PHA in all dealings with the Contractor.
- (d) "Contractor" means the person or other entity entering into the contract with the PHA to perform all of the work required under the contract.
- (e) "Drawings" means the drawings enumerated in the schedule of drawings contained in the Specifications and as described in the contract clause entitled Specifications and Drawings for Construction herein.
- (f) "HUD" means the United States of America acting through the Department of Housing and Urban Development including the Secretary, or any other person designated to act on its behalf. HUD has agreed, subject to the provisions of an Annual Contributions Contract (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.
- (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.

2. Contractor's Responsibility for Work

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

4. Other Contracts

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

Construction Requirements

5. Pre-construction Conference and Notice to Proceed

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

6. Construction Progress Schedule

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

7. Site Investigation and Conditions Affecting the Work

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

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

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

8. Differing Site Conditions

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

9. Specifications and Drawings for Construction

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

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

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

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

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

10. As-Built Drawings

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

11. Material and Workmanship

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

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

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

12. Permits and Codes

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

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

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

13. Health, Safety, and Accident Prevention

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

14. Temporary Heating

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

15. Availability and Use of Utility Services

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

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

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

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

17. Temporary Buildings and Transportation of Materials

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

18. Clean Air and Water

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

19. Energy Efficiency

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

20. Inspection and Acceptance of Construction

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

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

21. Use and Possession Prior to Completion

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

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

22. Warranty of Title

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

23. Warranty of Construction

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

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

24. Prohibition Against Liens

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

Administrative Requirements

25. Contract Period

this contract within 180 calendar days of the effective date of the contract, or within the time schedule established in the notice to proceed issued by the Contracting Officer.

26. Order of Provisions

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

27. Payments

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

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

- (d) The Contractor shall submit, on forms provided by the PHA, periodic estimates showing the value of the work performed during each period based upon the approved

submitted not later than 45 days in advance of the date set for payment and are subject to correction and revision as required. The estimates must be approved by the Contracting Officer with the concurrence of the Architect prior to payment. If the contract covers more than one project, the Contractor shall furnish a separate progress payment estimate for each.

- (e) Along with each request for progress payments and the required estimates, the Contractor shall furnish the following certification, or payment shall not be made: I hereby certify, to the best of my knowledge and belief, that

- (1) The amounts requested are only for performance in accordance with the specifications, terms, and conditions of the contract;
- (2) Payments to subcontractors and suppliers have been made from previous payments received under the contract, and timely payments will be made from the proceeds of the payment covered by this certification, in accordance with subcontract agreements; and,
- (3) This request for progress payments does not include any amounts which the prime contractor intends to withhold or retain from a subcontractor or supplier in accordance with the terms and conditions of the subcontract.

Name: _____

Title: _____

Date: _____

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

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

- (h) All material and work covered by progress payments made shall, at the time of payment become the sole property of the PHA, but this shall not be construed as (1) relieving the Contractor from the sole responsibility for all material and work upon which payments have been made or the restoration of any damaged work; or, (2) waiving the right of the PHA to require the fulfillment of all of the terms of the contract. In the event the work of the Contractor has been damaged by other contractors or persons other than employees of the PHA in the course of their employment, the Contractor shall restore such damaged work without cost to the PHA and to seek redress for its damage only from those who directly caused it.
- (i) The PHA shall make the final payment due the Contractor under this contract after (1) completion and final acceptance of all work; and (2) presentation of release of all claims against the PHA arising by virtue of this contract, other than claims, in stated amounts, that the Contractor has specifically excepted from the operation of the release. Each such exception shall embrace no more than one claim, the basis and scope of which shall be clearly defined. The amounts for such excepted claims shall not be included in the request for final payment. A release may also be required of the assignee if the Contractor's claim to amounts payable under this contract has been assigned.
- (j) Prior to making any payment, the Contracting Officer may require the Contractor to furnish receipts or other evidence of payment from all persons performing work and supplying material to the Contractor, if the Contracting Officer determines such evidence is necessary to substantiate claimed costs.
- (k) The PHA shall not; (1) determine or adjust any claims for payment or disputes arising there under between the Contractor and its subcontractors or material suppliers; or, (2) withhold any moneys for the protection of the subcontractors or material suppliers. The failure or refusal of the PHA to withhold moneys from the Contractor shall in 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 a adjustment based on defective specifications, no proposal for any change under paragraph (b) above shall be allowed for any costs incurred more than 20 days (5 days for oral orders) before the Contractor gives written notice as required. In the case of defective specifications for which the PHA is responsible, the equitable adjustment shall include any increased cost reasonably incurred by the Contractor in attempting to comply with the defective specifications.
- (e) The Contractor must assert its right to an adjustment under this clause within 30 days after (1) receipt of a written change order under paragraph (a) of this clause, or (2) the furnishing of a written notice under paragraph (b) of this clause, by submitting a written statement describing the general nature and the amount of the proposal. If the facts justify it, the Contracting Officer may extend the period for submission. The proposal may be included in the notice required under paragraph (b) above. No proposal by the Contractor for an equitable adjustment shall be allowed if asserted after final payment under this contract.
- (f) The Contractor's written proposal for equitable adjustment shall be submitted in the form of a lump sum proposal supported with an itemized breakdown of all increases and decreases in the contract in at least the following details:

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

30. Suspension of Work

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

been so suspended, delayed, or interrupted by any other cause, including the fault or negligence of the Contractor or for which any equitable adjustment is provided for or excluded under any other provision of this contract.

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

31. Disputes

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

32. Default

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

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

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

33. Liquidated Damages

- (a) If the Contractor fails to complete the work within the time specified in the contract, or any extension, as specified in the clause entitled Default of this contract, the Contractor shall pay to the PHA as liquidated damages, the sum of \$ 250.00 [Contracting Officer insert amount] for each day of delay. If different completion dates are specified in the contract for separate parts or stages of the work, the amount of liquidated damages shall be assessed on those parts or stages which are delayed. To the extent that the Contractor's delay or nonperformance is excused under another clause in this contract, liquidated damages shall not be due the PHA. The Contractor remains liable for damages caused other than by delay.
- (b) If the PHA terminates the Contractor's right to proceed, the resulting damage will consist of liquidated damages until such reasonable time as may be required for final

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

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

34. Termination for Convenience

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

35. Assignment of Contract

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

36. Insurance

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

- (a) The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, national origin, or handicap.
- (b) The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, religion, sex, national origin, or handicap. Such action shall include, but not be limited to, (1) employment, (2) upgrading, (3) 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 shall post in conspicuous places available to employees and applicants for employment the notices to be provided by the Contracting Officer that explain this clause.
- (d) The Contractor shall, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, state that all qualified applicants will receive consideration for employment without regard to race, color, religion, sex, national origin, or handicap.
- (e) The Contractor shall send, to each labor union or representative of workers with which it has a collective bargaining agreement or other contract or understanding, 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 shall comply with Executive Order 11246, as amended, and the rules, regulations, and orders of the Secretary of Labor.
- (g) The Contractor 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 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 determination that the Contractor is not in compliance with this clause or any rule, regulation, or order of the Secretary of Labor, this contract may be canceled, terminated, or suspended in whole or in part, and the Contractor may be declared ineligible for further Government contracts, or Federally assisted construction contracts under the procedures authorized in Executive Order 11246, as amended. In addition, sanctions may be imposed and remedies invoked against the Contractor as provided in Executive Order 11246, as amended, the rules, regulations, and orders of the Secretary of Labor, or as otherwise provided by law.
- (i) The Contractor shall include the terms and conditions of this clause in every subcontract or purchase order unless exempted by the rules, regulations, or orders of the Secretary of Labor issued under Executive Order 11246, as amended, so that these terms and conditions will be binding upon each subcontractor or vendor. The Contractor shall take such action with respect to any subcontract or purchase order as the Secretary of Housing and Urban Development or the Secretary of Labor may direct as a means of enforcing such provisions, including sanctions for noncompliance; provided that if the Contractor becomes involved in, or is threatened with, litigation with a subcontractor or vendor as a result of such direction, the Contractor may request the United States to enter into the litigation to protect the interests of the United States.
- (j) Compliance with the requirements of this clause shall be to the maximum extent consistent with, but not in derogation of, compliance with section 7(b) of the Indian Self-Determination and Education Assistance Act and the Indian Preference clause of this contract.

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

- (a) The work to be performed under this contract is subject to the requirements of section 3 of the Housing and Urban Development Act of 1968, as amended, 12 U.S.C. 1701u (section 3). The purpose of section 3 is to ensure that employment and other economic opportunities generated by HUD assistance or HUD-assisted projects covered by section 3, shall, to the greatest extent feasible, be directed to low- and very low-income persons, particularly persons who are recipients of HUD assistance for housing.
- (b) The parties to this contract agree to comply with HUD's regulations in 24 CFR Part 135, which implement section 3. As evidenced by their execution of this contract, the parties to this contract certify that they are under no contractual or other impediment that would prevent them from complying with the Part 135 regulations.
- (c) The contractor agrees to send to each labor organization or representative of workers with which the contractor has a collective bargaining agreement or other understanding, if any, a notice advising the labor organization or workers' representative of the contractor's commitments under this section 3 clause, and will post copies of the notice in conspicuous places at the work site where both employees and applicants for training and employment positions can see the notice. The notice shall describe the section 3 preference, shall set forth minimum number and job titles subject to hire, availability of apprenticeship and training positions, the qualifications for each; and the name and location of the person(s) taking applications for each of the positions; and the anticipated date the work shall begin.
- (d) The contractor agrees to include this section 3 clause in every subcontract subject to compliance with regulations in 24 CFR Part 135, and agrees to take appropriate action, as provided in an applicable provision of the subcontract or in this section 3 clause, upon a finding that the subcontractor is in violation of the regulations in 24 CFR Part 135. The contractor will not subcontract with any subcontractor where the contractor has notice or knowledge that the subcontractor has been found in violation of the regulations in 24 CFR Part 135.
- (e) The contractor will certify that any vacant employment positions, including training positions, that are filled (1) after the contractor is selected but before the contract is executed, and (2) with persons other than those to whom the regulations of 24 CFR Part 135 require employment opportunities to be directed, were not filled to circumvent the contractor's obligations under 24 CFR Part 135.
- (f) Noncompliance with HUD's regulations in 24 CFR Part 135 may result in sanctions, termination of this contract for default, and debarment or suspension from future HUD assisted contracts.
- (g) With respect to work performed in connection with section 3 covered Indian housing assistance, section 7(b) of the Indian Self-Determination and Education Assistance Act (25 U.S.C. 450e) also applies to the work to be performed under this contract. Section 7(b) requires that to the greatest extent feasible (i) preference and opportunities for training and employment shall be given to Indians, and (ii) preference in the award of contracts and subcontracts shall be given to Indian organizations and Indian-owned Economic Enterprises. Parties to this contract that are subject to the provisions of section 3 and section 7(b) agree to comply with section 3 to the maximum extent feasible, but not in derogation of compliance with section 7(b).

41. Interest of Members of Congress

No member 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 Federal appropriated funds to pay any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, and officer or employee of Congress, or an employee of a Member of Congress in connection with any of the following covered Federal actions: the awarding of any Federal contract; the making of any Federal grant; the making of any Federal loan; the entering into of any cooperative agreement; or the modification of any Federal contract, grant, loan, or cooperative agreement.
- (b) The Contractor further agrees to comply with the requirement of the Act to furnish a disclosure (OMB Standard Form LLL, Disclosure of Lobbying Activities) if any funds other than Federal appropriated funds (including profit or fee received under a covered Federal transaction) have been paid, or will be paid, to any person for influencing or attempting to influence an officer or employee of any agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with a Federal contract, grant, loan, or cooperative agreement.

44. Royalties and Patents

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

45. Examination and Retention of Contractor's Records

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

46. Labor Standards - Davis-Bacon and Related Acts

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

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

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

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

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

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

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

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

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

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

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

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

47. Non-Federal Prevailing Wage Rates

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

48. Procurement of Recovered Materials.

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



Development & Modernization
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**QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS
FACILITY SERVICES SITE (AMP-09)**

HACP Contract No. 600-22-18

SUPPLEMENTAL GENERAL CONDITIONS

SUPPLEMENTAL GENERAL CONDITIONS

To the extent that there is a conflict between the terms of the General Conditions and the terms of the Supplemental General Conditions, the terms of the Supplemental General Conditions shall govern to the extent of such conflict.

If HUD 5370 applies:

Section 31(e) of the General Conditions shall be deleted in its entirety and replaced by the following:

31(e). Forum. The Contracting Officer's decision shall be final unless, within thirty (30) days of receipt of the Contracting Officer's decision, the Contractor files suit in a court of competent jurisdiction.

If HUD 5370-EZ applies:

Section 3(d) of the General Conditions shall be deleted in its entirety and replaced by the following:

31(d). Forum. The Contracting Officer's decision shall be final unless, within thirty (30) days of receipt of the Contracting Officer's decision, the Contractor files suit in a court of competent jurisdiction.

If HUD 5370-C applies:

Section 1 Item 7(d) of the General Conditions shall be deleted in its entirety and replaced by the following:

Section 1 Item 7(d). Forum. The Contracting Officer's decision shall be final unless, within thirty (30) days of receipt of the Contracting Officer's decision, the Contractor files suit in a court of competent jurisdiction.

HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

Date: _____

Signature: _____
Contracting Officer

=====

Vendor Name(Insert vendor company name above)

Date: _____

Signature: _____

Title: _____

THE HOUSING AUTHORITY OF THE CITY OF PITTSBURGH

**QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS
FACILITY SERVICES SITE (AMP-09)**

HACP Contract No. 600-22-18

WAGE DETERMINATION SCHEDULE

The construction covered by this contract is subject to the requirements of Clause 47 **Labor Standards - Davis-Bacon and Related Acts** of the General Conditions of the Contract for Construction. In accordance with 47 (a)(1) the wage determination of the Secretary of Labor is attached.

General Decision Number: PA180001 03/16/2018 PA1

Superseded General Decision Number: PA20170001

State: Pennsylvania

Construction Type: Building

County: Allegheny County in Pennsylvania.

BUILDING ERECTION AND FOUNDATION EXCAVATION PROJECTS (does not include residential construction consisting of single family homes and apartmentns up to and including 4 stories) EXCLUDING SEWAGE AND TREATMENT PLANT PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of \$10.35 for calendar year 2018 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, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least \$10.35 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 calendar year 2018. The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/05/2018
1	01/12/2018
2	02/09/2018
3	03/16/2018

ASBE0002-001 08/01/2017

	Rates	Fringes

Asbestos Workers/Insulator

Includes the application of all insulating materials, protective coverings, coatings and finishings to all types of mechanical systems.....	\$ 39.76	24.17

BOIL0154-001 01/01/2017

	Rates	Fringes

BOILERMAKER.....	\$ 40.90	27.27

BRPA0009-029 12/01/2017

	Rates	Fringes

BRICKLAYER.....	\$ 31.69	21.27

BRPA0009-060 12/01/2017

Rates	Fringes

MASON - STONE.....	\$ 32.66	20.56

BRPA0009-061 12/01/2017

Rates	Fringes

TILE SETTER.....	\$ 30.75	18.38

CARP0142-001 06/01/2017

Rates	Fringes

Carpenter/Lather.....	\$ 33.01	16.45

CARP1759-001 06/01/2017

Rates	Fringes

FLOOR LAYER: Carpet.....	\$ 33.01	16.45

CARP2235-001 06/01/2017

Rates	Fringes

MILLWRIGHT.....	\$ 39.83	18.62

CARP2235-007 01/01/2018

Rates	Fringes

PILEDRIVERMAN.....	\$ 33.55	18.55

* ELEC0005-007 12/23/2017

Rates	Fringes

ELECTRICIAN.....	\$ 39.76	25.43

ELEC0126-006 05/29/2017

Rates	Fringes

Line Construction:

Groundmen.....	\$ 27.14	28.25%+11.00
Lineman.....	\$ 45.24	28.25%+11.00
Truck Driver.....	\$ 29.41	28.25%+11.00
Winch Truck Operator.....	\$ 31.67	28.25%+11.00

ELEV0006-001 01/01/2018

Rates	Fringes

ELEVATOR MECHANIC.....	\$ 47.22	32.645+A+B

FOOTNOTE: A. Employer contributes 8% of regular hourly rate as vacation pay credit for employees with more than 5 years of service, and 6% for 6 months to 5 years of service.

B. Eight Paid Holidays (provided employee has worked 5 consecutive days before and the working day after the holiday): New Years's Day; Memorial Day; Independence Day; Labor Day; Veteran's Day; Thanksgiving Day and the Friday after Thanksgiving Day, and Christmas Day.

* ENGI0066-001 06/12/2017

	Rates	Fringes

Power equipment operators:

CLASS 1.....	\$ 34.49	20.15
CLASS 2.....	\$ 29.58	20.15
CLASS 3.....	\$ 27.25	20.15

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

CLASS I

Asphalt Paver, Asphalt Roller, Asphalt Plant Operator, Athey Loader, Auger (Truck or Tractor Mounted), Auto Grader (C.M.I. and similar), Backhoe (180' and 360' swing), Back-Filling Machine, Batch Plant, Bulldozer, Cable Layer, Cableway, Caisson Drill, Central Mix Plant, Compactor with Blade, Concrete Pump (all types), Over-Head Crane, Crane (Crawler or Truck Mounted)*, Tower Crane (Stationary or Climbing Type), Rough Terrain Crane**, Wagon Crane, Crushing and/or Screening Plant, Derrick Traveler, Derrick (all types)(when assistance is needed it will be an oiler or apprentice), Derrick Boats, Dragline, Drill (Davey or similar), Dredge, Drill (Well and Core)(Truck or Skid Mounted), Elevator, Excavating Equipment (all other), Fork Lift (Lull or similar), Franki Pile Machine (or similar), Guard Post Driver, Gradall (all types), Grader, Elevating Grader, Equipment Greaser, Helicopter, Helicopter Hoist Operators, Front End Loader, Hoist, Hydraulic Boom Truck, Jumbo Operator, Kocal, Koehring Scooper, Locomotive, Metro Chip Harvester (or similar), Mix Mobile, Mixer - Paver, Mucking Machine, Multiple Bowl Machines, Pile Driver (Sonic or similar), Scrapers, Shovels (powered), Slip Form Paver (C.M.I. and similar), Spreader (Concrete, Asphalt, or Stone), Tire Repairman (when assigned to a jobsite), Tower Mobile, Tractors (all types), Trencher, Tug Boat, Vermeer Saw, Welder (repairman), Whirley

* Cranes with Boom or Mast length (including jib) 100 ft or over shall be paid an additional \$.50 per hour for each 50-foot increment of additional boom and/or jib length)

** Rough Terrain Cranes with Boom or Mast length (including jib) 101 ft or over shall be paid an Additional \$.50 per hour for each 50-foot increment of additional boom and/or jib length)

Note: An additional \$1.25 per hour (not counting boom pay) shall be paid for any crane (excluding overhead cranes) rated 100 ton or over.

CLASS II

Ballast Regulator, Boat (material or personnel)(powered), Boiler, Boring Machine, Compressor (combined with Air Tugger, Air Pump, Gunit Machine, or Sand Blaster), Concrete Belt Placer, Concrete Saw, Conveyor, Carry Crane,

Crushing/Screening Plants, Curb Builder (self-propelled), Forklifts (ridden or self-propelled), Form Line Machine, Generator (over 5KW), Grout Pump, Heaters, Hoist (monorail, roof, one drum-regardless of power used), Huck Machine (or similar), Hydraulic Jack (single or multiple)(power driven), Ladavator, Mortar Mixer, Mulching Machine, Pavement Breaker (self-propelled or ridden), Pin Puller (powered), Pipe Cleaning Machine, Pipe Dream, Power Broom (except push type), Pulverizer, Pumps (regardless of power used), Roller/Compactor (Dirt), Refrigeration Plant, Ross Carrier (or similar), Seeding Machine, Skid Steer Loader (or similar), Slab Lifting Machine (hydraulic), Soil Stabilizer (pump type), Spray Cure Machine (power driven), Side Delivery Shoulder Spreader (attachment), Steam Jenny (or similar), Stone Crusher, Stone Spreader (self-propelled), Siphon (steam or air), Tie Tamper (multiple heads), Tractor (when used for landscaping, snaking, or hauling), Truck (Winch)(when hoisting and placing), Tube Finisher (C.M.I. and similar), Tugger, Water Blaster, Welding Machine, Well Point System

CLASS III

Brakeman, Deck Hand, Helicopter Signalman, Oiler*, Elevator (Alterations & Remodeling Commercial Buildings),

* Oilers on Truck Cranes: less than 50 ton shall receive \$.10 over the Class III base rate; 50 ton up to 100 ton rated capacity shall be paid an additional \$.25 per hour over the Class III base rate; 100 ton and over shall be paid an additional \$1.00 per hour over the Class III base rate.

General Note: Hazardous Material Sites Level C & D receive \$1.00 per hour premium for all classifications and Levels A & B receive \$2.50 premium for all classifications

IRON0003-002 06/01/2017

	Rates	Fringes
IRONWORKER.....	\$ 33.54	29.87

LAB00613-002 01/01/2016

	Rates	Fringes
Laborers:		
GROUP 1.....	\$ 22.22	14.60
GROUP 2.....	\$ 22.37	14.60
GROUP 3.....	\$ 22.50	14.60
GROUP 4.....	\$ 22.97	14.60

LABORERS CLASSIFICATIONS

GROUP 1: COMMON LABORER - Building laborer; Brick removal for alterations; Carryable pumps; West brick buggy or similar; Walk behind forklift or similar (non self-propelled); Stripper and mover of forms; Toolroom man; all material conveyors (regardless of power used, including starting and stopping); Pouring of mortar or aggregate into blocks of voids

GROUP 2: SKILLED LABORER - West brick buggy or similar (self

propelled); Power wheelbarrows and buggies; walk behind forklift or similar (self-propelled); Drill runner; All operators of compacting equipment; Pipe layer; Burner; Jackhammer man - concrete buster; Vibrator operator; Clay spade and/or similar; Gunnite nozzleman; Blaster; Concrete saw operator; Hod carrier; Scaffold builder; Air track operator; Bell and Bottom Man on furnace and stacks; Grout machine feeder and pump operator; Gunnite machine operator or similar; Gunnite machine potman or similar; Mortar Mixer; Mortar mixer machine (regardless of power used, including starting and stopping); Wagon drill operator; Laser cleaner; Lancer

GROUP 3: Asbestos removal or abatement laborer

GROUP 4: Toxic or Hazardous waste handling laborer

LABO0952-004 07/01/2015

	Rates	Fringes
Landscaping		
GROUP 1.....	\$ 18.50	13.30
GROUP 2.....	\$ 18.92	13.30
GROUP 3.....	\$ 19.22	13.30

LANDSCAPING CLASSIFICATIONS

GROUP 1: Landscape laborer to include general landscaping work and the driving of trucks for the distribution of materials on the job site but not to include trucks used to transport supplies to the job

GROUP 2: Skilled Landscape Laborer to plant all types of trees and shrubs without direct supervision.

GROUP 3 - Landscape tractor operator to operate small industrial rubber tire tractor equipped with front end loader and backhoe attachment or a skid loader with landscape attachments used for the sole purpose of landscape work including soil spreading, unloading and loading of materials and such other landscaping work but not for heavy and highway construction work

PAIN0057-003 06/01/2017

	Rates	Fringes
PAINTER		
Brush & Roller.....	\$ 27.50	18.43

PAIN0057-005 06/01/2017

	Rates	Fringes
DRYWALL FINISHER/TAPER.....	\$ 27.80	18.75

PAIN0751-001 09/01/2017

	Rates	Fringes

GLAZIER.....	\$ 28.00	22.36

PLAS0031-014 06/01/2015		
	Rates	Fringes
PLASTERER.....	\$ 27.97	14.26

PLAS0526-007 06/01/2017		
	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 29.52	18.39

PLUM0027-002 06/01/2017		
	Rates	Fringes
PLUMBER.....	\$ 39.20	21.27

PLUM0449-001 06/01/2017		
	Rates	Fringes
PIPEFITTER.....	\$ 39.35	20.97

ROOF0037-001 06/01/2017		
	Rates	Fringes
ROOFER.....	\$ 31.00	15.17

SFPA0542-001 07/01/2017		
	Rates	Fringes
SPRINKLER FITTER.....	\$ 37.17	19.52

SHEE0012-002 07/01/2017		
	Rates	Fringes
SHEET METAL WORKER.....	\$ 33.70	27.21

TEAM0040-002 01/01/2017		
	Rates	Fringes
Truck drivers:		
GROUP 1.....	\$ 28.10	17.42
GROUP 2.....	\$ 28.24	17.50
GROUP 3.....	\$ 28.71	17.80

FOOTNOTES:

A. Hazardous/toxic waste material/work level A & B receive additional \$2.50 per hour above classification rate

B. Hazardous/toxic waste materials/Work level C & D receive \$1.00 per hour above classification

TRUCK DRIVERS CLASSIFICATIONS

GROUP 1 - Single Axle (2 axles including steering axle);
Includes partsman and warehoueman

GROUP 2 - Tandem - Tri-Axle - Semi-Tractor Trailer
(combination) (3 axles or more including steering axle)

GROUP 3 - Specialty Vehicles; Heavy equipment whose capacity exceeds that for which state licenses are issued specifically refers to units in excess of eight (8) feet width (such as Euclids, Atley Wagon, Payloader, Tournawagons, and similar equipment when not self loaded); Tar and Asphalt Distributors Trucks, Heavy Duty Trailer, such as Low Boy, High Boy

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

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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 www.dol.gov/whd/govcontracts.

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) (ii)).

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

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than "SU" or "UAVG" denotes that the union classification and rate were prevailing for that classification in the survey. Example:

PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

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

Survey Rate Identifiers

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

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

Union Average Rate Identifiers

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

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

WAGE DETERMINATION APPEALS PROCESS

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

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on

- a wage determination matter
- * a conformance (additional classification and rate) ruling

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

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

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

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

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

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

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

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

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

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END OF GENERAL DECISION

PART 4: TECHNICAL SPECIFICATIONS

QUONSET HUT RENOVATION AT NORTHVIEW HEIGHTS FACILITY SERVICES SITE (AMP-09)

IFB CONTRACT NO. 600-22-18

SECTION - 01010
SUMMARY OF WORK

PART 1. GENERAL

1.1 CONTRACT DOCUMENTS

- A. Refer to the instructions to Contractors, General Conditions, Special Conditions, Special Requirements, and all contract drawings, which form part of this Contract and have the same force and effect as if herein full.
- B. Drawing List:
 - CS Cover Sheet
 - A-01 Architectural – Repair Work, Floor Plan, Details & Pictures
 - A-02 Architectural – Repair Work Elevations and Details
 - A-03 Architectural – Repair Work Floor Plan and Details
 - H-01 HVAC – Notes, Symbols, Legends, Details & Schedules
 - H-02 HVAC – Plan & Notes
 - E-01 Electrical – General Notes, Legend, Abbreviations, Details, Site Plan
 - E-02 Electrical – New Work Floor Plan & Sections
 - E-03 Electrical – Pictures, Details, Panelboard Schedule

1.2 PROJECT IDENTIFICATION

- A. The Contractor shall furnish all labor and materials and perform all work necessary for the implementation of all work associated with the rebuilding of the Quonset Hut, Northview Highrise Facility Services Site, shown in the Contract Drawings.
- B. By submitting a bid and executing the Contract, the Contractor represents that he has carefully examined all Drawings, Specifications, Addenda, and other Contract Documents and has visited the site; and that he has satisfied himself as to the nature and location of the Work, the conditions and difficulties under which it is to be performed, and all matters which may in any way affect the Work or its performance. Further that he fully understands the intent and purpose of the Documents and conditions bidding. Claims for additional compensation or extension of time because of any Contractor's failure to familiarize himself with the Contract Documents and all conditions which affect the Work will not be allowed.
- C. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all. The Contractor will be responsible for all work pertaining to this entire Contract based on the entire set of Contract Documents. The intention of the Documents is to include, unless specifically accepted, all labor, all materials, equipment, tools, construction equipment and machinery, transportation, and other facilities and services necessary for the proper execution and completion of the Work. The specifications and the drawings are complementary to each other. Work shown but not specified, and work specified but not shown, shall be fully included as if both shown and specified. Should any

direct contradiction(s) between specifications, drawings, or specifications and drawings become apparent, the Contractor shall satisfy the most stringent requirements.

1.3 CONTRACT WORK

- A. Clean and prepare existing Quonset hut for new insulation, new heating system, shelving, new electrical service, new lighting and distribution, and all other work as shown on the Contract Drawings identified above.
- B. Provide all labor, engineering, tools, transportation, services, supervision, materials, and equipment necessary for and incidental to satisfactory completion of required work as indicated in Contract Documents.
- C. Provide all required staging, temporary placement of existing or temporary systems, and all other components of construction.
- D. The work required by this contractor shall be to furnish and deliver all materials, tools, equipment, testing, transportation, secure all permits, license, do and perform all labor, superintendent and all means of construction, pay all fees and do all incidental work, execute and finish in all expeditious, substantial and workmanlike manner the project in accordance with drawings and specifications to complete satisfaction and acceptance of the Owner.
- E. The contract work for this project will include all work required to demolish existing facilities as shown on the Contract Drawings and provide new construction for renovation work according to the Contract Drawings.

1.3.1 Rebuilding the Quonset Hut

The complete scope is defined in the Contract Drawings and Specifications. In general:

- A. Provide demolition of all existing systems in place that are not to remain.
- B. Provide cleaning of the Quonset hut in preparation for the new insulation system to be provided and installed.
- C. Provide and install new radiant heating throughout the structure, including all appurtenances and controls as shown on the Contract Drawings.
- D. Provide and install new shelving as shown on the Contract Drawings.
- E. Provide all wire and cable, all conduit, all wiring devices, all lighting fixtures and the new service entrance rated panelboard as shown on the Contract Drawings.
- F. Provide all work associated with all Division 1 requirements.
- G. Provide all work associated with Division 2 demolition requirements.

1.4 CONCURRENT MODERNIZATION WORK AND BUILDING OPERATION

- A. This project is a project in an existing building which will continue to operate throughout all phases of required work. It is essential that all Contractors give special attention and priority to all matters concerning project safety, protection from dust and loose materials, reduction of noise level, protection from water

and air infiltration into building, and maintenance of neat, sightly conditions in and around work areas inside and outside of building. Packaging, scrap materials, and demolition debris shall be promptly removed from building and site on a daily basis.

- B. At all times Contractor shall provide clearly visible warning and directions signs, barricades, temporary lighting, overhead protection, and hazard-free walking surfaces throughout the area. At all times special attention must be given to building entrances, exits, and proper safe exiting through work areas as required by law.
- C. Contractor shall consult Owner to establish and maintain safe temporary routes including, but not limited to, proper barricades, walking surfaces, lighting, fire protection, exiting, warning, and directional signs, and general protection of persons from all hazards in accordance with OSHA Standards due wholly or partially to its operations.

1.5 CONTRACTOR'S USE OF PREMISES

- A. Contractors shall limit their use of premises to construction activities in areas indicated; allow for Authority's occupancy and use by the public.
 - 1. Confine operations to areas within Contract limits indicated. Portions of site beyond areas in which construction operations are indicated are not to be disturbed.
 - 2. Keep driveways and entrances serving premises clear and available to tenants and the Authority's employees at all times. Do not use these areas for parking or storage of materials. Schedule deliveries to minimize space and time requirements for storage of on-site materials and equipment.
 - 3. Burial of Waste Materials: Do not dispose of waste material on site, either by burial or burning. All materials must be hauled away from the site and disposed of in a manner acceptable to the local in which the disposal occurs.

1.6 OWNER OCCUPANCY

- A. Full Owner Occupancy: Owner (The Housing Authority of the City of Pittsburgh) will occupy site and existing building during the entire construction period. Cooperate with the Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform work so as not to interfere with Owner's operations.
 - 1. The Authority's services have priority over all work. The Authority will make every reasonable effort to accommodate Work in an orderly manner, but reserves the right to adjust or change any work schedule if necessary to maintain proper tenant services.
 - 2. Keep the Authority informed, through the Authority Representative, of Contractor activity so that the Authority can coordinate its functions with work. Schedules must be approved by the Authority. Shutdowns and changeovers of services and systems must be approved by the Authority 72 hours in advance of the work to be scheduled. Shutdowns and changeovers shall be incorporated into the construction CPS.

PART 2 PRODUCTS

Not Used

PART 3 EXECUTION

Not Used

END OF SECTION 01010

SECTION - 01039
COORDINATION AND MEETINGS

PART 1. GENERAL

1.1 SUMMARY

This section governs the administrative and coordination functions of the Contractors that are scheduled to be on-site under separate Contracts with the Authority.

1.2 SECTION INCLUDES

- A. Coordination
- B. Alteration project procedures
- C. Pre-construction conference.
- D. Progress meetings.

1.3 RELATED SECTIONS

- A. Section 01010 – Summary of Work: Coordination with Authority and all other contractors.
- B. Section 01039 – Coordination and Meetings.
- C. Section 01300 – Submittals.
- D. Section 01700 – Project Closeout: Record documents.

1.4 COORDINATION

- A. Contractor shall:
 - 1. Perform the work as required and in the sequence necessary to maintain the overall progress of the project.
 - 2. Coordinate work with their own employees and subcontractors.
 - 3. Expedite the work to assure compliance with approved schedules.
 - 4. Coordinate the work with that of other Contractors and work by the Authority.
 - 5. Refer to Section 01300 – Submittals, for procedure on Coordination Drawings.
- B. Contractor shall coordinate scheduling, submittals, and work of the various sections of specifications to assure efficient and orderly sequence of installation of interdependent construction elements with provisions for accommodating items to be installed later.
- C. Contractor shall verify that utility requirement characteristics of operating equipment are compatible with building utilities. Coordinate work of various

sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.

- D. Contractor shall coordinate space requirements and installation of Quonset Hut building interior systems, which are indicated diagrammatically on the Contract Drawings. Follow locations of appliances, panels, as closely as practicable and within code.
- E. The Contractor shall give the Authority's Representative a minimum of one weeks (seven calendar days) notice of the need for any type of shutdown or interruption in utility service. Shutdowns and changeovers of services and systems must be approved by the Authority. Once notice has been given by the Authority to its resident's, the date of the shutdown can then be scheduled. Utilities include but are not limited to electricity, water, heating, telephone, cable, and the like.
- F. The Contractor shall give 48 hours advanced notice to Authority for approval to work during weekends and weekday non-normal work hours. No premium times will be paid if the contractor needs to work on weekends or out of normal work times during the weekdays.

1.5 CONSTRUCTION ORGANIZATION AND START-UP

- A. The Authority Representative(s) will establish on-site lines of authority and communications:
 - 1. Contractor shall attend a pre-construction meeting and progress meetings as specified. Pre-Construction meeting shall be scheduled and conducted by the Authority. Progress meetings shall be conducted by the Engineer.
 - 2. Establish procedures for intra-project communications:
 - a. Submittals.
 - b. Reports and records.
 - c. Recommendations.
 - d. Coordination drawings.
 - e. Schedules.
 - f. Resolution of conflicts.
 - 3. Contractor shall control the use of the site:
 - a. Allocate space for Contractor's use for field offices, sheds, and work and storage areas.
 - b. Establish locations for access, traffic, and parking allocations and regulations.
 - c. Monitor use of site during construction.

1.6 CONTRACTORS' RESPONSIBILITIES FOR COORDINATION

- A. The Contractor is required to coordinate the work, schedules, and progress of the work with all contractors.
- B. Monitor the use of Temporary Utilities:
 - 1. Verify that adequate services are provided and maintained.
 - 2. Coordinate use of the Authority's facilities.

- C. Close-Out Duties:
 - 1. Equipment, Appliances and Systems start-up:
 - a. Coordinate checkout of utilities, operational systems, and equipment.
 - b. Verify in coordinating initial start-up and testing.
 - c. Record dates of start of operation of systems and equipment.
 - d. Submit to Owner, written notice of beginning of warranty period of equipment, appliances, and systems put into service.
 - 2. At completion of work of the contract, conduct an inspection to assure that:
 - a. All equipment, appliances, and systems are fully functional and in working order.
 - b. Specified cleaning has been accomplished.
 - c. Temporary facilities have been removed from site.
 - 3. Substantial Completion:
 - a. When the Contractor considers that the Work, or a designated portion thereof which is acceptable to the Owner, is substantially complete, the Contractor shall prepare for the Owner's representative a list of items to be completed or corrected.
 - b. The Architect will review the punch list for completion and add any additional items if required. The failure to include any items on such list does not alter the responsibility of the Contractor to complete the Work in accordance with the Contract Documents.
 - c. Subsequently, when all punch list items have been corrected and completed, the Contractor shall provide Architect/Engineer with documentation stating that all outstanding punch list items have been corrected and completed or in what other status the items remain.
 - 4. Administration of Contract Closeout:
 - a. When the Owner's Representative and the Authority, on the basis of inspection and consultation with the Contractor, determines that the Work, or designated portion thereof, is substantially complete, the Authority shall prepare and distribute for approval a Certificate of Substantial Completion.

1.7 RESPONSIBILITY OF AUTHORITY'S REPRESENTATIVE(S)

- A. Authority's Representative(s) will observe the work at all construction phases and for all contracts. Enforce the requirements of all contract documents and report deficiencies immediately.
- B. Authority's Representative(s) will have authority in matters concerning the coordination of all aspects of the project.
 - 1. Verify that adequate services are provided and maintained.
 - 2. Coordinate use of the Authority's facilities.
- C. Maintain reports and records at job site, available to Engineer and HACP:
 - 1. Daily log of progress of work of each contractor.
 - 2. Records:
 - a. Contracts.
 - b. Purchase orders.

- c. Materials and equipment records.
- d. Applicable handbooks, codes, and standards.
- 3. Obtain information from contractors, and maintain file of record documents.
- 4. Assemble documentation for handling of claims and disputes.

1.8 ALTERATION PROJECT PROCEDURES

- A. Materials: As specified in product sections match existing products and work for patching and extending work.
- B. Close openings in exterior surfaces to protect existing work from weather and extremes of temperature and humidity.
- C. Remove, cut, and patch work in a manner to minimize damage and to provide a means of restoring products and finishes to specified condition.
- D. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with a neat transition to adjacent finishes.
- E. Where new work abuts or aligns with existing, perform a smooth and even transition. "Patched Work" to match existing adjacent work in finish, texture, and appearance.
- F. When finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Engineer.
- G. Where a change of plane of 1/4" or more occurs, submit recommendation for providing a smooth transition for Engineer to review and request instructions from Engineer.
- H. Patch or replace portions of existing surfaces which are damaged, lifted, discolored, or showing other imperfections in accordance with the approved recommendation of the Authority's Representative(s) at no additional cost to the Authority.
- I. Finish surfaces as specified in individual product sections.

1.9 PRE-CONSTRUCTION MEETING

- A. Authority's Representative(s) will schedule a Pre-Construction Meeting, after "Notice of Award."
- B. Attendance Required: The Authority, Architect/Engineer, and the Contractor's Project Manager/Superintendent(s).
- C. Agenda:
 - 1. Distribution of contract documents.
 - 2. Submission of executed bonds and insurance certificates, list of subcontractors, list of products, schedule of values, and approved progress schedule. (Progress schedule shall be submitted, reviewed,

- revised, and approved prior to Notice to Proceed.)
3. Designation of personnel representing the parties in contract, and the Engineer.
 4. Procedures and processing of field decisions, submittals, substitutions, applications for payment, proposal requires, change orders, and contract close-out procedures.
 5. Procedures for maintaining project record documents.
 6. Critical work sequencing schedules.
 7. Major deliveries and priorities.
 8. Safety and first aid.
 9. Use of premises by Authority and Contractor.
 10. Authority's requirements.
 11. Construction facilities and controls.
 12. Temporary utilities.
 13. Survey and building layout.
 14. Security and housekeeping procedures.
 15. Procedures for testing.
 16. Requirements for start-up of equipment.
 17. Inspection and acceptance of equipment put into service during construction period.
 18. OSHA Orientation Program.

1.10 PROGRESS MEETINGS

- A. Authority Representative(s) will schedule and administer meetings throughout progress of the work at regular intervals.
- B. Construction schedule will be updated weekly at the progress meetings. The Contractor's Project Manager and Superintendent are to attend.
- C. Authority Representative(s) will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings, record minutes, and distribute copies to the Authority, participants, and those affected by decisions made.
- D. Attendance Required: The Contractor's Project Manager and Job Superintendent, Authority Representative(s), Architect/Engineer, and as appropriated to agenda topics for each meeting:
 1. Representative of contractors, subcontractors, and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.
- E. Agenda:
 1. Review minutes of previous meetings.
 2. Review of work progress.
 3. Field observations, problems, and decisions.
 4. Identification of problems, which impeded planned progress.
 5. Review of status of submittals.
 6. Review of fabrication and delivery schedules.
 7. Maintenance of progress schedule.

8. Corrective measures required to regain projected progress schedules.
9. Planned progress during succeeding work period.
10. Coordination of projected progress.
11. Maintenance of quality and work standards.
12. Effect of proposed changes on progress schedule, coordination, and on contracts.
13. Other business relating to work.

PART 2. PRODUCTS – Not Used

PART 3. EXECUTION – Not Used

END OF SECTION 01039

SECTION - 01045 CUTTING AND PATCHING

PART 1. GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements for cutting and patching.
- B. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
- C. Demolition of selected portions of the building for alterations is included in Section "Selective Demolition" and in the Section "Electrical Demolition".

1.2 QUALITY ASSURANCE

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.
 - 1. Obtain approval from the Engineer of the cutting and patching proposal before cutting and patching any structural elements.
- B. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.
- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces, in a manner that would, in the Authority's opinion, reduce the building's aesthetic qualities, or result in visual evidence of cutting and patching. Remove and replace Work cut and patched in a visually unsatisfactory manner. Obtain approval for changes to the existing building exterior from the Authority.

PART 2. PRODUCTS

2.1 MATERIALS

- A. Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

PART 3. EXECUTION

3.1 INSPECTION

- A. Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.
- B. Before proceeding, meet at the site with parties involved in cutting and patching, including all trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.
- C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining.
- D. Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to by pass them.

3.3 PERFORMANCE

- A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.
- B. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
- C. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer; comply with the original installer's recommendations.
- D. Where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
- E. To avoid marring exiting finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.

- F. Cut through concrete and masonry using a cutting machine such as carborundum saw or diamond core drill.
- G. Comply with requirements of applicable Sections of Division-2 where cutting and patching requires excavating and backfilling.
- H. Patching: Patch with durable seams that are invisible as possible. Comply with specified tolerances.
- I. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
- J. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
- I. Patching: Patch with durable seams that are invisible as possible. Comply with specified tolerances.

3.4 CLEANING

- A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damage pipe covering to it original condition.

END OF SECTION 01045

SECTION - 01060
REGULATORY REQUIREMENTS

PART 1. GENERAL

1.1 SECTION INCLUDES

- A. Description of applicable code requirements.

1.2 RELATED SECTIONS

- A. Section 01010 – Summary of Work
- B. Section 01039 – Coordination and Meetings
- C. Refer to the instruction to Contractors, General Conditions, Special Conditions, Special Requirements, and Division 1 and all Drawings, which form part of this contract and have the same force and effect as if herein full.

1.3 QUALITY ASSURANCE

- A. Design of Code required construction assemblies are to comply with requirements of the code, except when more rigid requirements are specified or are required by overriding codes.
- B. Conform to reference standard by date of issue current on date for receiving bids.
- C. Obtain copies of codes and regulations when required.
- D. Maintain copy at jobsite during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference code requirements conflict with Contract Documents, request clarification from Engineer before proceeding.

1.4 SCHEDULE OF REGULATORY REQUIREMENTS

Pennsylvania Department of Labor and Industry
Bureau of Management Support Services
Division of Physical Plant and Construction
Box 911
Harrisburg, PA 17108

1.5 BUILDING CLASSIFICATION INFORMATION

- A. All work must comply, at a minimum, with the following:
 - 1. National Electrical Code 2011
 - 2. National Fire Protection Association

3. National Board of Fire Underwriters Laboratories, Incorporated, Rules and Regulations
4. National Electrical Manufacturer's Association
5. National Bureau of Standards Handbook H-30
6. Federal Department of Labor Occupational Safety and Health Standards as contained in the Federal Register Volume 36, Number 105, Dated May 29, 1971 or the latest revision thereof.
7. American National Standards Institute, Inc.
8. Underwriter's Laboratories, Inc.
9. American Society for Testing Materials and Specifications
10. Electrical Underwriters Inspection Bureau
11. Institute of Electrical and Electronics Engineers
12. Insulated Power Cable Engineers Associated Specifications
13. Uniform Federal Accessibility Standards (UFAS)
14. Americans with Disabilities Act of 1990
15. Pennsylvania Department of Labor and Industry Fire and Panic Regulations
16. Pennsylvania Department of Environmental Resources
17. Building Officials and Code Administrators (BOCA)
18. International Building Code 2009
19. City of Pittsburgh laws, codes, and regulations
20. County of Allegheny laws, codes, and regulations
21. Local Fire Authority
22. Requirements of most stringent provision of local applicable building code.
23. Life Safety Code, NFPA 101
24. State codes, Local codes, and all other Jurisdictions having Authority

PART 2. PRODUCTS Not Used.

PART 3. EXECUTION Not Used.

END OF SECTION 01060

SECTION - 01300 SUBMITTALS

PART 1. GENERAL

1.1 SECTION INCLUDES

- A. Submittal procedures.
- B. Procedural manuals.

1.2 RELATED SECTIONS

- A. Section 01010 – Summary of Work
- B. Section 01039 – Coordination and Meetings

1.3 SUBMITTAL PROCEDURES

- A. Transmit eight (8) copies of each submittal to the Engineer with the Contractor's standard transmittal form, and a copy of all transmittals to the Authority. See each specification section for specific submittal information requirements.
- B. Sequentially number the transmittal forms. Resubmittals to have the original number with and alphabetic suffix.
- C. Identify Project, contractor, subcontractor, or supplier; pertinent Drawing sheet and detail number(s), and Specification Section, as appropriate.
- D. Sequentially number the submittal by using the Specification Section along with a 2-digit extension (i.e. for concrete design mix reports, the number shall be 03310.01).
- E. Apply Contractor's stamp, signed or initialed certifying that review, verification of products required, field dimensions, adjacent construction work, and coordination of information, is in accord with the requirements of the Work and Contract Documents.
 - 1. Failure by the Contractor to stamp and sign the submittal will be cause for rejection.
 - 2. The submittal will be returned without any action by the Engineer.
- F. Schedule submittals to expedite the project, and deliver to the Engineer at their business address. Coordinate submission of related items.
- G. Identify variations from Contract Documents and product or system requirements, which may be detrimental to successful performance of the completed Work.
- H. Provide space for Contractor's and the Engineer's review stamps.

- I. After review, the Engineer will send one (1) copy to the Contractor, six (6) copies to the Authority, and keep one (1) copy for the Engineer; if not approved, only a transmittal form will be sent to the Contractor.
- J. Immediately revise and resubmit submittals as required; identify all changes made since the previous submittal.
 - 1. Make any corrections or changes in the submittals required by the Engineer and resubmit until approved.
 - a. Indicate any changes, which have been made other than those, requested by the Engineer.
- K. Distribution: Furnish reviewed submittal copies to installers, subcontractors, suppliers, and others required for performance of construction activities. Show distribution on transmittal forms. Do not proceed with installation until a copy of Product Data is in the Installer's possession. Forward a copy of all distribution transmittals log to the Construction Manager.
 - a. Do not use unmarked Product Data for construction.

1.4 PROCEDURAL MANUALS

- A. Submit to the Engineer, the number of copies, which the Contractor requires, plus four (4) copies, which will be retained, by the Engineer, Authority and the Contractor.
- B. Mark each copy to identify Specification Section number, applicable products, models, options, and other data. Supplement manufacturers standard data to provide information unique to this project.
- C. After review, distribute in accord with the Submittal Procedures, and provide copies for Record Documents as described in Section 01700.

PART 2. PRODUCTS Not Used.

PART 3. EXECUTION Not Used.

END OF SECTION 01300

SECTION - 01310
CONSTRUCTION PROGRESS SCHEDULES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Related Sections
- B. Purpose
- C. Format
- D. Contents
- E. Submittals
- F. Revisions to Schedules
- G. Approvals
- H. Time Extensions
- I. Float
- J. Distribution

1.2 RELATED SECTIONS

Refer to the Instructions to Contractors, General Conditions, Special Conditions, Division 1, and all drawings which form part of this contract and have the same force and effect as if herein full.

1.3 PURPOSE

The Construction Progress Schedule ("CPS") shall be utilized to track job progress, analyze potential delays, identify potential progress problems early, determine the project completion date, issue progress payments, determine validity of time extension requests, and complete cost projections and analysis.

1.4 FORMAT

- A. The CPS shall be in time scale CPM Gantt Chart format
- B. The CPS shall provide graphical (horizontal bar chart) representations for each major portion of work or operation (Summary Tasks)
- C. The CPS shall provide a graphical representation for each of the activities/tasks and events that will occur during the performance of the work
- D. The CPS shall show the complete sequence of construction by activity/task, with dates for beginning and completion of each element of construction
- E. Activities shall be listed in a logical, sequential order, and shall use proper precedence logic (Chronological/Sequential System)
- F. Each activity shall have predecessor and/or successor ties. The CPS shall show the interrelations/interdependencies of all activities/tasks
- G. No onsite activity shall have a duration of greater than twenty (20) working days

H. The Critical Path shall be clearly identified

I. All CPSs', CPS revisions, preliminary submissions, and associated backup documentation shall be submitted in hard copy and electronic formats. Three (3) hard copies of each document shall be submitted to the Housing Authority, and one (1) hard copy of each document shall be submitted to the Engineer.

J. Sheet Size: Minimum 8.5 x 14 inches

1.5 CONTENTS

A. The CPS shall begin at the Notice to Proceed ("NTP") date. The initial CPS shall be based on the anticipated NTP date as provided by the Housing Authority.

B. The CPS shall identify each phase/stage of demolition, construction, occupancy/relocation, and other logically grouped activities (Summary Tasks).

C. The CPS shall set forth milestone dates and deadlines, including substantial completion of ALL work, i.e., the entire project.

D. The CPS shall identify all project constraints.

E. The CPS shall identify work for each building unit/apartment (unless authorization is obtained in writing from the Contracting Officer allowing the CPS to only identify work for each floor or building). Each task for each unit/apartment shall be identified on the CPS.

F. The CPS shall identify all Housing Authority, governmental and/or regulatory review periods.

G. CPS duration shall not exceed contractual construction period.

H. The CPS shall indicate decision dates for selection of finishes.

I. The CPS shall clearly identify order dates and lead times for all specified products, particularly long lead time items, items requiring fabrication, and major equipment.

J. The CPS shall indicate delivery dates for Housing Authority furnished products.

K. The contractor(s) shall coordinate the CPS content with the Schedule of Values (Schedule of Amounts). All progress payment amounts will be derived from, and tied to, the Schedule of Values and the CPS; therefore all activities on the CPS shall be consistent with the information contained in the Schedule of Values.

1.6 SUBMITTALS AND APPROVALS

A. The Contractor is responsible for consolidating the work efforts of all other contractors into one realistic, aggressive CPS, and for submitting the CPS to the Housing Authority for approval.

- B. If any contractor fails to submit schedule information to the Contractor in a timely manner as specified in the contract, the Contractor shall immediately notify the Housing Authority of this fact in writing. Failure of any contractor to submit required information in a timely manner shall be a default in accordance with the terms of this contract.
- C. If any contractor is found to be in default by the Contracting Officer for failure to submit schedule information in a timely manner, the Contracting Officer may terminate the contractor's right to proceed with the schedule preparation and may elect to complete the contractor's schedule information in his stead, in which case the contractor will be bound by any approved CPS as if the schedule information was prepared/developed by the contractor's own personnel. The contractor and its surety shall then be liable for any damage to the Housing Authority resulting from the contractor's failure to submit the schedule information within the specified timeframe.
- D. All CPSs' submitted to the Contracting Officer for approval shall be dated and signed by a representative of all prime contractors involved in the project. The signatures shall represent an acknowledgement that all prime contractors are in agreement with the submitted schedule. The Contractor shall be responsible for obtaining all signatures.
- E. Submittal of the initial CPS and subsequent updates/revisions for approval shall be understood to be the contractors' representation that the submitted CPS meets all of the conditions of the contract documents, accurately reflects work to be completed, and that the work will be executed in the sequence indicated on the submitted CPS.
- F. In no event shall any adjustment proposed in a progress report or corrective plan constitute an adjustment in the CPS, contract time, or any milestone date unless any such adjustment is agreed to and authorized in writing by the Contracting Officer.
- G. All contractors shall be aware that time is of the essence when submitting CPS information and when completing the Work in the timeframes established in the approved CPS.

1.6.1 INITIAL CPS SUBMITTAL AND APPROVAL

- A. The Contractor shall within ten (10) calendar days of execution of the Owner – Contractor Agreement (construction contract) submit the proposed CPS to the Contracting Officer for review.
- B. The proposed CPS shall not be saved as a baseline until written approval is received from the Contracting Officer. Upon approval, the Contractor shall be responsible for saving the baseline schedule, and monitoring and maintaining the CPS.
- C. The Contracting Officer shall review the initial CPS submission, (and any required resubmission), and respond with comments, recommendations, requests, or acceptance within five (5) working days of receipt.
- D. If the proposed CPS is not accepted by the Contracting Officer, the CPS shall be revised by the contractor(s) in accordance with the comments, recommendations, or requests of the Contracting Officer and resubmitted for acceptance within three (3) working days of receipt of said comments, recommendations, or requests. The contractor shall be

required to make the changes as directed by the Contracting Officer to arrive at a reasonable, realistic, and acceptable CPS.

- E. The NTP **will not** be issued and the project **shall not** begin without a CPS approved in writing by the Contracting Officer. The NTP will be issued within five (5) working days of written CPS approval provided all required back up documentation is received by the Housing Authority in the timeframe required in the contract.
- F. Upon acceptance by the Contracting Officer of the proposed CPS, the accepted schedule shall be deemed the “Construction Project Schedule” and will be considered part of the contract.
- G. The Housing Authority’s approval or acceptance of the CPS shall not impose on the Housing Authority any responsibility for the CPS, for timely submittals of complete and project-conforming shop drawings, for work sequencing, scheduling milestones, or progress of the work, nor shall acceptance interfere with or relieve the Contractor from the contractor’s full responsibility to complete all work in accordance with the contract. Contractors are solely responsible for the development and performance of the means, methods, and execution of performance reflected in the CPS.
- H. A separate submittal schedule shall be submitted along with the initial CPS. The submittal schedule shall include and identify dates for shop drawing submittal and approval, product data, and samples, including Housing Authority furnished products. The submittal schedule must include dates reviewed submittals will be required from the Housing Authority. Contractors are required to relate submittal tasks to construction activities/tasks. The submittal schedule may be incorporated into the CPS provided written authorization is obtained from the Contracting Officer.
- I. The Contractor shall keep the submittal schedule current. The submittal schedule shall be coordinated with the CPS, and shall allow for reasonable time for Housing Authority submittal review as documented in the contract.

1.6.2 MONTHLY UPDATED CPS SUBMITTAL AND APPROVAL

- A. A preliminary updated CPS and all associated backup documentation shall be submitted by the Contractor for review along with the “pencil copy” of the application for payment. The preliminary updated CPS should be submitted to the Housing Authority and the ENGINEER no later than three (3) working days before the pay application progress meeting, with the site walk occurring no later than one (1) working day before the pay application progress meeting.
- B. Backup documentation shall include a narrative discussion of the progress to date, forecasted work for next period, problem areas, and anticipated delays. If applicable, the narrative shall document schedule slippage, provide a detailed explanation concerning the reason(s) for the slippage, how each prime contractor is affected, and shall include a written recovery plan for getting the project back on schedule. The written recovery plan shall include any necessary overtime or additional labor and what steps are being taken to recover the original schedule, and/or what logic changes occurred and why said changes occurred. The plan shall indicate the date by which the progress of the work will comply with the current approved CPS.

- C. The preliminary updated CPS and the pencil copy of the application for payment shall be reviewed by all contractors, Housing Authority representative(s), and the ENGINEER during the site walk meeting.
- D. The Contractor shall make any revisions as noted during the site walk meeting, and shall submit the formal/finalized updated CPS and all associated backup documentation along with the finalized monthly application for payment at the pay application progress meeting.
- E. The formal/finalized updated CPS and associated backup documentation shall be considered part of the application for payment submission. Failure to submit an accurate updated CPS and all associated backup documentation with the application for payment will be cause for rejection of the application for payment.

1.6.3 CRITICAL PATH, LOGIC, or TASK CHANGES CPS UPDATE SUBMITTAL

- A. The Contractor shall **immediately** submit a revised CPS and a written recovery/corrective action plan to the Contracting Officer any time a critical path item is three (3) working days behind the current approved CPS, if a non-critical activity becomes critical, or if there are changes in schedule logic and/or tasks.
- B. The Contracting Officer shall review the updated CPS submission and respond with comments, recommendations, requests, or acceptance within three (3) working days of receipt.
- C. If the revised/updated CPS is not accepted by the Contracting Officer, the schedule shall be revised by the contractor(s) in accordance with the comments, recommendations, or requests of the Contracting Officer and resubmitted for acceptance within five (5) working days of receipt of said comments, recommendations, or requests.
- D. The contractor(s) shall be required to make the changes as directed by the Contracting Officer to arrive at a reasonable, realistic, and acceptable CPS.

1.6.4 CHANGE ORDER OR DIRECTED WORK CPS SUBMITTALS

- A. Any contractor submitting a Request For Change Order (“RFCO”) shall submit as backup documentation along with said RFCO a proposed CPS outlining how the change would impact the current approved CPS. The proposed CPS shall show in detail the work involved in the proposed change, how the proposed change will be incorporated into the current approved CPS, and the impact on other work caused by the adjustment to the current approved CPS.
- B. Within three (3) working days of receipt of any **executed** change order(s), change directive, or proceed order that affects the CPS, the contractor to whom the change order, directive, or proceed order was issued shall submit to the Contractor a proposed revised CPS. The Contractor shall then incorporate the changes into the current approved schedule and within three (3) working days of receipt of the proposed revised CPS from the contractor to whom the change order, directive, or proceed order was issued, issue a proposed CPS to the Contracting Officer for review and approval.
- C. Along with the proposed CPS, the Contractor shall submit a written narrative outlining the change and how it affects the current, approved CPS.

- D. The Contracting Officer shall review the proposed CPS submission and respond with comments, recommendations, requests, or acceptance within three (3) working days of receipt.
- E. If the proposed CPS is not accepted by the Contracting Officer, the proposed CPS shall be revised by the contractor(s) in accordance with the comments, recommendations, or requests of the Contracting Officer and resubmitted for acceptance within three (3) working days of receipt of said comments, recommendations, or requests.
- F. The contractor(s) shall be required to make the changes as directed by the Contracting Officer to arrive at a reasonable, realistic, and acceptable CPS.

1.7 REVISIONS TO CONSTRUCTION PROGRESS SCHEDULES

- A. All revised CPSs' should be saved with the project # and revision # clearly noted.
- B. The lead contractor shall be responsible for updating/revising the current approved CPS.
- C. All revised/updated CPSs' shall include but not be limited to the following information:
 - Actual and baseline construction start and finish dates
 - Actual and baseline procurement start and finish dates
 - Graphical representation of the baseline and actual task start and finish dates
 - Logic revisions – any revised sequences
 - Added or changed work, including change order work and RFI submittals that affect the work
 - Activity duration projections/revisions
 - Activity percent complete – actual percent complete of each activity not based on cost
 - Current events that affect construction progress – adverse weather, strikes, differing site conditions

1.8 TIME EXTENSIONS & DELAY CLAIMS

- A. Time extensions will only be granted for delays that will demonstratively delay the contractual project completion date as of the date of the delay and are authorized by executed change orders from the Contracting Officer. Please note that the delay **MUST** affect the contract completion date **at the time of the delay**.
- B. Contractors may not request additional compensation and/or time from the Housing Authority unless the cause of any delay is attributable to the act or failure to act of the Housing Authority or its representative, or to other causes beyond the contractors' control for which time extensions are available per the contract.

1.9 FLOAT

- A. **ALL** Float shall be recognized as a shared resource that is available for reasonable use by all parties under contract for this project, and by the Housing Authority if necessary. Float shall not be considered for the exclusive use of the Housing Authority or any single contractor. This includes but is not limited to any float generated due to the efficiencies

of any party, or efficiencies gained as a result of favorable weather within a calendar month, where the number of days of normally anticipated adverse weather are fewer than expected.

- B. Any submission, coupled with subsequent approval, of a CPS showing an early completion will have the effect of adding float to the project. This float shall be utilized as necessary and shall be recognized as outlined in Section 01310 Item 1.09 A. No compensation shall be due any contractor or the Owner for failure of any party to meet the early end date. No time extensions will be granted nor delay damages paid unless a delay occurs which impacts the project's critical path, consumes all available float or contingency time, and extends the work beyond the contract completion date. If a CPS submitted shows early completion, but after analysis and review by the Contracting Officer the CPS is determined not to reflect a reasonable plan for performance, the CPS shall be rejected and returned to the contractor for revision and resubmission per the guidelines of this section.

1.10 DISTRIBUTION

- A. The Contractor shall distribute all reviewed and approved CPS's to all project participants within one (1) working day of approval by the Contracting Officer.
- B. The Contractor shall keep a copy of all approved (past and current) CPS's on the project site at all times.

PART 2 PRODUCTS

CPSs' shall be developed in Microsoft Project scheduling software, or other software as approved by the Contracting Officer.

PART 3 EXECUTION Not Used

END OF SECTION 01310

SECTION - 01500
CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1. GENERAL

1.1 RELATED SECTIONS

- A. Section 01010 – Summary of Work
- B. Section 01039 – Coordination and Meetings
- C. Section 01700 – Contract Closeout: Final Cleaning

1.2 TEMPORARY VENTILATION

- A. The Contractor is to provide equipment to properly ventilate enclosed areas to assist the cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
- B. When practical, and upon the approval of the Authority Representative(s), extend and supplement equipment with additional fan units as required to maintain clear air for construction operations. Remove equipment at project closeout.
- C. The Contractor must be aware that any burning or dust will set off the existing fire alarm system. The Contractor must provide the Authority with advance notice so that the fire alarm system may be temporarily disconnected in that specific area of burning dust.

1.3 TELEPHONE SERVICE

- A. The Contractor shall provide for phone service and equipment to meet the needs of the Project.
- B. The Contractor shall provide and pay for telephone service for use of the Contractor Construction Manager.
 - 1. Include the cost for any and all calls.

1.4 TEMPORARY SANITARY FACILITIES

- A. The Contractor shall provide and maintain the following facilities and enclosures:
 - 1. Provide one (1) or more portable units as required by the Contractor personnel at the site, located where directed by the Authority Representative(s).
 - 2. Maintain temporary facilities in a clean and sanitary condition.
 - 3. Clean and service weekly, and more often if directed by the Construction Manager, each facility.
 - 4. Comply with applicable Pennsylvania Department of Environmental Resources requirements and with local codes.

5. Permit no public nuisance or unsanitary conditions to exist on the project site.
6. Remove temporary facilities when directed by the Engineer at the completion of the Project.
7. Provide toilet paper and supplies for temporary toilet facilities.

1.5 BARRIERS

- A. The Contractor shall provide barriers to prevent unauthorized entry to construction areas and to allow for Authority Representative(s) use of the site, and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
 1. Provide separations as required to accommodate construction work in progress in the event that the Phasing Schedule is not met.
 2. Provide barricades and covered walkways required by governing authorities for public rights-of-way.
 3. Protect non-owned vehicular traffic, stored materials, site and structures from damage.
 4. Provide and maintain OSHA-approved barriers at floor openings, stairs, roof openings, roofs, temporary railings and protection where required by OSHA.
- B. The Contractor shall reinstall or replace the temporary controls or protection meeting OSHA requirements necessary for the progress of the Work for their Contract.

1.6 PROTECTION OF INSTALLED WORK

- A. The Contractor shall:
 1. Protect the installed Work and provide special protection where specified in the individual Specification Sections.
 2. Provide temporary and removable protection for installed products. Control the activity in the immediate work area to minimize damage.

1.7 SECURITY

- A. The Contractor shall provide facilities to protect and secure the Work and construction operations from unauthorized entry, vandalism, or theft.
 1. Unlock the site at the beginning of the workday and lock and secure the site at the end of the workday.
- B. The Contractor shall provide security and protection of materials and equipment stored on the project site.
- C. The Contractor shall coordinate with the Authority's existing security program.
- D. The Contractor shall be responsible for installing exterior lights to adequately light all areas under construction.

1.8 PARKING

- A. The Authority Representative(s) will arrange for parking area to be used by construction personnel at the Pre-Construction Meeting.

1.9 PROGRESS CLEANING

- A. The Contractor shall maintain the site and work areas in a clean and orderly condition by adhering the following standards:
 - 1. Removing debris, garbage, litter, rubble, and rubbish from pipe chases, plenums, attics, and closed or remote spaces, prior to enclosing those spaces.
 - 2. Removing debris, garbage, litter, rubble, and rubbish from the Contractor's portion of the work site daily and depositing in trash collection facilities.
 - 3. Broom and vacuum cleaning interior areas prior to start of surface finishing, and continue cleaning to eliminate dust, and dirt from being present.
 - 4. Cleaning of construction vehicles prior to exiting the site, with water wash-down hose.
 - 5. Ensure mud and site soils are not carried onto the roadways.
- B. Do not place hazardous materials in the dumpster. Remove from the site by the Contractor.
- C. Workforce personnel are not allowed to eat meals within the confines of each building.

1.10 FIRE PROTECTION

- A. The Contractor shall provide the general temporary fire protection requirements.
 - 1. The Contractor shall provide fire protection for their own special requirements.

1.11 PROJECT INFORMATION SIGNS

- A. The Contractor shall provide information signs with large size lettering to allow legibility at a reasonable distance containing the following information:
 - 1. Bulletin boards with protective covers to post safety and code notices.

1.12 FIELD OFFICES AND SHEDS

- A. The Contractor shall provide a field office and storage sheds as required by their needs.
 - 1. Use of any Authority buildings as construction progresses will not be permitted as office or storage space.

- B. Locate offices as directed by the Authority Representative(s).

1.13 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

- A. The Contractor shall remove temporary above-grade or buried utilities, equipment, facilities, materials, prior to Substantial Completion and Final Application for Payment inspection.
- B. Remove underground installations to a minimum depth of two (2) feet. Grade site as indicated.
- C. Clean and repair damage caused by installation or use of temporary work.
- D. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.
- E. Restore areas under and adjacent to the Contractor's construction trailers after removal from site.

1.14 TEMPORARY FIRST-AID FACILITIES

- A. The Contractor shall provide temporary first-aid facilities as follows:
 - 1. Provide one (1) sixteen (16) unit first-aid kit (or equivalent) for each 25 persons, or fraction thereof, for all employees on the work site and additionally where required by the Regulatory Agencies.

PART 2. PRODUCTS Not Used.

PART 3. EXECUTION Not Used.

END OF SECTION 01500

SECTION 01501 TEMPORARY UTILITIES

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 requirements for temporary facilities and controls, including temporary utilities, support facilities, and security and protection facilities.
- B. Temporary utilities include, but are not limited to, the following:
 - 1. Water service and distribution.
 - 2. Electric power service.
 - 3. Lighting.
 - 4. Telephone service.
- C. Utilities to buildings must be maintained in operational condition 24 hours per day, 7 days per week. Contractor to provide temporary utilities to buildings that require interruption to the permanent utilities. Utility interruptions require a minimum of 7 days notice to the Owner.
- D. Related Sections include the following:
 - 1. Division 1 Section "Temporary Facilities and Controls" for access roads and parking areas, temporary controls, ventilation, support facilities, and security and protection facilities.
 - 2. Divisions 2 through 16 for temporary heat, ventilation, and humidity requirements for products in those Sections.

1.3 USE CHARGES

- A. General: Cost or use charges for temporary facilities are not chargeable to Owner, Owner's Representative, or Architect and shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:
 - 1. Owner's construction forces.
 - 2. Occupants of Project.
 - 3. Architect.
 - 4. Owner's Representative.
 - 5. Testing agencies.
 - 6. Personnel of authorities having jurisdiction.

- B. Water Service: Use water from Owner's existing water system without metering and without payment of use charges.
- C. Electric Power Service: Use electric power from Owner's existing system without metering and without payment of use charges.

1.4 QUALITY ASSURANCE

- A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.
 - 1. 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. Contractor who fails to carry out their responsibility in supplying utilities required for execution of the Work shall be held responsible for such failure. Owner shall have the right to take action, as it deems proper for the protection and conduct of the Work and shall deduct the cost involved from the amount due the Contractor at fault.
- B. Temporary Utilities: At earliest feasible time, when acceptable to Owner, change over from use of temporary service to use of permanent service.
 - 1. Temporary Use of Permanent Facilities: Installer of each permanent service shall 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 MATERIALS AND EQUIPMENT

- A. General: Provide new materials and equipment suitable for use intended. Undamaged, previously used materials in serviceable condition may be used if approved by Architect. Provide materials suitable for use intended.
- B. Water: Potable.
- C. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.
- D. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.

PART 3 - EXECUTION

3.1 TEMPORARY TELEPHONE SERVICE

- A. Telephone Service: Prime Contractor shall provide their own phone service and equipment to meet their needs throughout construction period. Provide job superintendent with cell phone to permit unlimited availability at any location on the project site.

3.2 TEMPORARY WATER SERVICE

- A. Where no other source of water is available in the construction areas, Contractor to provide, protect and maintain adequate water supply for use by all Contractors of the Work.
- B. Make available within 5 days, after written request from any Contractor requiring specified water service.
- C. Contractor shall install temporary water source at construction Entrance/Exit for use in tire and vehicle cleaning before exiting site.
- D. Install either permanent water supply line or temporary water supply line up to the building's footprint. Provide water with minimum flow of 15 gals. per minute and 40 lbs. pressure per sq.in.
- E. Special Service: Where supply of water greater than previously specified is required, Contractor requiring same shall install and pay all costs of such special service.
 - 1. Contractor requiring special service shall install, valve, maintain and protect temporary water lines from Plumbing Contractor's point of termination.
 - 2. When temporary water lines are no longer required, Contractor responsible for their installation shall remove them and restore to original condition any part of grounds or building disturbed or damaged by installation and removal of temporary water lines.

3.3 TEMPORARY LIGHT AND POWER SERVICE

- A. Electric Power Service: Use of Owner's existing electric power service will be permitted, as long as equipment is maintained in a condition acceptable to Owner.
- B. Contractor shall:
 - 1. Provide and maintain weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Provide uninterrupted electrical service to the heating, water and pumping equipment 24 hours a day, seven days a week.
 - a. Make available specified electric services, within two (2) days of written request from a Contractor requiring electrical power.

2. Extend electrical service to the building and/or portions thereof, and exterior pole lights in construction storage trailer area at location acceptable to Prime Contractors, and Architect.
 3. Provide receptacle outlets adequate for connection of power tools and equipment.
 4. Provide waterproof connectors to connect separate lengths of electrical power cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.
 5. Provide and maintain electrical service to any equipment installed by the General Contractor and/or Mechanical Contractor that is required for temporary and/or permanent heat.
 6. Remove temporary electrical lines when no longer required and restore to original condition grounds and building portions disturbed or damaged.
- C. Special Service: Where supply of electrical power and/or lighting greater than previously specified is required, Contractor requiring same shall install and pay all costs of such special service.

3.4 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.

END OF SECTION 01501

SECTION -01570
TRAFFIC REGULATION

PART 1. GENERAL

1.1 REQUIREMENTS INCLUDED

- A. The General Contractor shall provide, operate, maintain equipment services and personnel listed in this section and, as required to expedite the work.
- B. Remove temporary traffic equipment and facilities when no longer required, restore grounds to original or to specified conditions.

1.2 TRAFFIC SIGNALS AND SIGNS

- A. Provide and operate traffic control and directional signals required to direct and maintain an orderly flow of traffic in all areas under Contractor's control or affected by Contractor's operations.
- B. Provide traffic control and directional signs, mounted on barricades or standard posts:
 - 1. At each sidewalk.
 - 2. At parking areas.

1.3 FLAGPERSON

- A. Provide qualified and suitably equipped flagperson when construction operations encroach on traffic lanes.

1.4 FLARES AND LIGHTS

- A. Provide flares and lights during periods of low visibility.
 - 1. To clearly delineate traffic lanes and to guide traffic.
 - 2. For use by flagmen in directing traffic.

1.5 CONSTRUCTION PARKING CONTROL

- A. Control vehicular parking to preclude interference with public traffic or parking.
- B. Monitor parking or construction personnel's private vehicles.
- C. No Prime or subcontractor shall close or obstruct any streets, sidewalks, alleys or passageways unless specifically authorized. No material whatsoever shall be placed or stored in streets, alleys, or passageways. Each contractor shall so conduct his operations as to interfere as little as possible with the use ordinarily made of any roads, streets, driveways, alleys, sidewalk facilities, etc.

1.6 HAUL ROUTES

- A. Consult with governing authorities, establish thoroughfares that will be used as

- haul routes.
 - B. Provide traffic control at critical areas of haul routes to expedite traffic flow, to minimize interference with normal public traffic.
- PART 2. PRODUCTS Not Used.
- PART 3. EXECUTION Not Used.

END OF SECTION 01570

SECTION - 01600
MATERIAL AND EQUIPMENT

PART 1. GENERAL

1.1 SECTION INCLUDES

- A. Products
- B. Transportation and handling
- C. Storage and protection
- D. Product options
- E. Substitutions

1.2 RELATED SECTIONS

- A. Refer to the instructions to contractors, general conditions, special conditions, special requirements, and Division 1 and all drawings, which form part of this contract and have the same force and effect as if herein full.

1.3 PRODUCTS

- A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming the Work. Does not include machinery and equipment used for preparation, fabrication, conveying and erection of the Work. Products may also include existing materials or components required for reuse, if so specified.
- B. Material and Equipment Incorporated into the Work shall:
 - 1. Conform to applicable specifications and standards.
 - 2. Comply with size, make, type and quality specified, or as specifically approved in writing by the Architect/Engineer.
 - 3. Manufactured and Fabricated Products:
 - a. Design, fabricate, and assemble in accordance with the best engineering and shop practices.
 - b. Manufacture like parts of duplicate units to standard sizes and gages, to be interchangeable.
 - c. Two (2) or more items of the same kind shall be identical, by the same manufacturer.
 - d. Products shall be suitable for service conditions.
 - e. Equipment capacities, sizes, and dimensions shown, or specified, shall be adhered to unless variations are specifically approved in writing by the Authority.
 - 4. Do not use material or equipment for any purpose other than that for which it is designed or is specified.

- C. Do not use materials and equipment removed from existing premises, except as specifically permitted by the Contract Documents.
- D. Provide interchangeable components of the same manufacturer, for similar components.

1.4 REUSE OF EXISTING MATERIAL

- A. Except as specified, materials and equipment removed from the existing structure shall not be reused in the project.
- B. Use special care in removal, handling, storage, and reinstallation, to assure proper function in the completed work.

1.5 TRANSPORTATION AND HANDLING

- A. Arrange deliveries of products in accordance with project construction schedules. Contractor to coordinate the deliveries to avoid conflict of work, and to suit site conditions:
 - 1. Notify the Authority's Representative(s), 48 hours in advance, of all major deliveries.
- B. Transport and handle products in accordance with manufacturer's instructions.
- C. Promptly inspect shipments to assure that products comply with requirements, are in manufacturer's original containers with identifying labels intact, quantities are correct, and products are undamaged.
- D. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.

1.6 STORAGE AND PROTECTION

- A. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible. Store sensitive products in weather-tight, climate controlled enclosures.
- B. For exterior storage of fabricated products, place on sloped supports, above ground.
 - 1. Provide substantial platforms, blocking, or skids to support fabricated products above ground, prevent soiling, or staining.
 - a. Cover products subject to discoloration, or deterioration, from exposure to the elements, with impervious sheet coverings. Provide adequate ventilation to avoid condensation.
 - 2. Store loose granular materials on solid surfaces such as paved areas, or provide plywood or sheet materials to prevent mixing with foreign matter.
 - a. Provide surface drainage to prevent flow or ponding of rainwater.
 - b. Prevent mixing with refuse, chemically injurious materials, or liquids.
- C. Provide off-site storage and protection when site does not permit on-site storage

or protection.

- D. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation.
- E. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- F. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- G. Arrange storage of products to permit access for inspection. Periodically inspect to assure products are undamaged and are maintained under specified conditions.

1.7 INSPECTION AND MAINTENANCE STORED PRODUCTS

- A. Maintain periodic system of inspection of stored products on scheduled basis to assure that:
 - 1. State of storage facilities is adequate to provide required conditions.
 - 2. Required environmental conditions are maintained on a continuing basis.
 - 3. Surfaces of product exposed to elements are not adversely affected.
 - a. Weathering of products, coatings, and finishes is not acceptable under requirements of Contract Documents.
- B. Mechanical and electrical equipment which require servicing during long-term storage shall have complete manufacturer's instructions for servicing accompanying each item, with notice of enclosed instructions shown on exterior of package.
 - 1. Comply with manufacturer's instructions on scheduled basis.

1.8 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or descriptions.

PART 2. PRODUCTS Not Used.

PART 3. EXECUTION Not Used.

END OF SECTION 01600

SECTION - 01700
PROJECT CLOSEOUT

PART 1. GENERAL

1.1 SECTION INCLUDES

- A. Inspection procedures
- B. Project record document submittal
- C. Operating and maintenance manual submittal
- D. Submittal of warranties
- E. Final cleaning

1.2 RELATED SECTIONS

- A. Section 01011 – Summary of Work
- B. Section 01039 – Coordination and Meetings
- C. Section 01300 - Submittals
- D. Section 01500 – Construction Facilities and Temporary Controls

1.3 GENERAL CLOSEOUT PROCEDURES

- A. Submit written certification that the Contract Documents have been reviewed, Work has been inspected and that the Work is complete in accordance with the Contract Documents and ready for the Authority's Representative(s) punch list inspection.
- B. Provide submittals to the Architect/Engineer and Authority's Representative(s) that are required by governing authorities.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments and remaining sum due at the time of submission.

1.4 SUBSTANTIAL COMPLETION

- A. When the Contractor considers the Work to be substantially complete, the contractor shall submit to the Authority's Representative(s):
 - 1. Written notice that all Work, or designated portions thereof, is substantially complete.
 - 2. A list of items that need to be completed or corrected.
- B. Within a reasonable time after receipt of such notice, the Architect/Engineer and

Authority's Representative(s) will make an inspection to determine the status of completion.

- C. Should the Authority's Representative(s) consider the Work not to be substantially complete:
 - 1. The Authority's Representative(s) will promptly notify, in writing, the Contractor giving the reasons for the Authority's Representative(s) denial.
 - 2. The Contractor shall remedy the deficiencies in the Work and send a second written notice of substantial completion.
- D. The Authority's Representative(s) will re-inspect the Work.
- E. After concurrence between the Authority's Representative(s) that the Work is substantially complete, the Authority's Representative(s) will prepare for the Contractor's signature:
 - 1. A Certificate of Substantial Completion: Attached with the Certificate will be the Contractor's listing of items to be completed or corrected as verified by and amended by the Authority's Representative(s).
 - 2. Submit the Certificate to the Authority's Representative(s) for their written acceptance of the responsibilities assigned to them in the Certificate.

1.5 FINAL INSPECTION

- A. When the Contractor considers the Work to be complete, submit written certification to the Authority's Representative(s) that the following criteria have been met:
 - 1. Complete review of the Contract Documents.
 - 2. Work has been inspected in compliance with the Contract Documents.
 - 3. Equipment and systems have been tested in the presence of the Owner's representative and are operational.
 - 4. Work is completed and ready for final inspection.
- B. The Authority's Representative(s) will make inspections to verify the status of completion within reasonable promptness after receipt of the written notification.
- C. Should the Authority's Representative(s) consider the Work to be incomplete or defective:
 - 1. The Authority's Representative(s) will promptly notify, in writing, the Contractor, listing the incomplete or defective Work.
 - 2. The Contractor shall immediately remedy all of the listed deficiencies of the Work and send a second written notice to the Authority's Representative(s) that the Work is complete.
- D. The Authority's Representative(s) will re-inspect the Work. Each re-inspection will be charged against the Contractor.
- E. When the Authority's Representative(s) consider the Work to be acceptable according to the Contract Documents, the Contractor will be notified by the Authority's Representative(s) to commence with the submission of final closeout documents.

1.6 CONTRACTOR'S CLOSEOUT SUBMITTALS

- A. Evidence of compliance with the requirements of governing authorities:
 - 1. Certificates of Inspection
 - a. Electrical
 - b. Fire Marshall
 - c. Pennsylvania Department of Environmental Resources
 - d. Department of Labor and Industry
 - e. City of Pittsburgh
- B. Warranties and Bonds
- C. Spare parts and maintenance materials
- D. Contractor's Affidavit of Payment and Debts and Claims: TO requirements of General and Supplementary Conditions of the Contract.
- E. Final Contractor's Weekly Payroll Certifications for Public Work Projects. (Davis Bacon Acts and as complies with this Specifications General Conditions for Construction HUD-5370)
- F. Consent of Surety Company to Final Payments

1.7 FINAL ADJUSTMENT OF CONTRACT SUM

- A. Submit final statement of accounting to the Authority's Representative(s). The Authority's Representative(s) will review and forward to the Architect/Engineer for approval.
- B. The statement shall reflect all adjustments to the Contract Sum:
 - 1. The original Contract Sum
 - 2. Additions and deductions resulting from
 - a. Change Orders
 - b. Unit Prices
 - c. Deduction for uncorrected Work
 - d. Deduction for Liquidated Damages
 - e. Deduction for re-inspections payments
 - f. Other adjustments.
- C. The Architect/Engineer will prepare a Change Order, reflecting adjustments to the Contract Sum, which were not previously made by Change Orders. This is further defined in this Specifications General Conditions for Construction, HUD-5370, Page 10, Item 29 Changes.

1.8 FINAL APPLICATION FOR PAYMENT

- A. Contractor shall submit Final Application for Payment on HUD Forms HUD-51000, HUD-51001, HUD-51003, and HUD-51004 in accordance with the procedures and requirements stated in the Conditions of the Contract.

1.9 FINAL CLEANING

- A. Final cleaning shall commence prior to the Contractor's request for final inspection.
- B. Contractor, prior to Substantial Completion and Final Cleaning, shall remove all debris, rubbish, materials, cartons, crates, protective wrappings and films and other construction-related items prior to final cleaning.
- C. All Contractors shall, prior to Substantial Completion and Final Cleaning, wipe the surfaces of the mechanical and electrical equipment. Remove all excess oil and other substances prior to the Final Cleaning.
- D. All Contractors, prior to Substantial Completion and Final Cleaning, shall remove labels and markings that are not permanent.

1.10 ADJUSTING

- A. Adjust operating products and equipment to ensure smooth and unhindered operations.

1.11 PROJECT RECORD DOCUMENTS

- A. Maintain on-site, one set of the following record documents; clearly label each document "Project Record". Record actual revisions to the Work:
 - 1. Contract Drawings
 - 2. Specifications
 - 3. Addenda
 - 4. Field Test Reports
 - 5. Change Orders and other modifications to the Contract
 - 6. Reviewed shop drawings, product data and sample
- B. Store Record Documents separately from documents used for construction in drawing file rack.
- C. Record information concurrent with construction progress in colored pen or marker (red-lines). The drawings shall show exact routing, mounting locations and power circuits used during the installation.
- D. Specifications: legibly mark, and record, at each product section the description of actual products installed, including the following:
 - 1. Manufacturer's name and product installed
 - 2. Product substitution or alternates utilized
 - 3. Changes made by Addenda and modifications
- E. Record Drawings: legibly mark, and record each item to record actual construction including:
 - 1. Measured depths of foundations in relation to finished first floor
 - 2. Measured horizontal and vertical location of underground utilities and appurtenances

3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features in the Work
 4. Field Changes of dimensions and details
 5. Details not on original Contract Drawings
- F. Delete the Engineer's title block from all the Documents.
- G. Submit documents to the Architect/Engineer with Final Application for Payment. Accompany submittal with transmittal containing project number, title, contractor's name and signature of contractor's authorized representative.

1.12 SPARE PARTS AND MAINTENANCE MATERIALS

- A. Provide products, spare parts, maintenance and extra material in quantities specified in individual specifications sections.
- B. Deliver to project site, or place in locations as directed; obtain receipt of acceptance by Authority prior to final payment.

PART 2. PRODUCTS Not Used.

PART 3. EXECUTION Not Used.

END OF SECTION 01700

SECTION 02220
SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Demolition and removal of selected portions of building elements.
2. Demolition and removal of selected site and protection elements.
3. Identification of demolition as indicated on the Drawings.

B. Related Sections include the following:

1. Division 01 Section 01010 "Summary" for use of premises and Owner-occupancy requirements.
2. Division 01 Section 01500 "Temporary Facilities and Controls" for temporary construction and environmental-protection measures for selective demolition operations.
3. Division 01 Section 01045 "Execution" for cutting and patching procedures.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of them off-site, unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction and deliver them to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, prepare them for reuse, and reinstall them where indicated.
- D. Existing to Remain: Existing items of construction that are not to be removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.3 SUBMITTALS

A. Qualification Data: For demolition firm.

B. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.

4. Means of protection for items to remain and items in path of waste removal from building.

1.4 QUALITY ASSURANCE

- A. Demolition Firm Qualifications: An experienced firm that has specialized in demolition work similar in material and extent to that indicated for this Project.
- B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- C. Standards: Comply with ANSI A10.6 and NFPA 241.

1.5 PROJECT CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
 1. Comply with requirements specified in Division 01 Section "Summary."
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: No hazardous materials have been documented in or around the work area.
- E. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition 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 so as not to void existing warranties.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before affected work is to begin.

- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. Inventory and record the condition of items to be removed and reinstalled and items to be removed and salvaged.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect. Contact at: info@tusickarchitects.com
- E. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems: Maintain services/systems indicated to remain and protect them against damage during selective demolition operations.
 - 1. Comply with requirements for existing services/systems interruptions specified in Division 01 Section "Summary."

3.3 PREPARATION

- A. 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.
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Division 01 Section "Temporary Facilities and Controls."

3.4 SELECTIVE DEMOLITION, GENERAL

- 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. Proceed with selective demolition systematically, replacing one panel at a time. Coordinate with adjacent areas of work.

2. 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, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
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 adequate ventilation when using cutting torches.
5. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
6. Remove structural members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
7. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
8. Dispose of demolished items and materials promptly.
9. Provide demolition of existing asphalt as shown on the Contract Drawings.
10. Ensure that demolition materials are disposed of properly.
11. Ensure that areas affected by asphalt demolition do not interfere with Owner activities.

B. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers.
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.

C. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse. Paint equipment to match new equipment.
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.

- D. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition & cleaned and be reinstalled in their indicated locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete/Asphalt: Demolish in small sections. Cut concrete/asphalt to a depth of at least 3/4 inch at junctures with construction to remain, using power-driven saw. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut

reinforcement, and then remove remainder of concrete indicated for selective demolition. Neatly trim openings to dimensions indicated.

- B. Roofing: Remove no more existing roofing than can be covered in one day by new roofing and so that building interior remains watertight and weathertight.
 - 1. Remove one section of arch panel at a time and install replacement as indicated per manufacturer's instructions.
 - 2. Consult with manufacturer to confirm structural integrity when removing arch panels.

3.6 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.7 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

3.8 SELECTIVE DEMOLITION SCHEDULE

- A. As indicated on the Drawings.

END OF SECTION 02220

SECTION 02750
ASPHALT PAVING

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents:
 - 1. Drawings and general provisions of the Subcontract apply to this Section.
 - 2. Review these documents for coordination with additional requirements and information that apply to work under this Section.
- B. Section Includes:
 - 1. Hot-mix asphalt paving.
- C. Related Sections:
 - 1. Division 32 Section 321214 "Joint Sealant."
 - 2. Division 32 Section 321313 "Concrete Paving."

1.2 REFERENCES

- A. General:
 - 1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
 - 2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
- B. State of Pennsylvania - Pennsylvania Department of Transportation (PENDOT):
 - 1. Standard Specifications, excluding measurement and payment items.

1.3 SUBMITTALS

- A. Submit under provisions of Division 01 Section "General Requirements."
- B. At no additional cost to the HACP, submit such quantities of construction materials as may be required by the HACP for test purposes.
- C. Submit signed verification from the source of supply for each material used on the Work indicating that the materials meet specified requirements.
- D. Submit manufacturer's certification of the actual volatile organic compounds (VOC) for pavement paints and bituminous sealers proposed for use on the Work. VOC content shall meet the applicable Environmental Protection Agency (EPA) Rules, Regulations, and Manual of Procedures for the time and place of application and intended use.
- E. Submit mix designs of asphaltic concrete to be used in the Project for approval by the Architect.

1.4 QUALITY ASSURANCE

- A. Qualifications of Workers: Provide sufficient skilled workers and supervisors who shall be present at all times during execution of this work and who shall be thoroughly familiar with the type of construction involved and the materials and technique specified.
- B. Obtain materials specified in this section from the same sources throughout the Work.
- C. Maintain one copy of the Drawings and Specifications on site.
- D. Work shall conform to the requirements of the Environmental Protection Agency (EPA).

1.5 PROJECT CONDITIONS

- A. Environmental Requirements:
 - 1. Do not place asphalt when base surface temperature is less than 50 deg F (10 deg C), or if surface is wet or frozen.
 - 2. Liquid asphalt shall be prevented from spraying upon adjacent pavements, that portion of the traveled way being used by traffic, structures, railings and barriers, markers, trees and shrubbery that are not to be removed, adjacent property and improvements, and other roadway improvements or facilities not mentioned herein.

PART 2 - PRODUCTS

2.1 ASPHALT MATERIALS

- A. Asphaltic Concrete: Conform with PENDOT Standard Specifications. **[Asphalt paving for base course shall have a mix designed for an aggregate of three quarters of an inch maximum size, Type A.]** Asphalt concrete for wearing courses shall have a mixed design for an aggregate of one-half inch maximum size, Type B.
- B. Paving Asphalt to be used as a Binder for Pavement Reinforcing Fabric: Steam-refined asphalt conforming to PENDOT Standard Specifications, "Asphalts."
 - 1. Select bitumen ratio in accordance with the tests specified in PENDOT Standard Specifications.
- C. Prime Coat and Paint Binder: Grade SSI, conforming to PENDOT Standard Specifications.
- D. Pavement Reinforcing Fabric: Conform to PENDOT Standard Specifications.
- E. Asphalt Treated Permeable Base: A mixture of aggregate and asphalt binder conforming to PENDOT Standard Specifications.
 - 1. Aggregate for Asphalt Treated Permeable Bases: Clean and free from decomposed materials, organic material, and other deleterious substances.

2. Asphalt Binder to be Mixed with the Aggregate: Steam-refined paving asphalt conforming with PENDOT, "Asphalts," unless otherwise specified by the Engineer.

F. Filter fabric: 100 percent post consumer recycled plastic content.

2.2 ACCESSORIES

- A. Primer: Homogeneous, medium, or rapid curing, liquid asphalt in accordance with PENDOT Standard Specifications.
- B. Tack Coat: Homogeneous, medium or rapid curing, liquid asphalt in accordance with PENDOT Standard Specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that compacted granular base is dry and ready to support paving and imposed loads.
- B. Verify that gradients and elevations of base are correct.

3.2 PRIME COAT, TACK COAT, AND PAINT BINDER

- A. Paint binder shall conform to the provisions of Section 39-4 of the State Standard Specifications. Paint binder shall be utilized on existing exposed asphalt surfaces prior to pavement reinforcing fabric placement and prior to new pavement placement.
- B. Paint binder shall be applied at the rate of approximately 0.25 gallons per square yard of surface area to existing pavement that will be in contact with the pavement reinforcing fabric and final pavement. Apply primer to contact surfaces of curbs, gutters and exposed vertical surfaces.
- C. Coat surfaces of manhole, catch basin, or other covers or encumbrances scheduled to remain with oil to prevent bond with asphalt pavement. Do not tack coat these surfaces.
- D. Use clean sand to blot excess primer.

3.3 PLACING PAVEMENT REINFORCING FABRIC

- A. Pavement reinforcing fabric shall be placed on existing pavement to be surfaced or between layers of asphalt concrete when such work is shown on the plans, or specified in the Special Provisions.

- B. Before placing the pavement reinforcing fabric, a binder of paving asphalt shall be applied to the surface to receive the pavement reinforcing fabric at an approximate rate of 0.25 gallons per square yard of surface covered. The exact rate will be determined by the Project Architect-Engineer. The binder shall be applied to a width equal to the width of the fabric mat plus 3 inches (76 mm) on each side.
- C. Before applying binder, large cracks, spalls, and chuckholes in existing pavement shall be repaired as directed by the Project Architect-Engineer.
- D. The fabric shall be stretched, aligned, and placed with no wrinkles that lap. The test for lapping shall be made by gathering together the fabric in a wrinkle. If the height of the doubled portion of extra fabric is 1/2 inch or more, the fabric shall be cut to remove the wrinkle, then lapped in the direction of the paving. Lap in excess of 2 inches (50 mm) shall be removed.
- E. Pavement reinforcing fabric shall not be placed in areas of conform tapers where the thickness of the overlying asphalt concrete is 0.08 feet (24 mm) or less.
- F. If manual lay down methods are used, the fabric shall be unrolled, stretched, aligned, and placed in increments of approximately 30 feet (9.1 m).
- G. Adjacent borders of the fabric shall be lapped 4 to 6 inches (100 mm to 150 mm). The preceding roll shall lap 4 to 6 inches (100 mm to 150 mm) over the following roll in the direction of paving at ends of rolls or at any break (exception - where necessary to form a smooth transition on curved sections). At fabric overlays, both the tack coat and the fabric shall overlap the previously placed fabric by the same amount.
- H. Seating of the fabric with rolling equipment after placing will be permitted. Turning of the paving machine and other vehicles shall be gradual and kept to a minimum to avoid damage.
- I. A small quantity of asphalt concrete, to be determined by the Project Architect-Engineer, may be spread over the fabric immediately in advance of placing asphalt concrete surfacing in order to prevent fabric from being picked up by construction equipment.
- J. Public traffic shall not be allowed on the bare reinforcing fabric, except that public cross traffic shall be allowed to cross the fabric, under traffic control, after the Subcontractor has placed a small quantity of asphalt concrete over the fabric.
- K. Care shall be taken to avoid tracking binder material onto the pavement reinforcing fabric or distorting the fabric during seating of the fabric with rolling equipment. If necessary, exposed binder material shall be covered lightly with sand.

3.4 PLACING ASPHALT PAVEMENT

- A. Asphalt concrete surfacing shall conform to PENDOT Standard Specifications. Paving shall be done under suitable weather conditions for such operations. Temperatures shall be above 50 deg F (10 deg C) during placement of paving, and shall be above

40 deg F (4.4 deg C) during placement of asphalt treated permeable base. Rain or other inclement weather will be cause for discontinuing paving work.

- B. The completed surface of the top course shall be of uniform texture, smooth, of uniform grade, and free from defects.
- C. Compact pavement by rolling. Do not displace or extrude pavement from position. Compaction by vehicular traffic is not permitted. Hand compact in areas inaccessible to rolling equipment.
- D. Develop rolling with consecutive passes to achieve an even and smooth finish without roller marks.
- E. Place asphalt concrete with a motorized paving machine. Use of a pull box to place asphalt concrete is not allowed.

3.5 TOLERANCES

- A. Paving asphalt shall be applied at a temperature of not less than 250 deg F (50 deg C), nor more than 375 deg F (75 deg C). The exact temperature will be determined by the on-site Lawrence Berkeley Laboratory Inspector. The Subcontractor will give the HACP 24 hours notice before paving operations are to be started.
- B. Flatness: Maximum variation of 1/4 inch (7 mm) measured with 10-foot (3 m) straight edge.
- C. Scheduled Compacted Thickness: Place to 1/2 inch (13 mm) compacted thickness.
- D. When deviations in excess of the above tolerances are found, the pavement surface shall be corrected by the addition of asphalt concrete mixture of an appropriate class to low places or the removal of material from high places by methods satisfactory to the Project Architect-Engineer or by removal and replacement of the course of asphalt concrete. Corrections of defects shall be carried out until there are no deviations anywhere greater than the allowable tolerances.
- E. Areas in which the surface of the completed pavement deviates more than twice the allowable tolerances described above shall be removed and replaced to the satisfaction of the Project Architect-Engineer.
- F. Costs involved in making the corrections of defects described above shall be borne by the Subcontractor and no compensation will be made for this work.

3.6 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed under provisions of Division 01 Section 014000 "Quality Requirements."

3.7 PROTECTION

- A. Immediately after placement, protect pavement from mechanical injury for a minimum of at least 3 hours. Asphalt concrete shall not be exposed to vehicular traffic until the temperature is less 150 deg F (30 deg C).
- B. Protection of Existing Street Surface: During the entire construction period, protect existing pavement or sealed surfaces. Backhoes and trenchers must have street pads as grousers, metal tipped pads will not be allowed. Repair surfaces scarred by cleanup or excavation equipment in a manner satisfactory to the Project Architect-Engineer. Repair damage caused by the Subcontractor's operations to existing roads and streets, including striping and raised pavement markers to the satisfaction of and at no additional cost to the HACP.

END OF SECTION

SECTION 03300
CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents:
 - 1. Drawings and general provisions of the Subcontract apply to this Section.
 - 2. Review these documents for coordination with additional requirements and information that apply to work under this Section.
- B. Section Includes:
 - 1. Cast-in-place concrete.
- C. Related Sections:
 - 1. Section 011000 - Summary

1.2 REFERENCES

- A. General:
 - 1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
 - 2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
 - 3. Refer to Division 01 Section "General Requirements" for the list of applicable regulatory requirements.
- B. American Concrete Institute (ACI):
 - 1. ACI 211.1 Proportioning Concrete Mixtures
 - 2. ACI 301 Specifications for Structural Concrete
 - 3. ACI 303.1 Specification for Cast-in-Place Architectural Concrete
 - 4. ACI 305 Hot Weather Concreting
 - 5. ACI 306 Specifications for Cold Weather Concreting
 - 6. ACI 308 Specifications for Curing Concrete
 - 7. ACI 309 Consolidation of Concrete
 - 8. ACI 318 Building Code Requirements for Structural Concrete
- C. American Society for Testing and Material (ASTM)
 - 1. ASTM C31 Practice for Making and Curing Concrete Test Specimens in the Field
 - 2. ASTM C33 Specification for Concrete Aggregates
 - 3. ASTM C94 Specification for Ready Mix Concrete
 - 4. ASTM C143 Test Method for Slump of Hydraulic Concrete
 - 5. ASTM C150 Specification for Portland Cement
 - 6. ASTM C156 Standard Test Method for Water Retention by Liquid Membrane Forming Curing Compounds for Concrete

7. ASTM C171 Specification for Sheet Materials for Curing Concrete
 8. ASTM C172 Practice for Sampling Freshly Mixed Concrete
 9. ASTM C260 Specifications for Air Entraining Admixtures for Concrete
 10. ASTM C309 Specification for Liquid Membrane - Forming Compounds for Curing Concrete
 11. ASTM C330 Specification for Lightweight Aggregates for Structural Concrete
 12. ASTM C494 Specification for Chemical Admixtures for Concrete
 13. ASTM C567 Test Method for Determining Density of Structural Lightweight Concrete
 14. ASTM C618 Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete
 15. ASTM C881 Specification for Epoxy - Resin - Base Bonding Systems for Concrete
 16. ASTM E1745 Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill Under Concrete Slabs
- D. American Association of State Highway and Transportation Officials (AASHTO):
1. M182-60 - Burlap Cloth Made for Jute or Kelat
- E. American Institute of Steel Construction (AISC):
1. Code of Standard Practice for Steel Buildings and Bridges

1.3 SUBMITTALS

- A. Submit under provisions of Division 01 Section 013300 "Submittal Procedures."
- B. Product Data: Provide data from proprietary materials, including admixtures curing materials, and finish materials.
- C. Submit Placement Shop Drawings, showing location of construction joints. Clearly indicate the construction joints in different locations than those shown in the Drawings.
- D. Samples: As requested by Testing Laboratory.
- E. Mix design for each concrete mix sealed by an engineer registered in Pennsylvania.
1. Include compression test data used to establish mix proportions.
- F. Submit certification that the facilities of the ready-mix plant comply with the requirements of ASTM C94.
- G. Material Certificates.
1. Cementitious materials, including supplemental cementitious material.
 2. Aggregates, including gradation and combined gradation.
 3. Admixtures. Where more than one admixture is proposed, include statement from admixture manufacturer indicating that admixtures proposed for use are compatible, such that desirable effects of each admixture will be realized.
- H. Submit ticket to Testing Laboratory for each batch of concrete delivered, bearing the following information. Refer to "Field Quality Control" Article of this Section.
1. Mix identification.

2. Weights of cementitious materials, aggregates, water and admixtures, and aggregate size.
- I. Submit test reports from the independent testing agency for review by the Owner/Engineer.

1.4 QUALITY ASSURANCE

- A. Quality assurance and inspection shall be in accordance with Division 01 Section 014000 "Quality Requirements."
- B. Standards: Comply with provisions of ACI 301, except where more stringent requirements are indicated. Evaluation and acceptance of concrete structures will be in accordance with ACI 301.
- C. Concrete Mix Design: Testing Laboratory shall, under direction of its Pennsylvania registered Civil Engineer, design concrete mixes. Each mix shall bear the signature, seal and registration expiration date of the engineer directing the design work. For mixes containing greater than twenty five percent fly ash, the Testing Laboratory shall produce calculations and test batches in accordance with the recommendations of ACI 211.1 to determine the minimum water content and to confirm workability, curing time and compressive strength.
- D. Certificates of Compliance: Acceptability of the following materials will be based upon documentation furnished by the manufacturer identifying each batch of material and certifying compliance with the requirements specified:
 1. Portland cement.
 2. Fly ash.
 3. Chemical admixtures.
- E. Certified Laboratory Test Reports: Before delivery of materials submit certified copies of the reports of the tests required in referenced standards or otherwise specified here. The testing shall have been performed by an independent laboratory approved by the University within one year of submittal of test reports for approval. Test reports on a previously tested material shall be accompanied by notarized certificates from the manufacturer certifying that the previously tested material is of the same type, quality, manufacture and make as that proposed for use in the Project. Certified test reports are required for the following:
 1. Portland Cement.
 2. Aggregates.
 3. Admixtures.
- F. Survey anchor bolts for placement and alignment prior to casting concrete.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

- A. Cementitious materials and aggregates for exposed concrete shall be from same source throughout the work.
- B. Cementitious Material: An intimate blend of Portland cement and supplemental cementitious material. Cementitious material shall include [15 percent minimum to a maximum of 25 percent] fly ash or ground blast furnace slag by weight unless the strength is specified to be achieved in 7 or 14 days. Cementitious material shall comply with ACI 318 Chapter 4 requirements for exposure class S1.
- C. Supplemental Cementitious Materials:
 - 1. Fly Ash: ASTM C618, Class F with the following Modified ASTM requirements:
 - a. Loss of Ignition (L.O.I.): maximum 1 percent.
 - b. Sulfur Trioxide (SO₃) shall not exceed 3 percent by weight.
 - c. Water requirement maximum: 100 percent control.
 - 1) $R = (\text{CaO} - 5 \text{ percent}) / (\text{Fe}_2\text{O}_3)$, where R (sulfate resistance) is 0.75 maximum and CaO/Fe₂O₃ is the percentage from fly ash oxide analysis.
 - 2. Ground Blast Furnace Slag: ASTM C989.]
- D. Aggregate for Standard Weight Concrete: ASTM C33, except as modified herein.
 - 1. Coarse Aggregates: Cleanliness Value of not less than 75 when tested as per CMM-Test Method No. California 227.
 - 2. Coarse Aggregate for Shrinkage Controlled Concrete: Lonestar, or Hanson Clayton, or Sechelt, B.C., or equal.
 - 3. Fine Aggregates: Sand Equivalent of not less than 75 when tested per CMM-Test Method No. California 217.
- E. Aggregate for Lightweight Concrete: ASTM C330. Lightweight aggregate shall be vacuum saturated expanded shale or clay produced by rotary kiln.
- F. Water: Mixing water shall be clean, potable, and free from deleterious material.
- G. Admixtures
 - 1. General:
 - a. Admixtures containing more than 0.05 percent chloride ions are not permitted.
 - b. Where mix contains more than one admixture, all admixtures shall be supplied by one manufacturer. Manufacturer shall certify that admixtures are compatible such that desirable effects of each admixture will be realized.
 - c. Liquid admixtures shall be considered part of the total water.
- H. Lightweight Concrete shall contain an air entrainment admixture conforming to ASTM C260, to produce an air content of 3 to 5 percent at point of placement.
- I. Water Reducing Admixture: ASTM C494, Type A. Provide in all concrete at necessary dosage to facilitate placement.
- J. Mid to High Range Water Reducing Admixture: ASTM C494, Type F; polycarboxylate formulation. Provide in mid-range or high-range dosage as necessary for placement at the maximum water to cement ratio specified.

- K. Set Accelerating Admixture: ASTM C494, Type E, non-chloride. Subject to approval of Architect, provide in necessary dosage to accelerate set.
- L. Set Retarding Admixture: ASTM C494, Type D. Subject to approval of Architect, provide in necessary dosage to retard set.

2.2 ACCESSORIES

- A. Curing Compounds: ASTM C309, [Type I, clear or translucent without dye,] [Type 1-D, clear or translucent with fugitive dye] or Type 2, white pigmented] and which will not discolor concrete or affect bonding of other finishes applied thereover, and which restricts loss of water to not more than 0.500 grams per square centimeter of surface when tested per ASTM C156, "Test Method for Water Retention by Concrete Curing Materials."
- B. Slab Curing Membrane: Membrane conforming to ASTM C171, non-staining.
- C. Burlap Sheet: AASHTO M182, class 3 or 4.
- D. Surface Hardener: Lapidolith, Hornolith, Kemi-Kal Liquid or equal.
- E. Rock Base: Clean, hard and durable gravel or crushed rock conforming to the requirements of PENDOT Standard Specifications for Class 1, Type A permeable material.
- F. Vapor Barrier: ASTM D2103, "Polyethylene Film and Sheeting."
- G. Sand Cover: Uniformly graded, clean sand free from excessive fines, organic materials or other deleterious substances.
- H. Form Tie Cone Hole Plugs: Burke Co., Grey, Recessed, Jumbo Cone, "Snaplug", or equal (no known equal) with waterproof adhesive.
- I. Filter drains such as behind concrete walls: Type A drain rock conforming to Division 31 Section "Backfilling" or prefabricated drain manufactured with polyethylene stranded or molded core and a geotextile fabric bonded to one side. Filter drains shall be manufactured by Mirafi, Exxon, or equal approved by the Architect-Engineer.
- J. Embedded Reglets and Dovetail Anchor Slots: 18 gauge galvanized steel.
- K. Bonding Agent: Burke Acrylic Bondcrete, Thorobond, or equal.

2.3 CONCRETE MIXES

- A. Schedule of Concrete Classes:

Mix ID/Use	Aggregate Size	Slump	Min. Strength	Other Req'ts

Mix ID/Use	Aggregate Size	Slump	Min. Strength	Other Req'ts
Mix A Drilled Piers, Foundations	Size 57 (1 inch) (25 mm)	4 to 6 inches (100 to 150 mm)	4000 psi (27.6 MPa)	
Mix B Walls, Columns, Suspended Slabs & Beams	Size 57 (1 inch) (25 mm)	4 to 6 inches (100 to 150 mm)	4000 psi (27.6 MPa)	Req't E.1, Req't E.2
Mix C Floor Slabs on Grade, Miscellaneous Concrete	Size 57 (1 inch) (25 mm)	3 to 5 inches (75 to 125 mm)	4000 psi (27.6 MPa)	Req't E.1, Req't E.2
Mix D Lightweight Concrete Fill on Metal Decking	1/2 inch (13 mm) by #4 lightweight	3 to 5 inches (75 to 125 mm)	4000 psi (27.6 MPa)	Req'ts E.2 and E.3
Mix E Miscellaneous concrete for curbs, pads, etc.	Size 57 (1 inch) (25 mm)	3 to 5 inches (75 to 125 mm)	3500 psi (24.1 MPa)	
Lean Concrete	Size 57 (1 inch) (25 mm)	3 to 5 inches (75 to 125 mm)	1500 psi (10.3 MPa)	

- B. Aggregate: Coarse aggregate size number in accordance with ASTM C33 for normal-weight aggregate. Coarse aggregate size in accordance with ASTM C330 for lightweight aggregates.
- C. Slump: Minimum-maximum slump at point of placement in inches when tested in accordance with ASTM C143.
- D. Strength: Minimum compressive strength in psi after 14 days, tested in accordance with ASTM C39.
- E. Other Requirements (apply only where indicated in Schedule of Concrete Mixes)
- Shrinkage Controlled Concrete: Use special coarse aggregates specified. Select materials and proportion mix to achieve shrinkage less than 0.040 percent (ASTM C157 modified).
 - Water to Cementitious Material Ratio: Mixes "B", "C" and "D" shall have a water-to-cementitious-material ratio not exceeding 0.45 by weight. Weight of water shall include all free moisture, including liquid admixtures. Mixes shall contain specified high range water reducing admixture at mid-range dosage as required to achieve specified slump.
 - Lightweight Concrete: Equilibrium weight (at 100 days air dry) of 113 pcf plus or minus 3 pcf, ASTM C567. Mix shall contain 4 percent, plus or minus 1 percent, entrained air by volume at point of placement.

- F. Proposed mixes shall produce concrete to strengths specified with adequate workability and proper consistency to permit concrete to be worked into forms and around reinforcement without excessive segregation or bleeding.
- G. Mix design shall be subject to review by the Owner's Representative and the Testing Laboratory. Submit mixes in a timely manner to allow for review and adjustment, if necessary.
- H. Add air entraining agent to normal weight concrete mix for work exposed to exterior.
- I. Concrete mixes used for liquid nitrogen tank foundations shall comply with ACI 318 Chapter 4 requirements for exposure class F1.
- J. For any concrete mix that uses greater than 45% total cementitious material the maximum water-cement ratio shall not exceed 0.38.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify site conditions.
- B. Verify requirements for concrete cover over reinforcement.
- C. Verify that anchor bolts, embedded plates, reinforcement, sleeves, and other items to be cast into concrete are accurately placed, positioned securely, and will not cause hardship in placing concrete.

3.2 FORMWORK ERECTION

- A. Verify lines, levels, and measurement before proceeding with formwork.
- B. Hand trim sides and bottom of earth forms; remove loose dirt.
- C. Align form joints.
- D. Do not apply form release agent to concrete surfaces which receive [special finishes] [or] [applied coatings] that may be affected by agent.
 - 1. Coordinate work of other sections in forming and setting openings, slots, recesses, chases, sleeves, bolts, anchors, and other inserts.

3.3 REINFORCEMENT AND EMBEDDED ITEMS

- A. Place, support, and secure reinforcement and embedded items against displacement.

- B. Installation tolerances for anchor bolts for structural steel columns shall comply with the AISC Code of Standard Practice for Steel Buildings and Bridges requirements for tolerances.

3.4 PLACING CONCRETE

- A. Notify the Owner at least 48 hours prior to commencement of concreting operations. No concrete shall be placed until all subgrade, formwork, reinforcing steel, embedded items, and surfaces against which concrete is to be placed have been accepted by the Architect. The rate of delivery, haul time, missing time, and hopper capacity shall be such that all mixed concrete delivered shall be placed in forms within 90 minutes from the time of the introduction of cement and water into the mixer. No water shall be added after transit mixer leaves the batching plant without the approval of the Owner.
- B. Prepare previously placed concrete by cleaning with [steel brush] or [sandblasting] [waterblasting] [wet sandblasting] and applying bonding agent in accordance with manufacturer's instruction.
- C. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with [non-shrink grout] or [epoxy grout].
- D. Foundation surfaces against which concrete is to be placed must be free from standing water, mud and debris. Surfaces shall be clean and free from oil, objectionable coatings, and loose or unsound material.
- E. All surfaces of forms and embedded items shall be free of grout before placing concrete.
- F. Install [joint fillers] and [waterstops] in accordance with manufacturer's instructions. Install 1/2-inch (13 mm) thick joint filler to separate slabs on grade from vertical surfaces. Extend joint filler from bottom of slab to within 1/4-inch (6 mm) of finished slab surface.
- G. Locate construction joints where indicated on the Structural Drawings.
- H. When ambient temperature is expected to exceed 80 degrees F during placing or finishing operations, steps shall be taken in accordance with ACI 305, "Recommended Practices for Hot Weather Concreting", to reduce concrete temperature and water evaporation by proper attention to the ingredients, production methods, handling, placing, protection and curing. The Subcontractor shall submit a detailed hot weather concreting procedure to the A/E for approval at least two business days before concrete placement is planned. The Subcontractor's testing agency will produce trial batches in accordance with ACI 305. Slabs will be fog sprayed from the completion of screeding until curing is begun; the fog spray may be discontinued on sections during troweling.

3.5 FLOOR SLABS

- A. Place floor slabs [in long strip patterns] [as indicated on Drawings]. Saw cut control joints at an optimum time after finishing. Cut slabs with a 3/16-inch (8 mm) thick blade to 1 inch (25 mm) depth.
- B. Separate slabs on grade from vertical surfaces with joint filler. Extend joint filler from bottom of slab to within 1/4 inch of finished slab surface.
- C. Nonslip finish surfaces.
- D. Install joint devices and joint device anchors in accordance with manufacturer's instructions. Maintain correct position to allow joint cover flush with floor finish.
- E. Construct slab on grade and shored elevated floor slabs with overall specified F_F30/F_L20 and with minimum F_F15/F_L10 for individual floor sections in accordance with ACI 302.1. Determination of F_F/F_L numbers will be in accordance with ASTM E 1155. The Subcontractor will take remedial measures when floor slabs do not meet specified requirements. The Subcontractor's plan for remedial measures shall be submitted to the Architect for review and approval. Slope slabs to drains 1/4 inch (6mm) per foot nominal, away from building.

3.6 SCHEDULE OF FORMED SURFACES

- A. Smooth surface finish at all locations.

3.7 CURING AND PROTECTION

- A. The requirements of this section may be modified only by the Structural Engineer of Record (SER) for the design. In those cases where the Structural Engineer of record is under subcontract to the Laboratory, approval by a Laboratory Structural Engineer is required prior to modification of the requirements of this section.
- B. Wheeling, working and walking on concrete shall be avoided for at least 24 hours after casting. Protect concrete from sun and rain. Do not permit concrete to become dry during curing period. Concrete shall not be subjected to any loads until concrete is completely cured, and until concrete has attained its 28 day strength and 14 days minimum.
- C. Protect concrete during and after curing from damage during subsequent building construction operations.
- D. Cover traffic areas with plywood or other suitable means for as long as necessary to protect concrete from damage.
- E. Specific curing requirements for slabs shall include the following: Immediately upon completion of finishing operation, the surface of slabs shall be sealed against moisture loss by the application of a curing blanket made of polyethylene bonded to burlap in accordance with the manufacturer's instructions. Alternatively, waterproof curing paper may be used with edges lapped and sealed with tape. The curing membrane shall be

weighted down. Tears and rips in curing membrane shall be repaired immediately during curing period. Curing shall be maintained for 21 days.

- F. Specific curing requirements for walls, beams and columns shall include the following: Concrete in forms shall be kept moist until removal. Immediately upon removal of forms, an approved sprayed-on curing compound shall be applied to the concrete surfaces in strict compliance with the manufacturer's recommendations. Curing shall be maintained for 14 days.
- G. For above grade concrete sections over three feet thick in all three orthogonal directions except lean concrete:
 - 1. Ten days before placing concrete, the results of thermal test performed by the Subcontractor will be submitted to the Architect for approval. Thermal tests shall consist of a three foot test cube of the design mix for the thick section instrumented with thermocouples by the Subcontractor's testing agency and monitored to determine whether the heat of hydration exceeds 150 deg F (66 deg C). If the temperature exceeds 150 deg F (66 deg C) , the mix design will be revised or standard aggregate cooling utilized and a second test cube cast and tested at no additional cost to the University.
 - 2. The temperature gradient between the center and the surface of the section must not exceed 20 deg F (6.6 deg C) during the first ten days of the controlled curing period. Thermocouples shall be installed by the Subcontractor's testing agency in the center and six inches from the surface at twenty foot intervals and at the corners. The thermocouples are to be monitored continuously by the Subcontractor's testing agency and, if the temperature gradient exceeds 20 deg (6.6 deg C), insulating blankets shall be placed over the surface. On surfaces with protruding reinforcing, such as the top of a wall, loose insulation will be used.

3.8 FIELD QUALITY CONTROL

- A. Inspection and Testing will be performed under provisions of Division 01.
- B. Testing Laboratory will:
 - 1. Collect and review tickets for each batch of concrete delivered. Annotate water or admixtures added subsequent to batching.
 - 2. Slump: ASTM C143; one test at point of placement at start of each day's pour; additional tests when concrete consistency appears to have changed.
 - 3. Compressive Strength: Test concrete for compressive strength in accordance with ASTM C39. Take 4 specimens per sample, test one at seven days, two at 28 days, and retain one specimen.
 - 4. Temperature: ASTM C1064; one test hourly. Take additional tests where warranted by weather conditions or delays in delivery.
 - 5. Air Content: ASTM C173; for mixes with more than 3 percent air, take one test hourly at point of placement.
- C. The Subcontractor will be responsible for all Testing Laboratory costs for investigating low-strength compressive test results.

END OF SECTION 033000

SECTION 03301
BOLLARDS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Metal bollards.
 - 2. [Steel pipe bollards.]
- B. Related Requirements:
 - 1. Division 03 Sections: Cast In Place Concrete.

1.2 REFERENCE STANDARDS

- A. ASTM A36 – Standard Specification for Carbon Structural Steel.
- B. ASTM A312 – Standard Specification for Seamless, Welded, and Heavily Cold Worked Austenitic Stainless Steel Pipes.
- C. ASTM A500 – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
- D. ASTM A536 – Standard Specification for Ductile Iron Castings.
- E. ASTM B26 – Standard Specification for Aluminum-Alloy Sand Castings.
- F. CE Mark – Manufacturer's declaration of compliance with European Union Low Voltage Directive 2006/95/EC.
- G. RoHS – Directive 2002/95/EC on the Restriction of the Use of certain Hazardous Substances in Electrical and Electronic Equipment.

1.3 SUBMITTALS

- A. Comply with Division 01 Section 013300 "Submittal Procedures."
- B. Product Data: Provide for each type of bollard, component, finish, and accessory specified.
- C. Color Samples: Submit manufacturer's standard colors for selection
- D. Setting Drawings: Show embedded items and cutouts required for work specified in other Sections.
- E. Maintenance Data: Submit manufacturer's field touch-up, cleaning, and maintenance instructions.
- F. Warranty Documentation: Submit sample of manufacturer's warranty.

1.4 QUALITY ASSURANCE

- A. Comply with Division 01 Section 014000 “Quality Requirements.”

1.5 DELIVERY, STORAGE AND HANDLING

- A. Comply with Division 01 Section 016000 “Product Requirements.”
- B. Protect bollards and accessories during delivery, storage, and handling.

1.6 WARRANTY

- A. Provide manufacturer’s standard warranty against defects in materials and workmanship.
 - 1. Warranty Period: Five years from date of invoice, except as otherwise indicated.
 - a. Coatings: Two years, against peeling, cracking, or significant color change.
 - b. Solar-Powered Lighting System: Three years.

PART 2 - PRODUCTS

2.1 METAL BOLLARDS

- A. Schedule 40 steel:
 - 1. Size: 84 inches high x 6 inches outside diameter.
 - 2. Exposed height: 42 inches above grade.
 - 3. Design: Cylinder filled with concrete with rounded top.
 - 4. Material: Cor-Ten A steel, ASTM A242.
 - 5. Country of Origin: United States of America.
 - 6. Installation: Below grade, set in concrete.



PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine paving or other substrates for compliance with manufacturer’s requirements for placement and location of embedded items, condition of substrate, and other conditions affecting installation of bollards.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer’s installation instructions and setting drawings.
- B. Damaged, cracked, chipped, deformed or marred bollards are not acceptable. Field touch-up minor imperfections in accordance with manufacturer’s instructions.

3.3 CLEANING & PROTECTION

- A. Protect bollards against damage.

- B. Immediately prior to Substantial Completion, clean bollards in accordance with manufacturer's instructions to remove dust, dirt, adhesives, and other foreign materials.
- C. Touch up damaged finishes according to manufacturer's instructions.

3.4 CLOSEOUT ACTIVITIES

- A. Provide executed warranty.

END OF SECTION

SECTION 05410
PRE-ENGINEERED STEEL BUILDINGS

PART 1 - GENERAL

1.1. SUMMARY

- A. Provide a pre-engineered steel building where shown on the Drawings, as specified herein, and as needed for a complete and proper installation.
- B. Related Work:
 - 1. Documents affecting work of this Section include, but are not necessarily limited to, General Conditions, supplementary Conditions, and sections in Division 1 of these Specifications.

1.2 SUBMITTALS

- A. Comply with pertinent provisions of Section 013300 Submittal Procedures.
- B. Within 25 Calendar days after the Contractor has received the Owner's Notice to Proceed:
 - 1. Prepare a preliminary design showing the proposed pre-engineered steel building dimensions, requirements, and the design building loads;
 - 2. Manufacturer's literature on the proposed pre-engineered steel building;
 - 3. Secure tentative approval of the proposed design from governmental agencies having jurisdiction;
 - 4. Submit to the Architect/Engineer for review and approval.
- C. Within 30 Calendar days after receipt of the Engineer's approval of the preliminary design:
 - 1. Prepare final design in accordance with pertinent provisions of Part 2 of this Section;
 - 2. Submit the following items to the Architect/Engineer for review and approval:
 - a. Material list of items proposed to be provided under this section;
 - b. Manufacturer's specifications and other data needed to prove compliance with the specified requirements;

- c. Shop Drawings and Calculations in sufficient detail to show fabrication, installation, anchorage, and interface of the work of this Section with the work of adjacent trades;
- d. Manufacturer's recommended installation procedures which, when approved by the Architect/Engineer, will become the basis for accepting or rejecting actual installation procedures used on the Work.

1.3 QUALITY ASSURANCE

- A. Use adequate numbers of skilled workers who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this Section.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Comply with pertinent provisions of Section 016200.

PART 2 – PRODUCTS

2.1 DESIGN

- A. The design shown on the Drawings depicts the existing size and location for the pre-engineered steel building of this Section. Field verify all dimensions and conditions for accuracy.
 - 1. To the maximum extent practicable, provide final design compatible with the existing building dimensions, spacing, and components.
- B. Using the services of a structural engineer, licensed to practice in the Commonwealth of Pennsylvania, to prepare design drawings, calculations, and other data, as needed to secure the approval of the Engineer, Owner, and governmental agencies having jurisdiction.

2.2 PRE-ENGINEERED STEEL BUILDING

- A. Acceptable manufacturers:
 - 1. Provide parts and materials for an S-Model pre-engineered steel building, as manufactured by American Steel Span, 400 Island Avenue, McKees Rocks, PA (800) 457-2206. The pre-engineered steel building shall have a width of 40 feet, a length of 100 feet, a height of 21 feet, and be fabricated of minimum 22-gage steel.
 - 2. Provide a pre-engineered steel building (or building components), upon which the design was based, or a pre-engineered steel building

of equal dimensions and requirements from a manufacturer, approved in advance by the Architect/Engineer.

PART 3 – EXECUTION

3.1 SURFACE CONDITIONS

- A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 INSTALLATION

- A. Coordinate, as required with other trades, to assure proper and adequate provision in the work of those trades for interface with the work of this Section.
- B. Install the work of this Section in strict accordance with the original design, the approved Shop Drawings, pertinent requirements of governmental agencies having jurisdiction, and the manufacturer's recommended installation procedures, as approved by the Architect/Engineer, anchoring all components firmly into position.
- C. Upon completion of installation, touch up scratches and abrasions to be completely invisible to the unaided eye from a distance of 5 feet.

END OF SECTION 05410

SECTION 05500
METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Steel framing and supports for applications where framing and supports are not specified in other Sections.
- B. Related Sections include the following:
 - 1. Division 03 Section "Miscellaneous Precast Concrete" for installing anchor bolts, steel pipe sleeves, wedge-type inserts and other items indicated to be cast into concrete.

1.2 PERFORMANCE REQUIREMENTS

- A. Thermal Movements: Provide exterior metal fabrications that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.3 SUBMITTALS

- A. Product Data: For the following: Paint products and Grout.
- B. Shop Drawings: Show fabrication and installation details for metal fabrications.
 - 1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
 - 2. Provide templates for anchors and bolts specified for installation under other Sections.
 - 3. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- C. Welding certificates.

1.4 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.3, "Structural Welding Code--Sheet Steel."

1.5 PROJECT CONDITIONS

- A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.
 1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate wall and other contiguous construction to ensure that actual dimensions correspond to established dimensions.
 2. Provide allowance for trimming and fitting at site.

1.6 COORDINATION

- A. Coordinate installation of anchorages for metal fabrications. 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.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

- A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

- A. Ductile Iron Cast Shapes: ASTM A 48/A 48M or A 126.
- B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.3 FASTENERS

- A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use. Provide stainless-steel fasteners for fastening stainless steel, and aluminum. Select fasteners for type, grade, and class required.
- B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
- C. Anchor Bolts: ASTM F 1554, Grade 36.

1. Provide hot-dip or mechanically deposited, zinc-coated anchor bolts where item being fastened is indicated to be galvanized.
- D. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488/E 488M, conducted by a qualified independent testing agency.
- E. Expansion Anchors: Anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.
 1. Material for Anchors in Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
 2. Material for Anchors in Exterior Locations: Alloy Group 1 (A1) stainless-steel bolts complying with ASTM F 593 (ASTM F 738M) and nuts complying with ASTM F 594 (ASTM F 836M).

2.4 MISCELLANEOUS MATERIALS

- A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.
- B. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.
- C. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 FABRICATION, GENERAL

- A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
- B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm), unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
- C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed work true to line and level with accurate angles and surfaces and straight edges.
- E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 2. Obtain fusion without undercut or overlap.
 3. Remove welding flux immediately.
 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.
- G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
- H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.
- I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.
1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

2.6 MISCELLANEOUS FRAMING AND SUPPORTS

- A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.
- B. Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.
- C. Galvanize miscellaneous framing and supports at exterior locations.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Cutting, Fitting, and Placement: Perform cutting and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack.

- B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.
- C. Field Welding: Comply with the following requirements:
 - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
 - 2. Obtain fusion without undercut or overlap.
 - 3. Remove welding flux immediately.
 - 4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
- D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag bolts, wood screws, and other connectors.

END OF SECTION 05500

SECTION 07210
SPRAY FOAM INSULATION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Closed Cell Spray Foam Insulation.

1.2 RELATED SECTIONS

- A. Section 07100 - Dampproofing and Waterproofing: Insulation installed with waterproofing systems.
- B. Section 07260 - Vapor Retarders: Vapor retarder materials.
- C. Section 07270 - Air Barriers: Air seal materials.
- D. Section 07810 - Fire and Smoke Protection: Insulation installed in conjunction with firestopping or smoke containment systems.
- E. Section 15810 - Ducts: Insulation to surround HVAC ductwork.

1.3 REFERENCES

- A. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
- B. ASTM C 177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
- C. ASTM C 1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings.
- D. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- E. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
- F. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
- G. ASTM D 1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
- H. ASTM D 1622 - Standard Test Method for Apparent Density of Rigid Cellular Plastics.
- I. ASTM D 1623 - Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.

- J. ASTM D 2126 - Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
- K. ASTM D 2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics.

1.4 PERFORMANCE REQUIREMENTS

- A. Conform to applicable code for flame and smoke, concealment, and over coat requirements.

1.5 SUBMITTALS

- A. Submit under provisions of Section 013300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.
- C. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Manufacturer with a minimum of ten years experience manufacturing products in this section shall provide all products listed.
- B. Installer Qualifications: Products listed in this section shall be installed by a single organization with at least five years experience successfully installing insulation on projects of similar type and scope as specified in this section.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store products in manufacturer's unopened packaging bearing the brand name and manufacturer's identification until ready for installation.
- B. Storage: Store materials in dry locations with adequate ventilation, protected from freezing rain, direct sunlight and excess heat and in such a manner to permit easy access for inspection and handling. Store at temperature between 55 and 80 degrees F (12.7 to 26.6 degrees C).
- C. Handling: Handle materials to avoid damage.

1.8 SEQUENCING

- A. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.9 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Do not apply insulation when substrate temperatures are under 40 degrees F (4.4

degrees C) prior to installation.

- C. Surfaces must be dry prior to application of spray foam. Excess humidity may cause poor adhesion, and result in product failure.
- D. To avoid overspray, product should not be applied when conditions are windy.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer, or approved equal: CertainTeed Corp., Insulation Group, which is located at: 750 E. Swedesford Rd. P. O. Box 860 ; Valley Forge, PA 19482-0860; Toll Free Tel: 800-233-8990; Fax: 610-341-7940; Web: certainteed.com/CertainTeed/Pro/Design+Professional/Insulation
- B. Substitutions: **As approved by Architect BEFORE bid submission.**
- C. Requests for substitutions will be considered in accordance with provisions of Section 016000.

2.2 SPRAY FOAM INSULATION

- A. Insulation: HFC-blown type Closed Cell Foam: CertainTeed CertaSpray Closed Cell Foam is a medium-density, MDI-based polyurethane thermoset rigid foam. When CertaSpray A-side closed cell is mixed with CertaSpray B-side closed cell under pressure in a 1:1 volumetric ratio, they react and expand into a medium-density closed cell foam with an in-place core density of 1.9- 2.2 pcf:
 - 1. Physical and Mechanical Properties:
 - a. Core Density: 1.9-2.4 pcf when tested in accordance with ASTM D 1622.
 - b. Thermal Resistance (aged): 5.8 less than or equal to 2-1/2 inches / 6.4 when greater than 2-1/2 inches when tested in accordance with ASTM C 518 at 75 degrees F, (h-ft²- degrees F)/Btu.
 - c. Thermal Resistance (initial): 6.4 when tested in accordance with ASTM C 518 at 75 degrees F, (h-ft²- degrees F)/Btu.
 - d. Closed Cell Content: 88-95 percent when tested in accordance with ASTM D 2842.
 - e. Compressive Strength: Greater than 25 psi when tested in accordance with ASTM D 1621.
 - f. Tensile Strength: 23 psi when tested in accordance with ASTM D 1623.
 - g. Water Absorption: Less than 2 percent by volume when tested in accordance with ASTM D 2842.
 - h. Dimensional Stability: Less than 9 percent by volume when tested in accordance with ASTM D 2126 at 75 degrees F/95 percent RH, 28 Day.
 - i. Water Vapor Transmission: 1.3 perm/inch when tested in accordance with ASTM E 96.
 - j. Air Permeability: 0.013 when tested in accordance with ASTM E 283 at 1 inch thickness, L/s/m².
 - k. Fungi Resistance: Pass, with no growth when tested in accordance with ASTM C 1338.

2. Fire performance
 - a. Flame Spread: Less than 25 when tested in accordance with ASTM E 84.
 - b. Smoke: Less than 450 when tested in accordance with ASTM E 84.
3. Thermal Performance (aged): Tested in accordance with ASTM C 518 and/or ASTM C 177 at 75 degrees F (24 degrees C) mean temperature.
 - a. Thickness 1 inch (25 mm), R-Value 5.8 (h-ft²-degreesF)/Btu (1.0 (m²-degreesC)/W).
 - b. Thickness 1-12 inches (38 mm), R-Value 8.7 (h-ft²-degreesF)/Btu (1.5 (m²-degreesC)/W).
 - c. Thickness 2 inches (51 mm), R-Value 11.6 (h-ft²-degreesF)/Btu (2.0 (m²-degreesC)/W).
 - d. Thickness 2-12 inches (64 mm), R-Value 16.0 (h-ft²-degreesF)/Btu (2.8 (m²-degreesC)/W).
 - e. Thickness 3 inches (76 mm), R-Value 19.2 (h-ft²-degreesF)/Btu (3.4 (m²-degreesC)/W).
 - f. Thickness 3-12 inches (89 mm), R-Value 22.4 (h-ft²-degreesF)/Btu (3.9 (m²-degreesC)/W).
 - g. Thickness 4 inches (102 mm), R-Value 25.6 (h-ft²-degreesF)/Btu (4.5 (m²-degreesC)/W).
 - h. Thickness 4-12 inches (114 mm), R-Value 28.8 (h-ft²-degreesF)/Btu (5.1 (m²-degreesC)/W).
 - i. Thickness 5 inches (127 mm), R-Value 32.0 (h-ft²-degreesF)/Btu (5.6 (m²-degreesC)/W).
 - j. Thickness 5-12 inches (140 mm), R-Value 35.2 (h-ft²-degreesF)/Btu (6.2 (m²-degreesC)/W).
 - k. Thickness 6 inches (152 mm), R-Value 38.4 (h-ft²-degreesF)/Btu (6.8 (m²-degreesC)/W).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify that all exterior and interior wall, partition, and floor/ceiling assembly construction have been completed to the point where the insulation may correctly be installed.
- C. Verify that substrate and cavities are dry and free of any foreign material that will impede application.
- D. Verify that mechanical and electrical services in ceilings, walls, and floors have been installed and tested and, if appropriate, verify that adjacent materials are dry and ready to receive insulation.
- E. Verify that manufacturer's recommended adhesion coating is applied to exposed metal surfaces before applying spray foam insulation.
- F. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Mask and protect adjacent surfaces from overspray or dusting.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions. Product must be installed according to local code, and must be applied by a qualified applicator.
- B. Apply insulation by spray method, to uniform monolithic density without voids.
- C. Apply to minimum cured thickness as indicated on the Drawings or as scheduled at the end of this Section.
- D. Apply to achieve thermal resistance R-Value of 20 .
- E. Seal plumbing stacks, electrical wiring and other penetrations to control air leakage.
- F. Apply insulation to fill voids around doors. Apply insulation to fill voids around accessible service and equipment penetrations.
- G. Do not install spray foam insulation in areas where it will be in contact with equipment or materials with operating temperatures of 180 degrees F (82 degrees C) or greater.
- H. Where building is designed to meet the specific air tightness standards of the Energy Star Program, apply insulation as recommended by manufacturer to provide airtight construction. Apply sealant to joints between structural assemblies as specified in Division 7.
- I. Patch damaged areas.

3.4 FIELD QUALITY CONTROL

- A. Inspection will include verification of insulation and density.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair, or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 07620
SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following sheet metal flashing and trim:
 - 1. Patching of metal building panels.
 - 2. Flashing at penetrations.
 - 3. Door and frame flashing.
- B. Related Sections include the following:
 - 1. Division 05 Section "Pre-Engineered Steel Buildings" for installation of flashing and adjacent panels or materials.
 - 2. Division 07 Section "Joint Sealants" for field-applied sheet metal flashing and trim sealants.

1.2 PERFORMANCE REQUIREMENTS

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Fabricate and install roof edge flashing and copings capable of resisting the following forces according to recommendations in FMG Loss Prevention Data Sheet 1-49:
 - 1. Wind Zone 1: For velocity pressures of 21 to 30 lbf/sq. ft.: 60-lbf/sq. ft. perimeter uplift force, 90-lbf/sq. ft. corner uplift force, and 30-lbf/sq. ft. outward force.
- C. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.
- D. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

- B. Shop Drawings: Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Include the following:
 - 1. Identify material, thickness, weight, and finish for each item and location in Project.
 - 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
 - 3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
 - 4. Details of expansion-joint covers, including showing direction of expansion and contraction.
- C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
 - 1. Sheet Metal Flashing: 6 inches long in finish and colors indicated.
 - 2. Sheet Metal Patches: 12 inches long. Include fasteners and other exposed accessories.

1.4 QUALITY ASSURANCE

- A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

1.5 COORDINATION

- A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leak-proof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.1 SHEET METALS

- A. Galvanized steel sheet: ASTM A 526, twenty-four [24] gauge GSM
 - 1. Finish: galvanized
 - 2. Location: Flashing at seams, doors & frames, penetrations, and patching of holes.

2.2 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal.
- B. Fasteners: Self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.

1. Exposed Fasteners: Heads matching color of sheet metal by means of plastic caps or factory-applied coating.
 2. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
- C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, non-sag, non-toxic, non-staining tape.
- D. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant, polyisobutylene plasticized, heavy bodied for hooked-type expansion joints with limited movement.

2.3 MANUFACTURED SHEET METAL FLASHING AND TRIM

- A. Roof Trim, door & frame, penetrations, patching: Match existing adjacent metal panels in materials and finish.
1. Colors: As selected by Architect from manufacturer's full range of available colors.
 2. Splice Plates: Concealed, of same material, finish, and shape as fascia cover.
 3. Special Fabrications: To match existing as required.

2.4 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 2. Obtain field measurements for accurate fit before shop fabrication.
 3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.
- C. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

- D. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 1. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
 - 2. Seams for Other Than Aluminum: Fabricate non-moving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- E. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
- F. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.
- G. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.
- H. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
 - 1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" and FMG Loss Prevention Data Sheet 1-49 for application but not less than thickness of metal being secured.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.
 - 1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.

1. Coat side of uncoated aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip sheet or install a course of polyethylene underlayment.
 3. Bed flanges in thick coat of asphalt roofing cement where required for waterproof performance.
- C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
- D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric for aluminum locations and butyl sealant for stainless steel locations.
- E. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
1. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.
- F. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric for aluminum locations and butyl sealant for stainless steel concealed within joints.
- G. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
1. Aluminum: Use aluminum or stainless-steel fasteners.
 2. Stainless Steel: Use stainless-steel fasteners.
- H. Seal joints with elastomeric and/or butyl sealant as required for watertight construction.
- I. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-temper edges of sheets to be soldered to a width of 1-1/2 inches except where pre-tinned surface would show in finished Work.
1. Do not solder prepainted and aluminum sheet.
 2. Do not use open-flame torches for soldering. Heat surfaces to receive solder and flow solder into joints. Fill joints completely and remove flux and spatter from exposed surfaces.

3.3 ROOF FLASHING INSTALLATION

- A. General: Install sheet metal roof flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and

SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.

- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FMG Loss Prevention Data Sheet 1-49 for specified wind zone and as indicated.
 - 1. Interlock bottom edge of roof edge flashing with continuous cleats anchored to substrate at 16-inch centers.

3.4 CLEANING AND PROTECTION

- A. Clean and neutralize flux materials. Clean off excess solder and sealants.
- B. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
- C. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07810
BARRIER COAT FIREPROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Barrier Coat Fireproofing.

1.2 RELATED SECTIONS

- A. Section 072140 – Spray Foam Insulation: Requirements for and application of compatible fireproofing coatings with spray foam insulation.

1.3 REFERENCES

- A. ASTM D 412 - Tensile set of Rubber and Thermoplastic Elastomers.
- B. ASTM D 522 - Standard Test Methods for Mandrel Bend Test of Attached Organic Coatings.
- C. ASTM D 661 - Standard Test Method for Evaluating Degree of Cracking of Exterior Paints.
- D. ASTM D 968 - Standard Test Methods for Abrasion Resistance of Organic Coatings by Falling Abrasive.
- E. ASTM D 1729 - ASTM D1729-96 Standard Practice for Visual Appraisal of Colors and Color Differences of Diffusely-Illuminated Opaque Materials.
- F. ASTM D 2243 - Standard Test Method for Freeze-Thaw Resistance of Water-Borne Coatings.
- G. ASTM D 2486 - Standard Test Methods for Scrub Resistance of Wall Paints.
- H. ASTM D 2794 - Standard Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).
- I. ASTM D 3273 - Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber.
- J. ASTM D 4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films.
- K. ASTM D 4541 - Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
- L. ASTM D 4585 - Standard Practice for Testing Water Resistance of Coatings Using Controlled Condensation.

- M. ASTM D 6904 - Standard Practice for Resistance to Wind-Driven Rain for Exterior Coatings Applied on Masonry.
- N. ASTM G 153 - Standard Practice for Operating Enclosed Carbon Arc Light Apparatus for Exposure of Nonmetallic Materials
- O. FTMS 141 M 4494 - Film Application & Test Charts - Leveling & Sagging.
- P. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
- Q. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
- R. ASTM E 119 - Standard Test Methods for Fire Tests of Building Construction and Materials.
- S. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth.
- T. UL 723 - Test for Surface Burning Characteristics of Building Materials
- U. ICC - International Urban-Wildland Interface Code.
- V. SFI 54.1 - Non-Flammable Thermal Barrier Fire Extinguishing Coatings.
- W. SWRI 99-02 - Flame spread and Flame penetration resistance according to SWRI 99-02 crawl space ignition barrier test.
- X. SSPC-SP 1 - Solvent Cleaning.
- Y. SSPC-SP 2 - Hand Tool Cleaning.
- Z. SSPC-SP 3 - Power Tool Cleaning.
- AA. SSPC-SP 6 - Commercial Blast Cleaning.

1.4 DESIGN / PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: As indicated by UL Fire Resistance Directory designation.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Storage and handling requirements and recommendations.
 - 3. Installation methods.

- C. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color, and patterns.
- D. Certification: Obtain and submit certification by authority having jurisdiction that fireproofing products are acceptable.
- E. Installer's qualification statement indicating installer is approved by the manufacturer as an installer.
- F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in the manufacture of the products specified, with minimum of 5 years documented experience.
- B. Installer Qualifications: Trained and approved by manufacturer, with minimum of 3 years documented experience.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in doors in a heated location in manufacturer's unopened packaging until ready for installation.

1.8 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
- B. Do not install when substrate temperature is less than 55 degrees F (12 degrees C) or above 95 degrees F (35 degrees C) and if relative humidity is above 60 percent.
- C. Maintain ventilation after application of fireproofing in accordance with manufacturer's recommendations.
- D. Coordinate sequence of work with other installers of work that needs to penetrate fireproofing, to avoid unnecessary damage and patching.
- E. Coordinate sequence of work with other installers of work that would obstruct access to surfaces to be fireproofed.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer, or approved equal (per Architect BEFORE bid submission): TPR² Corp. (Thermal Product Research), which is located at: 161 Interstate Ln. ; Waterbury, CT 06705; Tel: 203-756-TPR2; Web: www.tpr2.com
- B. Substitutions: **As approved by Architect BEFORE bid submission.**
- C. Requests for substitutions will be considered in accordance with provisions of Section 013300.

2.2 MATERIALS

- A. Fireshell F10E - NFPA 286 Thermal Barrier Coating for sprayfoam:
 - 1. Non-flammable, 1-part, water based, intumescent coating.
 - 2. Expands up to 2000 percent.
 - 3. Non-toxic, drain safe, water based, non-fuming.
 - 4. For Interior application.
 - 5. Can be latex or oil base top coated.
 - 6. Approvals:
 - a. Meets NFPA 286 over open cell Foam for Walls, Foam, Attics, and Crawl Spaces.
 - b. Meets NFPA 286 over closed cell Foam for Walls, Foam, Attics, and Crawl Spaces.
 - c. Meets Green Standards and Lead Paint Requirements.
 - d. Meets EPA requirements for Ultra Low VOC.
 - e. Meets ASTM E 84 and UL 723, 5 flame, 20 smoke.
 - f. Meets SCAQMD (California South Coast Air Quality Management District) requirements as a Supercompliant Coating.
 - 7. Color:
 - a. White.
 - b. Custom Color.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify that substrates are ready to receive barrier coat fireproofing.
- C. Ensure that all primers are compatible with the barrier coat fireproofing.
- D. Verify that items that need to penetrate the barrier coat fireproofing film are in place, including clips, hangers, supports, and sleeves.
- E. Verify that other work that would obstruct access to surfaces to be fireproofed has not been installed.
- F. Where barrier coat fireproofing is to be exposed to view as a finished surface, verify that surfaces are smooth, without voids, cracks, or

projections.

- G. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
- C. Clean surfaces of dirt, dust, grease, oil, loose material, and other matter that may affect bond of fireproofing.
- D. Clean surfaces in accordance with manufacturer's instructions and SSPC-1, SSPC-2, SSPC-3, or SSPC-6 as required to obtain substrate suitable for installation of fireproofing.
- E. Seal penetrations and open ended fireproofing terminations as required by manufacturer.
- F. Protect floors and adjacent walls and ceilings from overspray, fall-out, and dusting.

3.3 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Prime all surfaces unless existing primer is suitable and undamaged and compatible with fireproofing.
- C. Install fireproofing in sufficient thickness to achieve fire rating indicated. Use as many passes as necessary to cover with a monolithic coating of uniform hardness, density, and texture.
- D. Remove fireproofing from surfaces not specifically required to be fireproofed.

3.4 FIELD QUALITY CONTROL

- A. Field inspection and testing will be performed by Owner's independent testing agency.
- B. Correct defective work and provide further inspection and testing to verify compliance, at no cost to Owner.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Remove excess material, overspray, droppings, and debris.

- C. Where fireproofing is subsequently cut away to facilitate installation of other work, patch fireproofing to same thickness and texture after installation of other work at no cost to Owner.
- D. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 07920
JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes joint sealants for the following applications:
 - 1. Exterior joints in vertical surfaces and horizontal non-traffic surfaces.
 - 2. Interior joints in the following vertical surfaces and horizontal non-traffic surfaces:
 - a. Perimeter joints of exterior openings.
 - b. Vertical joints on exposed surfaces of walls and partitions.
 - c. Perimeter joints between metal patches and exterior metal panels.
 - d. Other joints as indicated.

1.2 DEFINITIONS

- A. Agencies and the abbreviations used to reference them include the following:
 - 1. ASTM - American Standards for Testing Materials.
 - 2. FS - Federal Specification. '
 - 3. FM- Factory Mutual.
 - 4. UL - Underwriters Laboratory.

1.3 SUBMITTALS

- A. Product Data: For each joint-sealant product.
- B. Warranties: Special warranties specified in this Section.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.
- B. Codes, Standards & Regulations: Work, including materials and installation, shall be in strict accordance with the following codes.
 - 1. FS TT-S-00230C: Sealing Compound; Elastomeric Type, Single Component.
 - 2. FS TT-S-001543A: Sealing Compound; Silicone Rubber Base.
 - 3. UL 263: Fire Tests of Building Construction and Materials.

1.5 PROJECT CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 degrees F.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

- A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. Warranty Period: Two years from date of acceptance of complete Project by Architect.

PART 2 - PRODUCTS

2.1 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 full range.

2.2 ELASTOMERIC JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Single-Component Non-Sag Urethane Sealant for Masonry or Siding to Metal Door Frames:
 1. Type and Grade: S (single component) and NS (non-sag).
 2. Class: 25.
 3. Uses Related to exposure: T (traffic) and NT (non-traffic)
 4. Uses Related to Joint Substrates: M, A, and O.
 5. Products: Subject to compliance with requirements, provide one of the following, or equal:
 - a. BASF Building Systems; Sonolastic SL 1.
 - b. Pecora Corporation; Urexpan NR-201.
 - c. Sika Corporation. Construction Products Division; Sikaflex - 1CSL.

2.3 LATEX JOINT SEALANTS

- A. Latex Joint Sealant: Acrylic terpolymer latex solvent-based, thermo-plastic, solids not less than 95 percent acrylic, paintable. Comply with performance requirements of either ASTM C-920 Type S, Class 12-1/2, Grade NS; or FS TT-S-0023C, Class B, Type Non-sag.
 - 1. Location: Interior joints. Do NOT use for traffic joints,
 - 2. Products: Subject to compliance with requirements, provide one of the following, or equal:
 - a. BASF Building Systems.
 - b. Pecora Corporation, AC-20.
 - c. Tremco Incorporated, Tremplex 834.

2.4 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 C1330, Type C (closed-cell material with a surface skin) or as approved by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance:

2.5 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from pre-construction joint-sealant-substrate tests and field tests.
 - 1. Provide primer at locations where PVC simulated wood trim is installed.
- 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 to joint substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint sealant performance.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 2. Clean 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 after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 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 capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 5. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.
- C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow 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.
- D. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
 2. Completely fill recesses in each joint configuration.
 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Non-Sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
1. Remove excess sealant from surfaces adjacent to joints.
 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 3. Provide concave joint configuration per Figure SA in ASTM C1193, unless otherwise indicated.

END OF SECTION

SECTION 08110
STEEL DOORS AND FRAMES

PART - 1 GENERAL

1.01 SUMMARY

- A. Section Includes:
 - 1. Non-rated and fire-rated steel door frames.
 - 2. Non-rated and fire-rated steel doors
 - 3. Accessories for doors and frames.
- B. Related Sections:
 - 1. Section 087000 - Hardware.
 - 2. Section 099000 - Painting: Field painting of metal.

1.02 REFERENCES

- A. NFPA 80 - Fire Doors and Windows.
- B. SDI-100 - Standard Steel Doors and Frames.
- C. 1 -105 - Recommended Erection Instructions for Steel Frames.
- D. ASTM A 525 - General Requirements for Steel Sheet. Zinc-Coated (Galvanized) by the hot dip process.
- E. ASTM E 152 - Methods of Fire Tests of Door Assemblies.
- F. NFPA - 101- Life Safety Code
- G. ANSI / CABO A117.1-American National Standard for Buildings and Facilities

1.03 QUALITY ASSURANCE

- A. Conform to requirements of SDI, ANSI, of Public and ASTM.
- B. Fire Rated Door and Frame Construction form to ASTM E 152
- C. Installed Frame and Door assembly: Conform to NFPA 80 for fire doors rate class as indicated in Schedule on Drawings and SDI guidelines.

1.04 REGULATORY REQUIREMENTS

- A. Conform to applicable building codes for fire rated frames and doors, having jurisdiction, including NFPA 101 fire life and safety.
- B. Conform to ADA requirements for making building accessible to physically impaired, including ANSYCABO A117.1 (American National Standard for Buildings and facilities; council of American Building Officials.

1.05 SUBMITTALS

- A. Submit shop drawings and product data under provisions of Section 013300.
- B. Indicate frame configuration, anchor types and spacings, location of cutouts for hardware, reinforcements, and finish. Contractor must verify all dimensions prior to any fabrication.
- C. Indicate door elevations, internal reinforcement, closure method, and cut outs for glazing and louvers.

1.06 DELIVERY, STORAGE AND PROTECTION

- A. Protect products under provisions of Section 016000.
- B. Protect frames with resilient packaging sealed with heat shrunk plastic.
- C. Break seal on-site to permit ventilation.
- D. Ship and store materials per manufactures recommendations.

1.07 PROJECT CONDITIONS

- A. Field measurements: Field measure as instructed by manufacturer to verify that frames fit intended space and interface with existing and new substrates and adjacent materials, and that doors will fit in frame. Contractor to verify all measurements.
- B. Coordinate Work of this section under provisions of Section 010400. Coordinate Work with frame and door opening construction, doors, frames, and door hardware installations.

PART -2 PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturers, or equal:
 - 1. Republic Builders Products Corp.
 - 2. Daybar
 - 3. Mesker Corporation
- B. Substitutions: Under provisions of Section 016000

2.02 MATERIALS - FRAMES

- A. Hollow Metal Frames: Welded type of following thicknesses:
 - 1. Openings less than 4 foot wide: 16 gauge
 - 2. Openings 4 foot wide or greater: 14 gauge
 - 3. All Fire Rated and Exterior: 14 gauge

- B. Fabricate all frames, side-lites, transoms, and borrowed lites to profiles shown on Drawings.

2.03 MATERIALS - DOORS

- A. Doors: SDI-100; sizes as scheduled on Drawings.
- B. Interior less than 3'- 4" wide:
Grade II (18 gauge), Model I (full flush, hollow steel with honeycomb core).
- C. Interior less than 3'- 4" wide:
Grade II (16 gauge), Model I (full flush, hollow steel with honeycomb core).
- C. Fire-Rated:
Grade 111 (16 gauge), Model I (full flush, composite construction).
- D. Below Grade, Exterior and 3'-4" wide or greater:
Grade III (16 gauge), Model IA (full flush, composite construction).

2.04 ACCESSORIES

- A. Rubber Silencers: Resilient rubber.
- B. Insert, Bolts and fasteners: Manufacturers standards; use countersunk fasteners, fabricated from 20 gauge galvanized.
- C. Glazing: Types specified under provisions of Section 088000.

2.05 FABRICATION

- A. Fabricate frames and doors with hardware reinforcement plates welded in place as follows:
 - 1. Hinge reinforcements: 7 gauge, 1-1/4 x 10 inch minimum.
 - 2. Other reinforcements: 12 gauge.
 - 3. Capable of meeting or exceeding ANSI 151.1 (endurance for reinforcing).
- B. Fabricate minimum depth of stops at 5/8 inches, 3/4 inch at fire rated openings.
- C. Prepare frame for silencers. Provide three single rubber silencers for single doors and mullions of double doors on strike side, and two single silencers on frame head at double doors without mullions. No silencers at weather stripped, smoke sealed, or sound sealed frames.
- D. Factory attach Fire Rated Label to each labeled frame and door unit, with appropriate rating specified.
- E. Close top and bottom edge of exterior door flush with steel channel closure, projection welded every 5 inches. Seal joints and make watertight.

- F. Fabricate frames for multiple or special openings with mullion and rail members which are closed tubular shapes having no visible seams or joints. Securely weld and finish smooth all joints between faces of abutting members.
SEC. 081100
- G. Construct and comply with NFPA 80, SDI 100, ASTM E 152, ANSI 115, A15.1 and 1.6
- H. Provide all frames with jamb and floor anchors of type recommended by manufacturer for installation in various wall conditions. Comply with SDI guidelines and procedures.
- I. Fabricate all Below Grade and Exterior Doors and Frames from Galvanized steel sheets in accordance with ASTM A 526 with mill phosphatized G60 coating.
- J. Fabricate all doors as continuously welded seamless edges.

2.06 FINISH

- A. Doors, Frames, and Stops: Thoroughly clean, phosphatize, and finish with one coat of baked on rust inhibiting primer capable of passing a 120 hour salt spray test (ANSI A 224.1 or ASTM B 117), and a 240 hour humidity test (ASTM D 173.5).
- B. Coat inside of frame profile with bituminous coating to a thickness of 1/16 inch. Coating may be shop or field applied. Apply to exterior frames in direct contact with masonry surfaces.
- C. Fill all frame cavities with foam insulation compatible with all contiguous materials.
- C. Field finish all doors, frames, borrowed lites, lites, louvers, Astragals, etc. custom color as selected by the Architect with reference to appropriate Painting Section.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Installer shall examine substrate and conditions under which steel doors and frames are to be installed.
- B. Examine substrate and conditions under provisions of Section 016000.

3.02 INSTALLATION

- A. General: Install standard steel doors, frames, and accessories in accordance with final shop drawings, manufacturers' data, and as herein specified.
- B. Install frames in accordance with SDI-105. -

- C. Set frames accurately in position, plumed, aligned and braced securely until permanent anchors are set.
- D. Install in each jamb, anchors in following quantities:
 - 1. Masonry construction:
 - a. Frames up to 7'- 6": 3 anchors.
 - 2. Metal stud construction:
 - a. Frames up to 7' - 6": 4 anchors
- E. Install fire-rated doors and frames in accordance with NFPA Std. No. 80.

3.03 TOLERANCES

- A. Maximum Diagonal Distortion: 1/16" measured with a straight edge, corner to corner.
- B. Non-rated Doors:
 - 1. 1/8 inch at jambs and heads.
 - 2. 1/2 inch from door bottom to top of decorative floor finish or covering.
 - 3. 1/4 inch from door bottom to top of threshold.
- C. Fire-Rated Doors: Comply with NFPA No. 80.

3.04 ADJUST AND CLEAN

- A. Adjust and clean doors and frames under provisions of Section 01700.
- B. Prime Coat Touch-up: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touch-up of compatible air-drying primes.
- C. Protected Removal: Immediately prior to final inspection, remove protective plastic wrappings from finished doors.
- D. Final Adjustments: Adjust hardware for smooth & balanced door movement.
- E. Clean debris associated with installation of steel frames.

3.05 SPECIFIED PRODUCT WARRANTY

- A. The Warranty shall be in effect during period of time after date of submittal completion.
- B. The Warranty shall also include refinishing and reinstallation which may be required due to repair or replacement of defective doors.

END OF SECTION

Division 08 – Openings
Section 081100 – Steel Doors and Frames

SECTION – 08710
DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Door hardware.
- B. Related Sections
 - 1. Division 8 Section • Steel Doors and Frames: Hinges provided by manufacturer for prehung units.

1.2 SUBMITTALS

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

1.3 WARRANTY

- A. Provide manufacturer's standard warranty.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in this Section and door hardware sets indicated in door and frame schedule and door hardware.
 - 1. Door Hardware Sets: Provide quantity, item, size, finish, or color indicated and products equivalent in function and comparable in quality to named products.
- B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware, indicated in Part 2.3. Products are identified by using door hardware designations. as follows:
 - 1. References to BHMA Standards: Provide products complying with these standards and requirements for description, quality. and function.

2.2 LOCKS AND LATCHES, GENERAL

- A. Backset: 2-3/4 inches, unless otherwise indicated.
- B. Strikes: Manufacturer's standard strike with strike box for each latchbolt or lock bolt, with curved lip extended to protect frame, finished to match door hardware set.

2.3 MECHANICAL LOCKS AND LATCHES

- A. Service Door Lockset:
 - 1. Manufacturer: Stanley or approved equal.
 - 2. Function: Heavy Duty Exit Device - Complete single rim cylinder handle set (exterior) w/ panic egress bar (interior).
 - 3. Style: QED312 panic, Pearce (PEA).
 - 4. Model: QED 300 Series: (QED312 panic, Pearce exterior lever handle, or equal. w/ rim cylinder)
 - 5. Certifications: ANSI: Grade 1
 - 6. Finish: 690 Painted Duranodic Bronze.

2.4 STOPS AND HOLDERS

- A. Stops and Bumpers: Spring Doorstop
 - 1. Product: Stanley #756257 or approved equal.
 - 2. Finish: Bright Brass (3)
 - 3. Base material: Steel.
 - 4. Class: CD7092.
 - 5. Projection: 2-13/16"

2.5 FABRICATION

- A. Base Metals: Produce door hardware units of base metal, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and BHMA A156.13 – Grade 1. Do not furnish manufacturer's standard materials or forming methods if different from specified standard.
- B. Fasteners: Provide screws according to commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware. unless otherwise indicated.
 - 1. Comply with NFPA 80 for fasteners of door hardware in fire-rated applications.
- C. Finishes: BHMA A156.13 – Grade 1, as indicated in Part 2.3 above.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Steel Doors and Frames: Comply with DHI A115 Series. Drill and tap doors and frames for surface-applied door hardware according to ANSI A250.6.
- B. Mounting Heights: Mount door hardware units at heights indicated as follows unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 2. Mounting heights per ANSI A117.1 Accessibility Code / ADA Compliant.
- C. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 09 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

END OF SECTION 08710

SECTION 09910
PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes surface preparation and field painting of exposed exterior and interior items and surfaces.
 - 1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.
- B. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.
 - 1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.
- C. Do not paint prefinished items, concealed surfaces, finished metal surfaces, operating parts, and labels.
 - 1. Prefinished items include the following factory-finished components:
 - a. Finished mechanical and electrical equipment.
 - b. Light fixtures.
 - c. Doors & Frames
 - 2. Concealed surfaces include walls or ceilings in the following generally inaccessible spaces:
 - a. Furred areas.
 - b. Ceiling plenums.
 - 3. Finished metal surfaces include the following:
 - a. Anodized aluminum.
 - b. Stainless steel.

- c. Copper and copper alloys.
 - d. Bronze and brass.
 - 4. Operating parts include moving parts of operating equipment and the following:
 - a. Valve and damper operators.
 - b. Linkages.
 - c. Sensing devices.
 - d. Motor and fan shafts.
 - 5. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
- D. Related Sections include the following:
- 1. Division 05 Section "Metal Fabrications" for shop priming ferrous metal.
 - 2. Division 08 Section "Steel Doors and Frames" for factory priming steel doors and frames.
 - 3. Division 32 Section "Pavement Markings" for traffic-marking paint.

1.3 DEFINITIONS

- A. General: Standard coating terms defined in ASTM D 16 apply to this Section.
- 1. "Flat" refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
 - 2. "Eggshell" refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
 - 3. "Semi-gloss" refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
 - 4. "Full gloss" refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

1.4 SUBMITTALS

- A. Product Data: For each paint system indicated. Include block fillers and primers.
- 1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
 - 2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.
- B. Samples for Initial Selection: For each type of finish-coat material indicated.
- 1. After color selection, Architect will furnish color chips for surfaces to be coated.
- C. Qualification Data: For Applicator.

1.5 QUALITY ASSURANCE

- A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.
- B. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:
 - 1. Product name or title of material.
 - 2. Product description (generic classification or binder type).
 - 3. Manufacturer's stock number and date of manufacture.
 - 4. Contents by volume, for pigment and vehicle constituents.
 - 5. Thinning instructions.
 - 6. Application instructions.
 - 7. Color name and number.
 - 8. VOC content.
- B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F (7 deg C). Maintain storage containers in a clean condition, free of foreign materials and residue.
 - 1. Protect from freezing. Keep storage area neat and orderly. Remove oily rags and waste daily.

1.7 PROJECT CONDITIONS

- A. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F (10 and 32 deg C).
- B. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F (7 and 35 deg C).
- C. Do not apply paint in snow, rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.
 - 1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and heated within temperature limits specified by manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

1. Benjamin Moore & Co. (Benjamin Moore).
2. Coronado Paint Company (Coronado).
3. ICI Dulux Paint Centers (ICI Dulux Paints).
4. Kelly-Moore Paint Co. (Kelly-Moore).
5. M. A. Bruder & Sons, Inc. (M. A. B. Paint).
6. PPG Industries, Inc. (Pittsburgh Paints).
7. Sherwin-Williams Co. (Sherwin-Williams).

2.2 PAINT MATERIALS, GENERAL

- A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
- B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.
- C. Colors: As selected by Architect from manufacturer's full range.

2.3 EXTERIOR PRIMERS

- A. Exterior Ferrous-Metal Primer: Factory-formulated rust-inhibitive metal primer for exterior application.
1. Benjamin Moore; Moore's IMC Alkyd Metal Primer No. M06: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
 2. Coronado; 35-147 Rust Scat Alkyd Metal Primer: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
 3. ICI Dulux Paints; 4160-XXXX Devguard Multi-Purpose Tank & Structural Primer. Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
 4. Kelly-Moore; 1711 Kel-Guard Alkyd White Rust Inhibitive Primer: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
 5. Kelly-Moore; 5725 DTM-Acrylic Metal Primer: Applied at a dry film thickness of not less than 1.8 mils (0.048 mm).
 6. M. A. B. Paint; Rust-O-Lastic Anti-Corrosive Primer 073-132: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
 7. Pittsburgh Paints; 90-712 Pitt-Tech One Pack Interior/Exterior Primer Finish DTM Industrial Enamel: Applied at a dry film thickness of not less than 3.0 mils (0.076 mm).

8. Sherwin-Williams; Kem Kromik Universal Metal Primer B50NZ6/B50WZ1: Applied at a dry film thickness of not less than 3.0 mils (0.076 mm).
- B. Exterior Galvanized Metal Primer: Factory-formulated galvanized metal primer for exterior application.
1. Benjamin Moore; Moore's IMC Acrylic Metal Primer No. M04: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
 2. Coronado; 36-11 Rust Scat Latex Metal Primer: Applied at a dry film thickness of not less than 1.4 mils (0.036 mm).
 3. ICI Dulux Paints; 4020-XXXX Devflex DTM Flat Interior/Exterior Waterborne Primer & Finish: Applied at a dry film thickness of not less than 2.2 mils (0.056 mm).
 4. ICI Dulux Paints; 4160-XXXX Devguard Multi-Purpose Tank & Structural Primer: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
 5. Kelly-Moore; 1722 Kel-Guard Acrylic Galvanized Iron Primer: Applied at a dry film thickness of not less than 1.8 mils (0.046 mm).
 6. Kelly-Moore; 5725 DTM-Acrylic Metal Primer: Applied at a dry film thickness of not less than 1.8 mils (0.046 mm).
 7. M. A. B. Paint; Rust-O-Lastic Hydro-Prime II Acrylic (DTM) Maintenance Primer 073-189: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
 8. Pittsburgh Paints; 90-709 Pitt-Tech One Pack Interior/Exterior Primer/Finish DTM Industrial Enamel: Applied at a dry film thickness of not less than 3.0 mils (0.076 mm).
 9. Sherwin-Williams; primer not required over this substrate.
 10. Sherwin-Williams; Galvite HS Paint B50WZ3: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
- C. Exterior Aluminum Primer under Acrylic Finishes: Factory-formulated acrylic-based metal primer for exterior application.
1. Benjamin Moore; Moore's IMC Acrylic Metal Primer No. M04: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
 2. Coronado; 36-11 Rust Scat Latex Metal Primer: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
 3. ICI Dulux Paints; 4020-XXXX Devflex DTM Flat Interior/Exterior Waterborne Primer & Finish: Applied at a dry film thickness of not less than 2.2 mils (0.056 mm).
 4. ICI Dulux Paints; 4160-XXXX Devguard Multi-Purpose Tank & Structural Primer: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
 5. Kelly-Moore; 1722 Kel-Guard Acrylic Galvanized Iron Primer: Applied at a dry film thickness of not less than 1.8 mils (0.046 mm).
 6. Kelly-Moore; 5725 DTM-Acrylic Metal Primer: Applied at a dry film thickness of not less than 1.8 mils (0.046 mm).
 7. M. A. B. Paint; Rust-O-Lastic Hydro-Prime II Acrylic (DTM) Maintenance Primer 073-189: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
 8. Pittsburgh Paints; 90-709 Pitt-Tech One Pack Interior/Exterior Primer/Finish DTM Industrial Enamel: Applied at a dry film thickness of not less than 3.0 mils (0.076 mm).

9. Sherwin-Williams; primer not required over this substrate.
 10. Sherwin-Williams; DTM Acrylic Primer/Finish B66W1: Applied at a dry film thickness of not less than 2.5 mils (0.064 mm).
- D. Exterior Aluminum Primer under Alkyd Finishes: Factory-formulated acrylic-based metal primer for exterior application.
1. Benjamin Moore; Moore's IMC Acrylic Metal Primer No. M04: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
 2. Coronado; 180-11 High Performance Acrylic Metal Primer: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
 3. ICI Dulux Paints; 4020-XXXX Devflex DTM Flat Interior/Exterior Waterborne Primer & Finish: Applied at a dry film thickness of not less than 2.2 mils (0.056 mm).
 4. Kelly-Moore; 1722 Kel-Guard Acrylic Galvanized Iron Primer: Applied at a dry film thickness of not less than 1.8 mils (0.046 mm).
 5. M. A. B. Paint; Rust-O-Lastic Hydro-Prime II Acrylic (DTM) Maintenance Primer 073-189: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
 6. Pittsburgh Paints; 90-709 Pitt-Tech One Pack Interior/Exterior Primer/Finish DTM Industrial Enamel: Applied at a dry film thickness of not less than 3.0 mils (0.076 mm).
 7. Sherwin-Williams; DTM Wash Primer B71Y1: Applied at a dry film thickness of not less than 2.5 mils (0.064 mm).

2.4 INTERIOR PRIMERS

- A. Interior Ferrous-Metal Primer: Factory-formulated quick-drying rust-inhibitive alkyd-based metal primer.
1. Benjamin Moore; Moore's IMC Alkyd Metal Primer No. M06: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
 2. Coronado; 35-147 Rust Scat Alkyd Metal Primer: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
 3. ICI Dulux Paints; 4130-6130 Devshield Rust Penetrating Metal Primer: Applied at a dry film thickness of not less than 2.2 mils (0.056 mm).
 4. ICI Dulux Paints; 4160-6130 Devguard Multi-Purpose Tank & Structural Primer: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
 5. Kelly-Moore; 1711 Kel-Guard Alkyd White Rust Inhibitive Primer: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
 6. M. A. B. Paint; Rust-O-Lastic Anti-Corrosive Primer 073-132: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
 7. Pittsburgh Paints; 90-709 Pitt-Tech One Pack Interior/Exterior Primer/Finish DTM Industrial Enamel: Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).
 8. Sherwin-Williams; Kem Kromik Universal Metal Primer B50NZ6/B50WZ1: Applied at a dry film thickness of not less than 3.0 mils (0.076 mm).
- B. Interior Zinc-Coated Metal Primer: Factory-formulated galvanized metal primer.

1. Benjamin Moore; Moore's IMC Acrylic Metal Primer No. M04: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
2. Coronado; 36-11 Rust Scat Acrylic Metal Primer: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
3. ICI Dulux Paints; 4160-6130 Devguard Multi-Purpose Tank & Structural Primer: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
4. Kelly-Moore; 1722 Kel-Guard Acrylic Galvanized Iron Primer: Applied at a dry film thickness of not less than 1.8 mils (0.046 mm).
5. M. A. B. Paint; Rust-O-Lastic Hydro-Prime II Acrylic (DTM) Maintenance Primer 073-189: Applied at a dry film thickness of not less than 2.0 mils (0.051 mm).
6. Pittsburgh Paints; 90-709 Pitt-Tech One Pack Interior/Exterior Primer/Finish DTM Industrial Enamel: Applied at a dry film thickness of not less than 3.0 mils (0.076 mm).
7. Sherwin-Williams; primer not required over this substrate.
8. Sherwin-Williams; Galvite HS B50WZ30: Applied at a dry film thickness of not less than 3.0 mils (0.076 mm).

2.5 EXTERIOR FINISH COATS

- A. Exterior Flat Acrylic Paint: Factory-formulated flat acrylic-emulsion latex paint for exterior application.

1. Benjamin Moore; Moorcraft Super Spec Flat Latex House Paint No. 171: Applied at a dry film thickness of not less than 1.2 mils (0.030 mm).
2. Coronado; 8-Line Supreme Acrylic Latex Flat: Applied at a dry film thickness of not less than 1.3 mils (0.033 mm).
3. ICI Dulux Paints; 2200-XXXX Dulux Professional Exterior 100 Percent Acrylic Flat Finish: Applied at a dry film thickness of not less than 1.4 mils (0.036 mm).
4. Kelly-Moore; 1205 Color Shield Exterior Flat Acrylic House Paint: Applied at a dry film thickness of not less than 1.9 mils (0.048 mm).
5. M. A. B. Paint; Fresh Kote Latex House Paint 409 Line: Applied at a dry film thickness of not less than 1.7 mils (0.043 mm).
6. Pittsburgh Paints; 6-600 Series SpeedHide Exterior House Paint Flat Latex: Applied at a dry film thickness of not less than 1.3 mils (0.033 mm).
7. Sherwin-Williams; A-100 Exterior Latex Flat House & Trim Paint A6 Series: Applied at a dry film thickness of not less than 1.3 mils (0.033 mm).

- B. Exterior Low-Luster Acrylic Paint: Factory-formulated low-sheen (eggshell) acrylic-latex paint for exterior application.

1. Benjamin Moore; Moorcraft Super Spec Low Lustre Latex House Paint No. 185: Applied at a dry film thickness of not less than 1.0 mil (0.025 mm).
2. Coronado; 408-Line Supreme Acrylic Satin Exterior: Applied at a dry film thickness of not less than 1.3 mils (0.033 mm).
3. ICI Dulux Paints; 2402-XXXX Dulux Professional Exterior 100 Percent Acrylic Satin Finish: Applied at a dry film thickness of not less than 1.4 mils (0.036 mm).
4. Kelly-Moore; 1245 Acry-Velvet Exterior Low Sheen Acrylic Finish: Applied at a dry film thickness of not less than 1.8 mils (0.046 mm).

5. M. A. B. Paint; Fresh Kote Latex Eggshell 405 Line: Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).
 6. Pittsburgh Paints; 6-2000 Series SpeedHide Exterior House & Trim Satin--Acrylic Latex: Applied at a dry film thickness of not less than 1.0 mil (0.025 mm).
 7. Pittsburgh Paints; 90-400 Series Pitt-Tech One Pack High Performance Waterborne Satin DTM Industrial Enamels: Applied at a dry film thickness of not less than 3.0 mils (0.076 mm).
 8. Sherwin-Williams; A-100 Exterior Latex Satin House & Trim Paint A82 Series: Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).
- C. Exterior Semi-gloss Acrylic Enamel: Factory-formulated semigloss waterborne acrylic-latex enamel for exterior application.
1. Benjamin Moore; Moorcraft Super Spec Latex House & Trim Paint No. 170: Applied at a dry film thickness of not less than 1.1 mils (0.028 mm).
 2. Coronado; 12-Line Supreme Acrylic Semi-Gloss: Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).
 3. ICI Dulux Paints; 2406-XXXX Dulux Professional Exterior 100 Percent Acrylic Semi-Gloss Finish: Applied at a dry film thickness of not less than 1.3 mils (0.033 mm).
 4. Kelly-Moore; 1250 Acry-Lustre Exterior Semi-Gloss Acrylic Finish: Applied at a dry film thickness of not less than 1.6 mils (0.041 mm).
 5. M. A. B. Paint; Sea Shore/Four Seasons Acrylic Latex Trim Enamel 024 Line: Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).
 6. Pittsburgh Paints; 6-900 Series SpeedHide Exterior House & Trim Semi-Gloss Acrylic Latex Paint: Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).
 7. Sherwin-Williams; A-100 Latex Gloss A8 Series: Applied at a dry film thickness of not

2.6 INTERIOR FINISH COATS

- A. Interior Flat Acrylic Paint: Factory-formulated flat acrylic-emulsion latex paint for interior application.
1. Benjamin Moore; Moorecraft Super Spec Latex Flat No. 275: Applied at a dry film thickness of not less than 1.2 mils (0.031 mm).
 2. Coronado; 28 Line Super Kote 5000 Latex Flat Paint: Applied at a dry film thickness of not less than 1.2 mils (0.031 mm).
 3. ICI Dulux Paints; 1200-XXXX Dulux Professional Velvet Matte Interior Flat Latex Wall & Trim Finish: Applied at a dry film thickness of not less than 1.4 mils (0.036 mm).
 4. Kelly-Moore; 450 Pro-Wall Interior Flat Latex Wall Paint: Applied at a dry film thickness of not less than 1.8 mils (0.046 mm).
 5. M. A. B. Paint; Fresh Kote Latex Flat 402 Line: Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).
 6. Pittsburgh Paints; 6-70 Line SpeedHide Interior Wall Flat-Latex Paint: Applied at a dry film thickness of not less than 1.0 mil (0.025 mm).
 7. Sherwin-Williams; ProMar 200 Interior Latex Flat Wall Paint B30W200 Series: Applied at a dry film thickness of not less than 1.4 mils (0.036 mm).

- B. Interior Flat Latex-Emulsion Size: Factory-formulated flat latex-based interior paint.
1. Benjamin Moore; Moorecraft Super Spec Latex Flat No. 275: Applied at a dry film thickness of not less than 1.2 mils (0.031 mm).
 2. Coronado; 28 Line Super Kote 5000 Vinyl Latex Flat Wall: Applied at a dry film thickness of not less than 1.2 mils (0.031 mm).
 3. ICI Dulux Paints; 1200-XXXX Dulux Professional Velvet Matte Interior Flat Latex Wall & Trim Finish: Applied at a dry film thickness of not less than 1.4 mils (0.036 mm).
 4. Kelly-Moore; 450 Pro-Wall Interior Flat Latex Wall Paint: Applied at a dry film thickness of not less than 1.8 mils (0.046 mm).
 5. M. A. B. Paint; Fresh Kote Latex Flat 402 Line: Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).
 6. Pittsburgh Paints; 6-70 Line SpeedHide Interior Wall Flat-Latex Paint: Applied at a dry film thickness of not less than 1.0 mil (0.025 mm).
 7. Sherwin-Williams; ProMar 200 Interior Latex Flat Wall Paint B30W200 Series: Applied at a dry film thickness of not less than 1.4 mils (0.036 mm).
- C. Interior Low-Luster Acrylic Enamel: Factory-formulated eggshell acrylic-latex interior enamel.
1. Benjamin Moore; Moorcraft Super Spec Latex Eggshell Enamel No. 274: Applied at a dry film thickness of not less than 1.3 mils (0.033 mm).
 2. Coronado; 30-Line Super Kote 5000 Latex Eggshell Enamel: Applied at a dry film thickness of not less than 1.3 mils (0.033 mm).
 3. ICI Dulux Paints; 1402-XXXX Dulux Professional Acrylic Eggshell Interior Wall & Trim Enamel: Applied at a dry film thickness of not less than 1.4 mils (0.036 mm).
 4. Kelly-Moore; 1610 Sat-N-Sheen Interior Latex Low Sheen Wall and Trim Finish: Applied at a dry film thickness of not less than 1.6 mils (0.041 mm).
 5. Kelly-Moore; 1686 Dura-Poxy Eggshell Acrylic Enamel: Applied at a dry film thickness of not less than 1.6 mils (0.041 mm).
 6. M. A. B. Paint; Fresh Kote Latex Satin Eggshell Enamel 405 Line: Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).
 7. Pittsburgh Paints; 6-400 Series SpeedHide Eggshell Acrylic Latex Enamel: Applied at a dry film thickness of not less than 1.25 mils (0.032 mm).
 8. Sherwin-Williams; ProMar 200 Interior Latex Egg-Shell Enamel B20W200 Series: Applied at a dry film thickness of not less than 1.6 mils (0.041 mm).
- D. Interior Semi-gloss Acrylic Enamel: Factory-formulated semi-gloss acrylic-latex enamel for interior application.
1. Benjamin Moore; Moorcraft Super Spec Latex Semi-Gloss Enamel No. 276: Applied at a dry film thickness of not less than 1.2 mils (0.031 mm).
 2. Coronado; 32-Line Super Kote 5000 Latex Semi-Gloss Enamel: Applied at a dry film thickness of not less than 1.3 mils (0.033 mm).
 3. ICI Dulux Paints; 1406-XXXX Dulux Professional Acrylic Semi-Gloss Interior Wall & Trim Enamel: Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).
 4. Kelly-Moore; 1649 Acrylic-Latex Semi-Gloss Enamel: Applied at a dry film thickness of not less than 1.7 mils (0.043 mm).

5. Kelly-Moore; 1685 Dura-Poxy Semi-Gloss Acrylic Enamel: Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).
6. M. A. B. Paint; Fresh Kote Latex Semi-Gloss 410 Line: Applied at a dry film thickness of not less than 1.5 mils (0.038 mm).
7. Pittsburgh Paints; 6-500 Series SpeedHide Interior Semi-Gloss Latex: Applied at a dry film thickness of not less than 1.0 mil (0.025 mm).
8. Sherwin-Williams; ProMar 200 Interior Latex Semi-Gloss Enamel B31W200 Series: Applied at a dry film thickness of not less than 1.3 mils (0.033 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application. Comply with procedures specified in PDCA P4.
 1. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry.
 2. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.
- B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates. On request, furnish information on characteristics of finish materials to ensure use of compatible primers.
 1. Notify Architect about anticipated problems when using the materials specified over substrates primed by others.

3.2 PREPARATION

- A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.
 1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.
- B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.
 1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

- C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.
1. Provide barrier coats over incompatible primers or remove and re-prime.
 2. Cementitious Materials: Prepare concrete, concrete unit masonry, cement plaster, and mineral-fiber-reinforced cement panel surfaces to be painted. Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Roughen as required to remove glaze. If hardeners or sealers have been used to improve curing, use mechanical methods of surface preparation.
 - a. Use abrasive blast-cleaning methods if recommended by paint manufacturer.
 - b. Determine alkalinity and moisture content of surfaces by performing appropriate tests. If surfaces are sufficiently alkaline to cause the finish paint to blister and burn, correct this condition before application. Do not paint surfaces if moisture content exceeds that permitted in manufacturer's written instructions.
 3. Ferrous Metals: Clean un-galvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.
 - a. Blast steel surfaces clean as recommended by paint system manufacturer and according to **[SSPC-SP 6/NACE No. 3]** **[SSPC-SP 10/NACE No. 2]**.
 - b. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
 - c. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.
 4. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.
- D. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.
1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
 2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
 3. Use only thinners approved by paint manufacturer and only within recommended limits.

3.3 APPLICATION

- A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.
1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.
 2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
 3. Provide finish coats that are compatible with primers used.
 4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
 5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 6. Paint interior surfaces of ducts with a flat, non-specular black paint where visible through registers or grilles.
 7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
 8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
 9. Sand lightly between each succeeding enamel or varnish coat.
- B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
 2. Omit primer over metal surfaces that have been shop primed and touchup painted.
 3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
 4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.
- C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.
1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
 2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.

3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required.
- D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.
- E. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.
- F. Electrical items to be painted include, but are not limited to, the following:
 1. Switchgear.
 2. Electrical equipment that is indicated to have a factory-primed finish for field painting.
- G. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.
- H. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.
- I. Transparent (Clear) Finishes: Use multiple coats to produce a glass-smooth surface film of even luster. Provide a finish free of laps, runs, cloudiness, color irregularity, brush marks, orange peel, nail holes, or other surface imperfections.
 1. Provide satin finish for final coats.
- J. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 FIELD QUALITY CONTROL

- A. Owner reserves the right to invoke the following test procedure at any time and as often as Owner deems necessary during the period when paint is being applied:
 1. Owner will engage a qualified independent testing agency to sample paint material being used. Samples of material delivered to Project will be taken, identified, sealed, and certified in the presence of Contractor.
 2. Testing agency will perform appropriate tests for the following characteristics as required by Owner:
 3. Owner may direct Contractor to stop painting if test results show material being used does not comply with specified requirements. Contractor shall remove non-complying paint from Project site, pay for testing, and repaint surfaces previously

coated with the noncomplying paint. If necessary, Contractor may be required to remove noncomplying paint from previously painted surfaces if, on repainting with specified paint, the two coatings are incompatible.

3.5 CLEANING

- A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.
 - 1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.6 PROTECTION

- A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.
- B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.
 - 1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

3.7 EXTERIOR PAINT SCHEDULE

- A. Ferrous Metal: Provide the following finish systems over exterior ferrous metal. Primer is not required on shop-primed items.
 - 1. Low-Luster Acrylic Finish: **Two finish coats** over a rust-inhibitive primer.
 - a. Primer: Exterior ferrous-metal primer.
 - b. Finish Coat: Exterior low-luster acrylic paint.
 - 2. Semigloss Acrylic-Enamel Finish: **Two finish coats** over a rust-inhibitive primer.
 - a. Primer: Exterior ferrous-metal primer.
 - b. Finish Coats: Exterior semigloss acrylic enamel.
- B. Zinc-Coated Metal: Provide the following finish systems over exterior zinc-coated metal surfaces:
 - 1. Low-Luster Finish: **Two finish coats** over a galvanized metal primer.
 - a. Primer: Exterior galvanized metal primer.
 - b. Finish Coat: Exterior low-luster acrylic paint.

2. Semigloss Acrylic-Enamel Finish: **Two finish coats** over a galvanized metal primer.
 - a. Primer: Exterior galvanized metal primer.
 - b. Finish Coats: Exterior semigloss acrylic enamel.
- C. Aluminum: Provide the following finish systems over exterior aluminum surfaces:
 1. Semigloss Acrylic-Enamel Finish: **Two finish coats** over a primer.
 - a. Primer: Exterior aluminum primer under acrylic finishes.
 - b. Finish Coats: Exterior semigloss acrylic enamel.

3.8 INTERIOR PAINT SCHEDULE

- A. Ferrous Metal: Provide the following finish systems over ferrous metal:
 1. Low-Luster Acrylic-Enamel Finish: **Two finish coats** over a primer.
 - a. Primer: Interior ferrous-metal primer.
 - b. Finish Coats: Interior low-luster acrylic enamel.
- B. Zinc-Coated Metal: Provide the following finish systems over interior zinc-coated metal surfaces:
 1. Low-Luster Acrylic-Enamel Finish: **Two finish coats** over a primer.
 - a. Primer: Interior zinc-coated metal primer.
 - b. Finish Coats: Interior low-luster acrylic enamel.

END OF SECTION

SECTION - 10520
FIRE-PROTECTION SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Portable fire extinguishers.
 - 2. Fire-protection cabinets for the following:
 - a. Portable fire extinguishers.
 - 3. Mounting brackets for fire extinguishers.
- B. Owner-Furnished Material: Fire extinguishers.
- C. Related Sections include the following:
 - 1. Division 9 painting Sections for field painting fire-protection cabinets.
 - 2. Division 10 Section "Signs" for directional signage to out-of-sight fire extinguishers and cabinets.

1.3 SUBMITTALS

- A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire-protection cabinets.
 - 1. Fire Extinguishers: Include rating and classification.
 - 2. Fire-Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.
- B. Samples for Verification: For each type of exposed factory-applied color finish required for fire-protection cabinets, prepared on Samples of size indicated below.
 - 1. Size: 6 by 6 inches (150 by 150 mm) square.
- C. Maintenance Data: For fire extinguishers to include in maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain fire extinguishers and fire-protection cabinets through one source from a single manufacturer.
- B. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
- C. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.
- D. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements of ASTM E 814 for fire-resistance rating of walls where they are installed.

1.5 COORDINATION

- A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

1.6 SEQUENCING

- A. Apply decals on field-painted fire-protection cabinets after painting is complete.

1.7 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of portable fire extinguishers that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Failure of hydrostatic test according to NFPA 10.
 - b. Faulty operation of valves or release levers.
 - 2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

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

2. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.
3. Basis-of-Design Product: The design for each product is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.

2.2 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.
- B. Aluminum: Alloy and temper recommended by aluminum producer and manufacturer for type of use and finish indicated, and as follows:
 1. Sheet: ASTM B 209 (ASTM B 209M).
 2. Extruded Shapes: ASTM B 221 (ASTM B 221M).
- C. Stainless-Steel Sheet: ASTM A 666, Type 304.

2.3 PORTABLE FIRE EXTINGUISHERS

- A. Manufacturers, or equal:
 1. Amerex Corporation.
 2. Ansul Incorporated.
 3. Badger Fire Protection.
 4. Buckeye Fire Equipment Company.
 5. Fire End & Croker Corporation.
 6. General Fire Extinguisher Corporation.
 7. JL Industries, Inc.
 8. Kidde Fyrnetics.
 9. Larsen's Manufacturing Company.
 10. Modern Metal Products; Div. of Technico.
 11. Moon American.
 12. Potter Roemer; Div. of Smith Industries, Inc.
 13. Watrous; Div. of American Specialties, Inc.
 14. Or Equal.
- B. General: Provide fire extinguishers of type, size, and capacity for each mounting bracket indicated.
- C. Purple-K Dry-Chemical Type in Aluminum Container UL-rated A:B:C, 10-lb nominal capacity, with DuPont FE-36 (Attapulgate), or equal dry chemical in enameled-aluminum container.

2.4 MOUNTING BRACKETS

- A. Manufacturers, or equal:
 1. Amerex Corporation.

2. Ansul Incorporated.
3. Badger Fire Protection.
4. Buckeye Fire Equipment Company.
5. Fire End & Croker Corporation.
6. General Fire Extinguisher Corporation.
7. JL Industries, Inc.
8. Larsen's Manufacturing Company.
9. Potter Roemer; Div. of Smith Industries, Inc.
10. Or Equal.

- B. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.

1. Color: Black.

- C. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.
 - a. Orientation: Vertical.

2.5 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire-protection cabinets after assembly.
- D. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 ALUMINUM FINISHES

- A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.
- B. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.

2.7 STEEL FINISHES

- A. Surface Preparation: Clean surfaces of dirt, oil, grease, mill scale, rust, and other contaminants that could impair paint bond using manufacturer's standard methods.
- B. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fire extinguishers for proper charging and tagging.
 - 1. Remove and replace damaged, defective, or undercharged units.

3.2 INSTALLATION

- A. General: Install fire-protection specialties in locations and at mounting heights indicated or, if not indicated, at heights indicated below:
 - 1. Mounting Brackets: 54 inches above finished floor to top of fire extinguisher.
- B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.
- C. Identification: Apply decals at locations indicated.

3.3 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire-protection specialties are installed, unless otherwise indicated in manufacturer's written installation instructions.
- B. Touch up marred finishes, or replace fire-protection elements that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection manufacturer.
- C. Replace fire-protection equipment that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 10670
METAL STORAGE SHELVING

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents:
 - 1. Drawings and general provisions of the Subcontract apply to this Section.
 - 2. Review these documents for coordination with additional requirements and information that apply to work under this Section.
- B. Section Includes:
 - 1. Provide steel storage shelving units and accessories, complete, as shown and as specified.
- C. Related Sections:
 - 1. Division 01 Section "General Requirements."
 - 2. Division 01 Section "Special Procedures."

1.2 REFERENCES

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

1.3 SYSTEM DESCRIPTION

- A. Design, fabricate and install seismic bracing for metal storage shelving as required to withstand loads prescribed by the governing codes and regulations pertinent to the work of this Section.

1.4 SUBMITTALS

- A. Submit under provisions of Division 01 Section "General Requirements."
- B. Product Data: Submit manufacturer's data for each item specified herein, identifying the item to be provided, and the manufacturer's recommendations for installation.
- C. Shop Drawings: Submit shop drawings, showing seismic bracing requirements and coordination with other work specified in other Sections of the Specifications.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Protect shelving from damage during shipping, handling, and storage. Dents, deformations, and defacements are not acceptable. If storage at project is necessary before installation can be accomplished, store such materials in a clean, dry place. Replace all damaged materials. Damaged parts may be replaced within a complete assembly, provided replacements are of the same quality, size, shape, color and other requirements.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Basis of Design, or approved equal:
 - 1. ULINE – phone: 800-295-5510, website: www.uline.com
 - a. Starter Unit: Model H-5415, 48"w x 36"d x 72"h, 3 shelves, 3,000 lb shelf capacity.
 - b. Add-On Unit: Model H-5424, 48"w x 36"d x 72"h, 3 shelves, 3,000 lb shelf capacity.

2.2 MATERIALS

- A. Materials supplied shall be of proper size, shapes, colors or other requirements. Properly mark for location of installation. Provide full instructions for the assembly of all units which are shipped KD (knocked-down). Adequately mark or otherwise indicate all parts required for full assembly.
- B. Open Shelving: Shelving shall be manufacturer's standard prefinished open (rack) units arranged as shown.
- C. Width(s), height(s) and depths of units, shelf arrangement and spacing, shall be as shown; field assembled with clips and without special tools, except as otherwise indicated
 - 1. Provide open units with beaded or angle front post and side and back sway and seismic bracing, with accessories as shown or required for complete shelving. Provide label holders where directed by the Project Manager.

2.3 FINISH

- A. Manufacturer's standard factory applied baked on enamel finish over phosphatized surfaces on all shelving components, except as otherwise indicated. Color shall be as selected by the Owner.

2.4 SHELVING COMPONENTS

- A. Adjustable shelving with interchangeable steel components. Shelf loading capacity shall be an evenly distributed load of 25 pounds/linear foot with no deflection across the shelf front flange; up to 3,000 lbs. per shelf. Components shall be as follows:
1. Posts for Open Shelving Units: Gauge and size of posts as necessary to support, without deformation, specified shelf loading; punched on 38 mm centers to receive clips for vertical adjustment of shelves, and to receive angle or corner sway braces.
 - a. Rear End Posts: square posts.
 - b. Front End Posts: square posts.
 - c. Front and Rear Intermediate Posts: Two single square posts.
 2. Shelves: Wire decking – galvanized steel mesh. 2"x4" openings. Metal front and rear edges; of strength to support specified loading without exceeding deflection limit; 18 gauge minimum; punched for shelf or bin dividers, label holders, and angle or corner sway braces; top shelf may be bolted to front posts.
 - a. Provide continuous angle or channel reinforcing between front and rear flanges and continuous hat shape reinforcing or 2 continuous reinforcing angles or channels (back to back) under center of shelf, provide 2 side shelf supports to support center reinforcing; bolt side shelf supports to posts, bolt center reinforcing to side shelf supports; bolt shelves in place.
 3. Shelf Clips: Manufacturer's standard cadmium plated shelf clips to hold shelf securely in place; clips and shelves easily installed without tools; provide 4 clips per shelf.
 4. Sway and Seismic Braces: Diagonal cross bracing or solid panel bracing; bolt to posts. Provide angle or corner sway braces bolted to shelves and posts where indicated. Carry seismic bracing up or over to the building structure as shown on the drawings, providing positive connections capable of transmitting the shelving design load for the shelving units as defined by the California Building Code, Chapter 16, as modified by Division 01 Section "Lateral Force Procedures".
 5. Label Holders: Continuous for full width of shelf; top and bottom edges folded over to receive and retain 1" high labels; bolt or clip to front edge of shelf.
 6. Accessories: Manufacturers standard accessories, including cadmium plated or zinc coated bolts, nuts, clips (other than shelf clips) and following:
 - a. Upright, Back, and Counter Front Panels for Closed Units: Punched for attachments; bolt to posts, except weld uprights to posts in upright assemblies; counter front flanged on top or bottom.
 - b. Base Fronts and Ends: Use to form closed base between bottom Shelf and floor; fasten in place with clips or bolts.
 - c. Shelf Dividers: Flanged and punched for attachments; beaded front edge; fasten in place with clips or bolts.
 - d. Miscellaneous: Cadmium plated footing plates or angles for posts; splices for posts, uprights, sides, and backs; cover plates for posts; side shelf supports, guides, stops, inserts, check hooks, etc.; punched or otherwise prepared for attachment.
 7. Ledge Tops: Not punched for bin dividers; with box formed front edge having face flange and return flange and extending beyond front of unit; integrally formed and closed exposed ends or with end caps or covers bolted to exposed ends of ledges. Provide provision for bolting to posts.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install metal shelving units in a secure manner, to concrete floor, in accordance with the recommendations of the manufacturer for the installation involved, and with the detailing shown. Install work rigid, level, and plumb. All moving parts shall operate freely. Perform all installation in accordance with the manufacturer's directions. Where special fastenings or like materials are required, supply as recommended by the manufacturer of the item.
- B. Protect finish surfaces of adjacent materials with tape, paper or other materials. Make fastenings as inconspicuous as possible. Remove sharp edges or burrs. Make final adjustment of moving parts immediately prior to final inspection of the work of the Project.

END OF SECTION

SECTION 15010
COMMON WORK RESULTS FOR HVAC

PART 1 GENERAL

1.1 DESCRIPTION

- A. The requirements of this Section apply to all sections of Division 23.

1.2 RELATED WORK

- A. Section 15890, HVAC DUCTS AND CASINGS.

1.3 QUALITY ASSURANCE

- A. Mechanical, electrical and associated systems shall be safe, reliable, efficient, durable, easily and safely operable and maintainable, easily and safely accessible, and in compliance with applicable codes as specified. The systems shall be comprised of high quality institutional-class and industrial-class products of manufacturers that are experienced specialists in the required product lines. All construction firms and personnel shall be experienced and qualified specialists in industrial and institutional HVAC or steam boiler plant construction, as applicable.
- B. Flow Rate Tolerance for HVAC Equipment: Section 15990, TESTING, ADJUSTING, AND BALANCING FOR HVAC.
1. After HVAC air balance work is completed and permanent drive sheaves are in place, perform field mechanical balancing and adjustments required to meet the specified vibration tolerance.
- C. Products Criteria:
1. Standard Products: Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products for at least 3 years. The design, model and size of each item shall have been in satisfactory and efficient operation on at least three installations for approximately three years. However, digital electronics devices, software and systems such as controls, instruments, computer work station, shall be the current generation of technology and basic design that has a proven satisfactory service record of at least three years. See other specification sections for any exceptions.
2. All items furnished shall be free from defects that would adversely affect the performance, maintainability and appearance of individual components and overall assembly.
3. Conform to codes and standards as required by the specifications. Conform to local codes, if required by local authorities such as the natural gas supplier, if the local codes are more stringent than those specified.

4. Multiple Units: When two or more units of materials or equipment of the same type or class are required, these units shall be products of one manufacturer.
5. Assembled Units: Manufacturers of equipment assemblies, which use components made by others, assume complete responsibility for the final assembled product.
6. Nameplates: Nameplate bearing manufacturer's name or identifiable trademark shall be securely affixed in a conspicuous place on equipment, or name or trademark cast integrally with equipment, stamped or otherwise permanently marked on each item of equipment.
7. Asbestos products or equipment or materials containing asbestos shall not be used.

D. Equipment Service Organizations:

1. HVAC: Products and systems shall be supported by service organizations that maintain a complete inventory of repair parts and are located reasonably close to the site.

E. HVAC Mechanical Systems Welding: Before any welding is performed, contractor shall submit a certificate certifying that welders comply with the following requirements:

1. Qualify welding processes and operators for piping according to ASME "Boiler and Pressure Vessel Code", Section IX, "Welding and Brazing Qualifications".
2. Comply with provisions of ASME B31 series "Code for Pressure Piping".
3. Certify that each welder has passed American Welding Society (AWS) qualification tests for the welding processes involved, and that certification is current.

F. Execution (Installation, Construction) Quality:

1. Apply and install all items in accordance with manufacturer's written instructions. Refer conflicts between the manufacturer's instructions and the contract drawings and specifications to the Engineer for resolution. Provide written hard copies or computer files of manufacturer's installation instructions to the Engineer at least two weeks prior to commencing installation of any item. Installation of the item will not be allowed to proceed until the recommendations are received. Failure to furnish these recommendations is a cause for rejection of the material.
2. All items that require access, such as for operating, cleaning, servicing, maintenance, and calibration, shall be easily and safely accessible by persons standing at floor level, or standing on permanent platforms, without the use of portable ladders. Examples of these items include, but are not limited to: all types of valves, filters and strainers, transmitters, control devices. Prior to commencing installation work, refer conflicts between this requirement and contract drawings to the Engineer for resolution.

3. Provide complete layout drawings required by Paragraph, SUBMITTALS. Do not commence construction work on any system until the layout drawings have been approved.

1.4 SUBMITTALS

- A. Contractor shall make all necessary field measurements and investigations to assure that the equipment and assemblies will meet contract requirements.
- B. If equipment is submitted which differs in arrangement from that shown, provide drawings that show the rearrangement of all associated systems. Approval will be given only if all features of the equipment and associated systems, including accessibility, are equivalent to that required by the contract.
- C. Prior to submitting shop drawings for approval, contractor shall certify in writing that manufacturers of all major items of equipment have each reviewed drawings and specifications, and have jointly coordinated and properly integrated their equipment and controls to provide a complete and efficient installation.
- D. Upon request by Owner, provide lists of previous installations for selected items of equipment. Include contact persons who will serve as references, with telephone numbers and e-mail addresses.
- E. Submittals and shop drawings for interdependent items, containing applicable descriptive information, shall be furnished together and complete in a group. Coordinate and properly integrate materials and equipment in each group to provide a completely compatible and efficient installation. Final review and approvals will be made only by groups.
- F. Samples: Samples will not be required, except for insulation or where materials offered differ from specification requirements. Samples shall be accompanied by full description of characteristics different from specification. The Owner, at the Owner's expense, will perform evaluation and testing if necessary. The Contractor may submit samples of additional material at the Contractor's option; however, if additional samples of materials are submitted later, pursuant to Owner request, adjustment in contract price and time will be made as provided under General Conditions.
- G. Layout Drawings:
 1. Submit complete consolidated and coordinated layout drawings for all new systems, and for existing systems that are in the same areas.
 2. The drawings shall include plan views, elevations and sections of all systems and shall be on a scale of not less than 1:32 (3/8-inch equal to one foot). Clearly identify and dimension the proposed locations of the principal items of equipment. The drawings shall clearly show locations and adequate clearance for all equipment, piping, valves, control panels and other items. Show the access means for all items requiring access for operations and maintenance. Provide detailed layout drawings of all piping and duct systems.

3. Do not install equipment foundations, equipment or piping until layout drawings have been approved.
 4. In addition, for HVAC systems, provide details of the following:
 - a. Hangers, inserts, supports, and bracing.
 - b. Pipe sleeves.
 - c. Duct or equipment penetrations of floors, walls, ceilings, or roofs.
- H. Manufacturer's Literature and Data: Submit under the pertinent section rather than under this section.
1. Submit belt drive with the driven equipment. Submit selection data for specific drives when requested by the Resident Engineer.
 2. Submit electric motor data and variable speed drive data with the driven equipment.
 3. Equipment and materials identification.
 4. Fire-stopping materials.
 5. Hangers, inserts, supports and bracing. Provide load calculations for variable spring and constant support hangers.
 6. Wall, floor, and ceiling plates.
- I. HVAC Maintenance Data and Operating Instructions:
1. Provide a listing of recommended replacement parts for keeping in stock supply, including sources of supply, for equipment. Include in the listing belts for equipment: Belt manufacturer, model number, size and style, and distinguished whether of multiple belt sets.
- J. Provide copies of approved HVAC equipment submittals to the Testing, Adjusting and Balancing Subcontractor.

1.5 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. Air Conditioning and Refrigeration Institute (ARI): 430-99 Central Station Air-Handling Units
- C. American National Standard Institute (ANSI): B31.1-2004 Power Piping
- D. Air Movement and Control Association (AMCA): 410-96 Recommended Safety Practices for Air Moving Devices
- E. American Society of Mechanical Engineers (ASME): Boiler and Pressure Vessel Code (BPVC):
Section I-2007..... Power Boilers
Section IX-2007 Welding and Brazing Qualifications
Code for Pressure Piping: B31.1-2004 Power Piping, with Amendments

- F. American Society for Testing and Materials (ASTM):
 - A36/A36M-05..... Carbon Structural Steel
 - A575-96(2002)..... Steel Bars, Carbon, Merchant Quality, M-Grades R (2002)
 - E84-07..... Standard Test Method for Burning Characteristics of Building Materials
 - E119-07..... Standard Test Method for Fire Tests of Building Construction and Materials
- G. Manufacturers Standardization Society (MSS) of the Valve and Fittings Industry, Inc:
 - SP-58-2002..... Pipe Hangers and Supports-Materials, Design and Manufacture
 - SP 69-2003..... Pipe Hangers and Supports-Selection and Application
 - SP 127-2001..... Bracing for Piping Systems, Seismic – Wind – Dynamic, Design, Selection, Application
- H. National Electrical Manufacturers Association (NEMA):
 - MG-1-2006..... Motors and Generators
- I. National Fire Protection Association (NFPA):
 - 70-08..... National Electrical Code
 - 90A-02..... Installation of Air Conditioning and Ventilating Systems
 - 101-06..... Life Safety Code

1.6 DELIVERY, STORAGE AND HANDLING

- A. Protection of Equipment:
 - 1. Equipment and material placed on the job site shall remain in the custody of the Contractor until phased acceptance, whether or not the Owner has reimbursed the Contractor for the equipment and material. The Contractor is solely responsible for the protection of such equipment and material against any damage.
 - 2. Place damaged equipment in first class, new operating condition; or, replace same as determined and directed by the Engineer. Such repair or replacement shall be at no additional cost to the Owner.
 - 3. Protect interiors of new equipment and piping systems against entry of foreign matter. Clean both inside and outside before painting or placing equipment in operation.
 - 4. Existing equipment and piping being worked on by the Contractor shall be under the custody and responsibility of the Contractor and shall be protected as required for new work.
- B. Cleanliness of Piping and Equipment Systems:
 - 1. Exercise care in storage and handling of equipment and piping material to be incorporated in the work. Remove debris arising from cutting, threading and welding of piping.

2. Piping systems shall be flushed, blown or pigged as necessary to deliver clean systems.
3. Clean interior of all tanks prior to delivery for beneficial use by the Owner.
4. Boilers shall be left clean following final internal inspection by Owner insurance representative or inspector.
5. Contractor shall be fully responsible for all costs, damage, and delay arising from failure to provide clean systems.

1.7 SUPERVISION

- A. Each Contractor shall retain a competent superintendent to direct the work constantly during construction, and to represent the Contractor at all times in connection with the work. He shall also instruct the Owner's representative in the use and maintenance of all equipment. This person must be superintendent from beginning to final acceptance of work.

1.8 EQUIPMENT INGRESS

- A. All equipment and materials shall be purchased, if required, in such knocked-down condition that they will pass through the building openings or such openings as may occur incidentally during construction.
- B. Provide for all scaffolding, staging, cribbing, equipment, etc., necessary for the installation under this Division. Comply with the requirements and regulations of federal, state and local bodies, including OSHA.

1.9 PROTECTION OF FINISHED AREAS AND SYSTEMS DURING CONSTRUCTION

- A. All sheet metal duct systems and equipment openings requiring connections shall be protected from the weather and construction dust. Temporary caps shall be provided over all open ends. All openings through the roof shall have temporary caps that are watertight and strong enough to resist wind loads.

1.10 INTERFERENCES/CLARIFICATIONS

- A. Before installing any work, the Contractor shall see that it does not interfere with clearance required for finish on beams, columns, pilasters, walls, other systems or other structural or architectural members. If any work is so installed and it later develops that Architectural/Engineering design cannot be followed, Contractor shall, at his own expense, make such changes in his work as the Engineer may direct to permit completion of Architectural work in accordance with plans and specifications.
- B. Install additional offsets on new ductwork where required to obtain maximum headroom or to avoid conflict with other work without additional cost to the Owner. Where mounting heights are not detailed or dimensioned, install HVAC services and overhead equipment to provide the maximum headroom possible.

- C. Report any interferences between work under this division and that of any other Contractors to the Engineer as soon as they are discovered. The Engineer shall determine which equipment shall be relocated, regardless of which was first installed, and his decision shall be final.
- D. Should there be any discrepancies or question of intent, refer the matter to Engineer for a decision before ordering equipment, materials or before starting any related work.
- E. Minor items and accessories or devices, reasonably inferable as necessary to the complete, proper installation and operation of any system, shall be provided by the Contractor for such system whether or not they are specifically referenced by the specification or the drawings.

1.11 SHOP AREAS AND MATERIAL STORAGE

- A. The Contractor shall make provisions for the delivery and safe storage of his materials and equipment in coordination with the work of others. Materials and equipment shall be delivered at such stages of the work as will expedite the work as a whole and shall be marked and stored in such a way as to be easily checked and inspected.

1.12 CLEAN-UP

- A. At conclusion of each day's work, clean up rubbish, debris and trash accumulated during the day as a result of the work performed. Side-walks, streets and adjoining property shall be kept broom clean and free of debris, rubbish, trash and obstructions of any kind caused by work of this contract.
- B. Upon completion of work, each Contractor shall thoroughly clean all apparatus furnished by him, thoroughly clean ductwork, fixtures, and equipment removing all dirt, grease and oil.

1.13 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to the project properly identified with names, model numbers, types, grades, compliance labels and other information needed for identification.
- B. Materials shall be delivered in manufacturer's original unopened packaging.
- C. Materials shall be stored and protected from the ground contact and other elements.

1.14 OMISSIONS AND DISCREPANCIES

- A. Any discrepancies found between the site conditions and the specifications, or any errors or omissions in the specification, discovered by the Bidding Contractor prior to the bid openings are to be brought to the attention of the Engineer. Approved changes to the drawings and specifications by addendum shall be issued by the Engineer prior to the bid opening as required,

PART 2 PRODUCTS

2.1 FACTORY-ASSEMBLED PRODUCTS

- A. Provide maximum standardization of components to reduce spare part requirements.
- B. Manufacturers of equipment assemblies that include components made by others shall assume complete responsibility for final assembled unit.
 - 1. All components of an assembled unit need not be products of same manufacturer.
 - 2. Constituent parts that are alike shall be products of a single manufacturer.
 - 3. Components shall be compatible with each other and with the total assembly for intended service.
 - 4. Contractor shall guarantee performance of assemblies of components, and shall repair or replace elements of the assemblies as required to deliver specified performance of the complete assembly.
- C. Components of equipment shall bear manufacturer's name and trademark, model number, serial number and performance data on a name plate securely affixed in a conspicuous place, or cast integral with, stamped or otherwise permanently marked upon the components of the equipment.
- D. Major items of equipment, which serve the same function, must be the same make and model. Exceptions will be permitted if performance requirements cannot be met.

2.2 COMPATIBILITY OF RELATED EQUIPMENT

- A. Equipment and materials installed shall be compatible in all respects with other items being furnished and with existing items so that the result will be a complete and fully operational plant that conforms to contract requirements.

2.3 LIFTING ATTACHMENTS

- A. Provide equipment with suitable lifting attachments to enable equipment to be lifted in its normal position. Lifting attachments shall withstand any handling conditions that might be encountered, without bending or distortion of shape, such as rapid lowering and braking of load.

2.4 EQUIPMENT AND MATERIALS IDENTIFICATION

- A. Use symbols, nomenclature and equipment numbers specified, shown on the drawings and shown in the maintenance manuals.
- B. Interior (Indoor) Equipment: Engraved nameplates, with letters not less than 3/16-inch high of brass with black-filled letters, or rigid black plastic with white

letters permanently fastened to the equipment. Identify unit components such as coils, filters, fans, etc.

- C. Control Items: Label all temperature and humidity sensors, controllers and control dampers. Identify and label each item as they appear on the control diagrams.
- D. Valve Tags and Lists:
 - 1. Valve tags: Engraved black filled numbers and letters not less than 1/2-inch high for number designation, and not less than 1/4-inch for service designation on 19 gage 1-1/2 inches round brass disc, attached with brass "S" hook or brass chain.
 - 3. Valve lists: Typed or printed plastic coated card(s), sized 8-1/2 inches by 11 inches showing tag number, valve function and area of control, for each service or system. Punch sheets for a 3-ring notebook.
 - 4. Provide detailed plan for each floor of the building indicating the location and valve number for each valve. Identify location of each valve with a color coded thumb tack in ceiling.

2.5 HVAC PIPE AND EQUIPMENT SUPPORTS AND RESTRAINTS

- A. Pipe Supports: Comply with MSS SP-58. Type Numbers specified refer to this standard. For selection and application comply with MSS SP-69.
- B. Attachment to Concrete Building Construction:
 - 1. Concrete insert: MSS SP-58, Type 18.
 - 2. Self-drilling expansion shields and machine bolt expansion anchors: Permitted in concrete not less than four inches thick when approved by the Engineer for each job condition.
 - 3. Power-driven fasteners: Permitted in existing concrete or masonry not less than four inches thick when approved by the Engineer for each job condition.
- C. Attachment to Steel Building Construction:
 - 1. Welded attachment: MSS SP-58, Type 22.
 - 2. Beam clamps: MSS SP-58, Types 20, 21, 28 or 29. Type 23 C-clamp may be used for individual copper tubing up to 7/8-inch outside diameter.
- D. Attachment to Wood Construction: Wood screws or lag bolts.
- E. Hanger Rods: Hot-rolled steel, ASTM A36 or A575 for allowable load listed in MSS SP-58. For piping, provide adjustment means for controlling level or slope. Types 13 or 15 turn-buckles shall provide 1-1/2 inches minimum of adjustment and incorporate locknuts. All-thread rods are acceptable.
- F. Hangers Supporting Multiple Pipes (Trapeze Hangers): Galvanized, cold formed, lipped steel channel horizontal member, not less than 1-5/8 inches by 1-5/8

inches, No. 12 gage, designed to accept special spring held, hardened steel nuts. Not permitted for steam supply and condensate piping.

1. Allowable hanger load: Manufacturers rating less 200 pounds.
2. Guide individual pipes on the horizontal member of every other trapeze hanger with 1/4-inch U-bolt fabricated from steel rod. Provide Type 40 insulation shield, secured by two 1/2-inch galvanized steel bands, or preinsulated calcium silicate shield for insulated piping at each hanger.

G. Supports for Piping Systems:

1. Select hangers sized to encircle insulation on insulated piping. To protect insulation, provide Type 39 saddles for roller type supports or preinsulated calcium silicate shields. Provide Type 40 insulation shield or preinsulated calcium silicate shield at all other types of supports and hangers including those for preinsulated piping.
2. Piping Systems except High and Medium Pressure Steam (MSS SP-58):
 - a. Standard clevis hanger: Type 1; provide locknut.
 - b. Riser clamps: Type 8.
 - c. Wall brackets: Types 31, 32 or 33.
 - d. Roller supports: Type 41, 43, 44 and 46.
 - e. Saddle support: Type 36, 37 or 38.
 - f. Turnbuckle: Types 13 or 15. Preinsulate.
 - g. U-bolt clamp: Type 24.
 - h. Copper Tube:
 - 1) Hangers, clamps and other support material in contact with tubing shall be painted with copper colored epoxy paint, plastic coated or taped with non adhesive isolation tape to prevent electrolysis.
 - 2) For vertical runs use epoxy painted or plastic coated riser clamps.
 - 3) For supporting tube to strut: Provide epoxy painted pipe straps for copper tube or plastic inserted vibration isolation clamps.
 - 4) Insulated Lines: Provide pre-insulated calcium silicate shields sized for copper tube.
 - i. Supports for plastic or glass piping: As recommended by the pipe manufacturer with black rubber tape extending one inch beyond steel support or clamp.

2.6 PIPE PENETRATIONS

- A. Install sleeves during construction for other than blocked out floor openings for risers in mechanical bays.
- B. Penetrations are not allowed through beams or ribs, but may be installed in concrete beam flanges. Any deviation from these requirements must receive prior approval of Engineer.

- C. Sheet Metal, Plastic, or Moisture-resistant Fiber Sleeves: Provide for pipe passing through floors, interior walls, and partitions, unless brass or steel pipe sleeves are specifically called for below.
- D. Cast Iron or Zinc Coated Pipe Sleeves: Provide for pipe passing through exterior walls below grade. Make space between sleeve and pipe watertight with a modular or link rubber seal. Seal shall be applied at both ends of sleeve.
- E. Galvanized Steel or an alternate Black Iron Pipe with asphalt coating Sleeves: Provide for pipe passing through concrete beam flanges, except where brass pipe sleeves are called for. Provide sleeve for pipe passing through floor of mechanical rooms, laundry work rooms, and animal rooms above basement. Except in mechanical rooms, connect sleeve with floor plate.
- F. Brass Pipe Sleeves: Provide for pipe passing through quarry tile, terrazzo or ceramic tile floors. Connect sleeve with floor plate.
- G. Sleeve Clearance: Sleeve through floors, walls, partitions, and beam flanges shall be one inch greater in diameter than external diameter of pipe. Sleeve for pipe with insulation shall be large enough to accommodate the insulation. Interior openings shall be caulked tight with fire stopping material and sealant to prevent the spread of fire, smoke, and gases.

2.7 SPECIAL TOOLS AND LUBRICANTS

- A. Furnish, and turn over to the Engineer, special tools not readily available commercially, that are required for disassembly or adjustment of equipment and machinery furnished.
- B. Grease Guns with Attachments for Applicable Fittings: One for each type of grease required for each motor or other equipment.
- C. Tool Containers: Hardwood or metal, permanently identified for intended service and mounted, or located, where directed by the Engineer.
- D. Lubricants: A minimum of one quart of oil, and one pound of grease, of equipment manufacturer's recommended grade and type, in unopened containers and properly identified as to use for each different application.

2.8 WALL, FLOOR AND CEILING PLATES

- A. Material and Type: Chrome plated brass or chrome plated steel, one piece or split type with concealed hinge, with set screw for fastening to pipe, or sleeve. Use plates that fit tight around pipes, cover openings around pipes and cover the entire pipe sleeve projection.
- B. Thickness: Not less than 3/32-inch for floor plates. For wall and ceiling plates, not less than 0.025-inch for up to 3-inch pipe, 0.035-inch for larger pipe.

- C. Locations: Use where pipe penetrates floors, walls and ceilings in exposed locations, in finished areas only. Use also where insulation ends on exposed water supply pipe drop from overhead. Provide a watertight joint in spaces where brass or steel pipe sleeves are specified.

2.9 ASBESTOS

- A. Materials containing asbestos are not permitted.

PART 3 EXECUTION

3.1 ARRANGEMENT AND INSTALLATION OF EQUIPMENT AND PIPING

- A. Coordinate location of piping, sleeves, inserts, hangers, ductwork and equipment. Locate piping, sleeves, inserts, hangers, ductwork and equipment clear of windows, doors, openings, light outlets, and other services and utilities. Prepare equipment layout drawings to coordinate proper location and personnel access of all facilities. Submit the drawings for review as required by Part 1. Follow manufacturer's published recommendations for installation methods not otherwise specified.
- B. Operating Personnel Access and Observation Provisions: Select and arrange all equipment and systems to provide clear view and easy access, without use of portable ladders, for maintenance and operation of all devices including, but not limited to: all equipment items, valves, filters, strainers, transmitters, sensors, control devices. All gages and indicators shall be clearly visible by personnel standing on the floor or on permanent platforms. Do not reduce or change maintenance and operating space and access provisions that are shown on the drawings.
- C. Equipment and Piping Support: Coordinate structural systems necessary for pipe and equipment support with pipe and equipment locations to permit proper installation.
- D. Location of pipe sleeves, trenches and chases shall be accurately coordinated with equipment and piping locations.
- E. Cutting Holes:
 - 1. Cut holes through concrete and masonry by rotary core drill. Pneumatic hammer, impact electric, and hand or manual hammer type drill will not be allowed, except as permitted by Engineer where working area space is limited.
 - 2. Locate holes to avoid interference with structural members such as beams or grade beams. Holes shall be laid out in advance and drilling done only after approval by Engineer. If the Contractor considers it necessary to drill through structural members, this matter shall be referred to Engineer for approval.
 - 3. Do not penetrate membrane waterproofing.

- F. Interconnection of Instrumentation or Control Devices: Generally, electrical and pneumatic interconnections are not shown but must be provided.
- G. Minor Piping: Generally, small diameter pipe runs from drips and drains, water cooling, and other service are not shown but must be provided.
- H. Electrical and Pneumatic Interconnection of Controls and Instruments: This generally not shown but must be provided. This includes interconnections of sensors, transmitters, transducers, control devices, control and instrumentation panels, instruments and computer workstations. Comply with NFPA-70.
- I. Protection and Cleaning:
 - 1. Equipment and materials shall be carefully handled, properly stored, and adequately protected to prevent damage before and during installation, in accordance with the manufacturer's recommendations and as approved by the Engineer. Damaged or defective items in the opinion of the Engineer, shall be replaced.
 - 2. Protect all finished parts of equipment, such as shafts and bearings where accessible, from rust prior to operation by means of protective grease coating and wrapping. Close pipe openings with caps or plugs during installation. Tightly cover and protect fixtures and equipment against dirt, water chemical, or mechanical injury. At completion of all work thoroughly clean fixtures, exposed materials and equipment.
- J. Concrete and Grout: Use concrete and shrink compensating grout.
- K. Install gages, thermometers, valves and other devices with due regard for ease in reading or operating and maintaining said devices. Locate and position thermometers and gages to be easily read by operator or staff standing on floor or walkway provided. Servicing shall not require dismantling adjacent equipment or pipe work.
- L. Work in Existing Building:
 - 1. Make alterations to existing service piping at times that will least interfere with normal operation of the facility.
 - 2. Cut required openings through existing masonry and reinforced concrete using diamond core drills. Use of pneumatic hammer type drills, impact type electric drills, and hand or manual hammer type drills, will be permitted only with approval of the Engineer. Locate openings that will least effect structural slabs, columns, ribs or beams. Refer to the Engineer for determination of proper design for openings through structural sections and opening layouts approval, prior to cutting or drilling into structure. After Engineer's approval, carefully cut opening through construction no larger than absolutely necessary for the required installation.

M. Inaccessible Equipment:

1. Where the Owner determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, equipment shall be removed and reinstalled or remedial action performed as directed at no additional cost to the Owner.
2. The term "conveniently accessible" is defined as capable of being reached without the use of ladders, or without climbing or crawling under or over obstacles such as motors, fans, pumps, belt guards, transformers, high voltage lines, piping, and ductwork.

3.2 TEMPORARY PIPING AND EQUIPMENT

- A. Continuity of operation of existing facilities will generally require temporary installation or relocation of equipment and piping.
- B. The Contractor shall provide all required facilities in accordance with the requirements of phased construction and maintenance of service. All piping and equipment shall be properly supported, sloped to drain, operate without excessive stress, and shall be insulated where injury can occur to personnel by contact with operating facilities. The requirements of Para. 3.1 apply.
- C. Temporary facilities and piping shall be completely removed and any openings in structures sealed. Provide necessary blind flanges and caps to seal open piping remaining in service.

3.3 RIGGING

- A. Design is based on application of available equipment. Openings in building structures are planned to accommodate design scheme.
- B. Alternative methods of equipment delivery may be offered by Contractor and will be considered by Owner under specified restrictions of phasing and maintenance of service as well as structural integrity of the building.
- C. Close all openings in the building when not required for rigging operations to maintain proper environment in the facility for Owner operation and maintenance of service.
- D. Contractor shall provide all facilities required to deliver specified equipment and place on foundations. Attachments to structures for rigging purposes and support of equipment on structures shall be Contractor's full responsibility. Upon request, the Owner will check structure adequacy and advise Contractor of recommended restrictions.
- E. Contractor shall check all clearances, weight limitations and shall offer a rigging plan designed by a Registered Professional Engineer. All modifications to structures, including reinforcement thereof, shall be at Contractor's cost, time and responsibility.

- F. Rigging plan and methods shall be referred to Engineer for evaluation prior to actual work.
- G. Restore building to original condition upon completion of rigging work.

3.4 PIPE AND EQUIPMENT SUPPORTS

- A. Where hanger spacing does not correspond with joist or rib spacing, use structural steel channels secured directly to joist and rib structure that will correspond to the required hanger spacing, and then suspend the equipment and piping from the channels. Drill or burn holes in structural steel only with the prior approval of the Engineer.
- B. Use of chain, wire or strap hangers; wood for blocking, stays and bracing; or, hangers suspended from piping above will not be permitted. Replace or thoroughly clean rusty products and paint with zinc primer.
- C. Use hanger rods that are straight and vertical. Turnbuckles for vertical adjustments may be omitted where limited space prevents use. Provide a minimum of 1/2-inch clearance between pipe or piping covering and adjacent work.
- D. HVAC Horizontal Pipe Support Spacing: Refer to MSS SP-69. Provide additional supports at valves, strainers, in-line pumps and other heavy components. Provide a support within one foot of each elbow.
- E. HVAC Vertical Pipe Supports:
 - 1. Up to 6-inch pipe, 30 feet long, bolt riser clamps to the pipe below couplings, or welded to the pipe and rests supports securely on the building structure.
 - 2. Vertical pipe larger than the foregoing, support on base elbows or tees, or substantial pipe legs extending to the building structure.
- F. Overhead Supports:
 - 1. The basic structural system of the building is designed to sustain the loads imposed by equipment and piping to be supported overhead.
 - 2. Provide steel structural members, in addition to those shown, of adequate capability to support the imposed loads, located in accordance with the final approved layout of equipment and piping.
 - 3. Tubing and capillary systems shall be supported in channel troughs.
- G. Floor Supports:
 - 1. Provide concrete bases, concrete anchor blocks and pedestals, and structural steel systems for support of equipment and piping. Anchor and dowel concrete bases and structural systems to resist forces under

- operating and seismic conditions (if applicable) without excessive displacement or structural failure.
- 2. Do not locate or install bases and supports until equipment mounted thereon has been approved. Size bases to match equipment mounted thereon plus 2 inch excess on all edges.
- 3. All equipment shall be shimmed, leveled, firmly anchored, and grouted with epoxy grout. Anchor bolts shall be placed in sleeves, anchored to the bases. Fill the annular space between sleeves and bolts with a granular material to permit alignment and realignment.

3.5 MECHANICAL DEMOLITION

- A. Insulation or materials shall be identified before attempting any demolition. Contractor shall comply with the requirements of EPA regulations, National Emissions Standards, and the OSHA regulations, as well as applicable State laws and City Codes and Ordinances. Asbestos insulation if found, shall be removed under a separate contract.
- B. Before commencing the work of this section, the Contractor shall check with Owner about materials, and equipment to be removed and those to be preserved. All those items requiring demolition shall be hauled away from site.
- C. Items so indicated on drawings to be removed and not indicated or specified to be saved or retained shall be demolished, removed, demounted, or disconnected in the best possible manner to ensure that no damage will result to other adjacent items or surface to remain.
- D. During removal of items so indicated, caution shall be used to eliminate damage to any equipment having salvage value. All material being removed shall become the property of the contractor for disposal unless otherwise noted or directed. Deliver any such item retained by the Owner to any location on the project site as indicated by the Engineer.
- E. Disposal and Clean-Up:
 - 1. Areas in which demolition and salvage work is being done shall be cleaned daily.
 - 2. All dirt, dust, debris, unsalvageable and un reusable items and the like shall be totally removed from the project site on a daily basis. Under no circumstances shall such refuse be allowed to collect for longer periods.
 - 3. Refuse shall not be allowed to block, or otherwise impair circulation in corridors, stairs, sidewalks or other traffic areas.
- F. Confine the work to the immediate area concerned; maintain cleanliness and wet down demolished materials to eliminate dust. Do not permit debris to accumulate in the area to the detriment of plant operation. Perform all flame cutting to maintain the fire safety integrity of this plant.
- G. Completely remove all piping, wiring, conduit, and other devices associated with the equipment not to be re-used in the new work. This includes all pipe, valves,

fittings, insulation, and all hangers including the top connection and any fastenings to building structural systems. Seal all openings, after removal of equipment, pipes, ducts, and other penetrations in roof, walls, floors, in an approved manner and in accordance with plans and specifications where specifically covered. Structural integrity of the building system shall be maintained. Reference shall also be made to the drawings and specifications of the other disciplines in the project for additional facilities to be demolished or handled.

3.6 CLEANING AND PAINTING

- A. Prior to final inspection and acceptance of the plant and facilities for beneficial use by the Owner, the plant facilities, equipment and systems shall be thoroughly cleaned and painted.
- B. In addition, the following special conditions apply:
 - 1. Cleaning shall be thorough. Use solvents, cleaning materials and methods recommended by the manufacturers for the specific tasks. Remove all rust prior to painting and from surfaces to remain unpainted. Repair scratches, scuffs, and abrasions prior to applying prime and finish coats.
 - 2. Material And Equipment Not To Be Painted Includes:
 - a. Motors, controllers, control switches, and safety switches.
 - b. Control and interlock devices.
 - c. Regulators.
 - d. Pressure reducing valves.
 - e. Control valves and thermostatic elements.
 - f. Lubrication devices and grease fittings.
 - g. Copper, brass, aluminum, stainless steel and bronze surfaces.
 - h. Valve stems and rotating shafts.
 - i. Pressure gauges and thermometers.
 - j. Glass.
 - k. Name plates.
 - 3. Control and instrument panels shall be cleaned, damaged surfaces repaired, and shall be touched-up with matching paint obtained from panel manufacturer.
 - 4. Temporary Facilities: Apply paint to surfaces that do not have existing finish coats.
 - 5. Paint shall withstand the following temperatures without peeling or discoloration:
 - a. Condensate and feedwater -- 100 degrees F on insulation jacket surface and 250 degrees F on metal pipe surface.
 - b. Steam -- 125 degrees F on insulation jacket surface and 375 degrees F on metal pipe surface.
 - 6. Final result shall be smooth, even-colored, even-textured factory finish on all items. Completely repaint the entire piece of equipment if necessary to achieve this.

3.7 IDENTIFICATION SIGNS

- A. Provide laminated plastic signs, with engraved lettering not less than 3/16-inch high, designating functions, for all equipment, switches, motor controllers, relays, meters, control devices, including automatic control valves. Nomenclature and identification symbols shall correspond to that used in maintenance manual, and in diagrams specified elsewhere. Attach by chain, adhesive, or screws.
- B. Factory Built Equipment: Metal plate, securely attached, with name and address of manufacturer, serial number, model number, size, performance.

3.8 STARTUP AND TEMPORARY OPERATION

- A. Start up equipment as described in equipment specifications. Verify that vibration is within specified tolerance prior to extended operation.

3.9 OPERATING AND PERFORMANCE TESTS

- A. Should evidence of malfunction in any tested system, or piece of equipment or component part thereof, occur during or as a result of tests, make proper corrections, repairs or replacements, and repeat tests at no additional cost to the Owner.
- B. When completion of certain work or system occurs at a time when final control settings and adjustments cannot be properly made to make performance tests, then make performance tests for heating systems and for cooling systems respectively during first actual seasonal use of respective systems following completion of work.

END OF SECTION

SECTION 15140
HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section includes specifications for supports of all HVAC equipment and materials as well as piping system anchors.

1.2 QUALITY ASSURANCE

- A. Refer to Division 1, General Conditions, Equals and Substitutions.

1.3 SUBMITTALS

- A. Refer to Division 1, General Conditions, Submittals.
- B. Schedule of all hanger and support devices indicating shields, attachment methods, and type of device for each pipe size and type of service.

1.4 DESIGN CRITERIA

- A, Materials and application of pipe hangers and supports shall be in accordance with MSS Standard Practice SP-58 unless noted otherwise.
- B. Piping connected to base mounted pumps, compressors, or other rotating or reciprocating equipment is to have vibration isolation supports for a distance of one hundred pipe diameters or three supports away from the equipment, whichever is greater. Standard pipe hangers/supports as specified in this section are required beyond the 100 pipe diameter/3 support distance.
- C. Piping flexible connections and vibration isolation supports are required for piping connected to coils that are in a fan assembly where the entire assembly is mounted on vibration supports; the vibration isolation supports are required for a distance of one hundred pipe diameters or three supports away from the equipment, whichever is greater. Piping flexible connection and vibration isolation supports are not required when the fan section is separately and independently isolated by means of vibration supports and duct flexible connections. Standard pipe hangers/supports as specified in this section are required when there are no vibration isolation devices in the piping and beyond the 100 pipe diameter/3 support distance.
- D. Piping supported by laying on the bottom chord of joists or trusses will not be accepted.
- E. Fasteners depending on soft lead for holding power or requiring powder actuation will not be accepted.

- F. Allow sufficient space between adjacent pipes and ducts for insulation, valve operation, routine maintenance, etc.

PART 2 PRODUCTS

2.1 STRUCTURAL SUPPORTS

- A. Provide all supporting steel required for the installation of mechanical equipment and materials, whether or not it is specifically indicated or sized, including angles, channels, beams, etc. to suspend or floor support tanks and equipment.

2.2 PIPE HANGERS AND SUPPORTS

- A. HANGERS FOR STEEL PIPE SIZES 1/2" THROUGH 2": Carbon steel, adjustable, clevis, black finish.
- B. HANGERS FOR STEEL PIPE SIZES 2-1/2" AND OVER Carbon steel, adjustable, clevis, black finish. Adjustable steel yoke, cast iron roll, double hanger. Anvil figure 181.
- C. MULTIPLE OR TRAPEZE HANGERS: Steel channels with welded spacers and hanger rods if calculations are submitted.
- D. WALL SUPPORT: Welded steel bracket with hanger.
- E. VERTICAL RISER SUPPORT: Carbon steel riser clamp, copper plated when used with copper pipe.
- F. FLOOR SUPPORT FOR PIPE SIZES THROUGH 4": Cast iron adjustable pipe saddle, locknut nipple, floor flange, and concrete pier or steel support.
- G. FLOOR SUPPORT FOR PIPE SIZES 5" AND OVER: Adjustable cast iron roll and stand, steel screws, and concrete pier or steel support.
- H. COPPER PIPE SUPPORT: Carbon steel ring, adjustable, copper plated or polyvinylchloride coated.
- I. INSULATION PROTECTION SHIELDS: Galvanized carbon steel of not less than 18 gauge for use on insulated pipe 2-1/2 inch and larger. Minimum shield length is 12 inches.
- J. STEEL HANGER RODS: Threaded both ends, threaded one end, or continuous threaded, black finish.
 - 1. Size rods for individual hangers and trapeze support as indicated in the following schedule.

Total weight of equipment, including valves, fittings, pipe, pipe content, and insulation, are not to exceed the limits indicated.

<u>Maximum Load (Lbs.)</u> <u>(650°F Maximum Temp.)</u>	<u>Rod Diameter</u> <u>(inches)</u>
610	3/8
1130	1/2
1810	5/8
2710	3/4
3770	7/8
4960	1
8000	1-1/4

Provide rods complete with adjusting and lock nuts.

2.3 WOOD STRUCTURE SUPPORTS

- A. Carbon steel pipe short strap for piping 1/2" through 2". Fastened with two No. 24 x 2 (minimum size) wood screws.
- B. Carbon steel coach screw rods machine threaded on opposite ends, minimum 3/8" diameter.
- C. Carbon steel side beam bracket with minimum 3/8" rod size and fastened with minimum 1/2" x 3" lag screws.

2.4 BEAM CLAMPS

- A. MSS SP-58 Type 23 malleable black iron clamp for attachment to beam flange to 0.62 inches thick for single threaded rods of 3/8, 1/2, and 5/8 inch diameter, for use with pipe sizes 4 inch and less. Furnish with a hardened steel cup point set screw.
- B. MSS SP-58 Type 28 or Type 29 forged steel jaw type clamp with a tie rod to lock clamp in place, suitable for rod sizes to 1-1/2 inch diameter but limited in application to pipe sizes 8 inch and less without prior approval.

2.5 CONCRETE INSERTS

- A. Carbon steel expansion anchors, vibration resistant, with ASTM B633 zinc plating. Use drill bit of same manufacturer as anchor.

2.6 ANCHORS

- A. Use welding steel shapes, plates, and bars to secure piping to the structure.

2.7 ROOF MOUNTED SUPPORTS

HEIGHT OF SUPPORTS:

Based on the length of the longest main support member, the height of the support member above the roof deck to be as follows:

Length of Longest Support	Min. Height of Support

<u>Member (inches)</u>	<u>Above Finished Roof</u>
Up to 36"	18 inches
37" and Over	36 inches

A. SUPPORTS 18" OR LESS IN HEIGHT:

1. Prefabricated Metal Sleeper Curb:

Constructed of not less than 18 gauge galvanized steel reinforced so it is structurally capable of supporting the intended load with no penetrations through the curb flashing, inside and outside corner sections that are mitered and continuously welded, filled with 3 pound density rigid fiberglass insulation, integral deck mounting flange, nominal two inch wood nailer, galvanized steel counter flashing with metal receiver cap. Attach a galvanized steel channel track for securing pipe or duct roller and roller support. Do not use built-in metal base flashings or cants.

2. Wood Build Sleeper Curb:

Constructed of wood blocking anchored to the deck. The curb must be structurally capable of supporting the intended load with no penetrations through the curb flashing. Galvanized steel counter flashing with metal receiver cap. Attach a steel channel track for securing pipe or duct roller support. Do not use built-in metal base flashings or cants.

Use galvanized structural steel members supported by pipe supports and use pipe or duct rollers fastened to the structural member. Pipe supports to be secured to the roof structure and sealed per pipe penetrations through roof specifications as specified in this section.

B. SUPPORTS 36" OR MORE IN HEIGHT:

1. Roof Support Stand/Equipment Roof Support Stand:

Use galvanized structural steel members supported by pipe supports and use pipe or duct rollers fastened to the structural member. Pipe supports to be secured to the roof structure and sealed per pipe penetrations through roof specifications as specified in this section

2.8 EQUIPMENT CURBS

- A. Prefabricated Metal Curb: Constructed of not less than 18 gauge galvanized steel reinforced so it is structurally capable of supporting the intended load with no penetrations through the curb flashing, inside and outside corner sections that are mitered and continuously welded, filled with 3 pound density rigid fiberglass insulation, integral deck mounting flange, nominal two inch wood nailer, galvanized steel counter flashing. Do not use built-in metal base flashings or cants. Use 18 inch high equipment curbs where the curb completely surrounds the perimeter of the equipment and there is no roof exposed to the weather.

- B. Wood Build Sleeper Curb: Constructed of wood blocking and anchored to the deck. The curb must be structurally capable of supporting the intended load with no penetrations through the curb flashing. Galvanized steel counter flashing. Do not use built-in metal base flashings or cants. Use 18 inch high equipment curbs where the curb completely surrounds the perimeter of the equipment and there is no roof exposed to the weather.

2.9 PIPE PENETRATIONS THROUGH ROOF

- A. Multiple Pipe Penetrations: Refer to acceptable Equipment Curb types listed above for curb specifications. An 8" high (minimum) curb height is required. The coping cap shall be constructed from laminated acrylic clad thermoplastic (ABS) with graduated step boots to accommodate various size pipes, stainless steel fastening screws for cover, stainless steel band clamps for securing boots around the pipe, and stainless steel band clamp or mechanical locking seal for securing boots around the ABS coping cap flanges.
- B. Single Pipe Penetrations: A stack flashing penetration may be utilized for single pipe penetrations through built up roofs and single ply membrane roofs. Utilize high temperature sealant for all high temperature applications. This includes but is not limited to steam condensate vent piping, steam safety relief piping, and flues.
- C. A single pre-manufactured boot may be utilized for single pipe penetrations through single ply membrane roofs only.

2.10 CORROSIVE ATMOSPHERE COATINGS

- A. Factory coat supports and anchors used in corrosive atmospheres with hot dip galvanizing after fabrication, ASTM A123, 1.5 ounces/square foot of surface, each side. Mechanical galvanize threaded products, ASTM B695 Class 150, 2.0 mil coating. Field cuts and damaged finishes to be field covered with zinc rich paint of comparable thickness to factory coating.

Corrosive atmospheres include the following locations:

- Exterior locations
- Chemical storage and hazardous waste storage rooms
- Wet wells
- Locker/shower rooms
- Meter Pits

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Work shall be installed as shown and according to the manufacturer's diagrams and recommendations.

- B. Install supports to provide for free expansion of the piping and duct system. Support all piping from the structure using concrete inserts, beam clamps, ceiling plates, wall brackets, or floor stands. Fasten ceiling plates and wall brackets securely to the structure and test to demonstrate the adequacy of the fastening.
- C. Piping shall be supported independently from ductwork and all other trades.
- D. Where piping can be conveniently grouped to allow the use of trapeze type supports, use standard structural shapes for the supporting steel.
- E. Perform all welding in accordance with standards of the American Welding Society. Clean surfaces of loose scale, rust, paint or other foreign matter and properly align before welding. Use wire brush on welds after welding. Welds shall show uniform section, smoothness of weld metal and freedom from porosity and clinkers. Where necessary to achieve smooth connections, joints shall be dressed smooth.

3.2 HANGER AND SUPPORT SPACING

- A. Place a hanger within 12 inches of each horizontal elbow, valve, strainer, or similar piping specialty item.
- B. Where several pipes can be installed in parallel and at the same elevation, provide multiple or trapeze hangers.
- C. Support riser piping independently of connected horizontal piping.
- D. Adjust hangers to obtain the slope specified in the piping section of this specification.

Space hangers for pipe as follows:

<u>Pipe Material</u>	<u>Pipe Size</u>	<u>Max. Spacing</u>
Steel	1/2" through 1-1/4"	6'-6"
Steel	1-1/2" through 6"	10'-0"
Steel	8" through 12"	14'-0"
Steel	14" and over	20'-0"
Thermoplastic	All sizes	6'-0"
Copper	1/2" through 1-1/4"	5'-0"
Copper	1-1/2" and larger	8'-0"

3.3 VERTICAL RISER CLAMPS

- A. Support vertical piping with clamps secured to the piping and resting on the building structure or secured to the building structure below at each floor.

3.4 ANCHORS

- A. Install where indicated on the drawings and details. Where not specifically indicated, install anchors at ends of principal pipe runs and at intermediate points

in pipe runs between expansion loops. Make provisions for preset of anchors as required to accommodate both expansion and contraction of piping.

3.5 ROOF MOUNTED SUPPORTS

- A. Use for all pipe and ductwork on roof. Secure bottom of support flat on roof deck. Apply two coats of zinc rich paint to cut edges of all galvanized steel elements. Flashing and counter flashing by the General Contractor.

3.6 EQUIPMENT CURBS

- A. Secure bottom of support flat on roof deck. Secure equipment to curb in accordance with equipment manufacturer's instructions. Flashing and counter flashing by the General Contractor. Fill the entire void space with compressible fiberglass insulation.

3.7 PIPE PENETRATION THROUGH ROOF

- A. Install at points where pipes penetrate roof. Install as shown on the drawings, as detailed and according to the manufacturer's installation instructions. Flashing and counterflashing by the General Contractor.

END OF SECTION

SECTION 15410
NATURAL GAS PIPING

PART 1 GENERAL

1.1 DESCRIPTION

- A. Fuel gas systems, including piping, equipment and all necessary accessories as designated in this section.

1.2 RELATED WORK

- A. Section 15010, COMMON WORK RESULTS FOR PLUMBING.

1.3 SUBMITTALS

- A. Product Data: For each type of the following:
 - Piping specialties.
 - Corrugated, stainless-steel tubing with associated components.
 - Valves. Include pressure rating, capacity, settings, and electrical connection data of selected models.
 - Pressure regulators. Indicate pressure ratings and capacities.
 - Service meters.
 - Dielectric fittings.
- B. Shop Drawings: For facility natural-gas piping layout. Include plans, piping layout and elevations, sections, and details for fabrication of pipe anchors, hangers, supports for multiple pipes, alignment guides, expansion joints and loops, and attachments of the same to building structure. Detail location of anchors, alignment guides, and expansion joints and loops.

1.4 APPLICABLE PUBLICATIONS

- A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.
- B. Federal Specifications (Fed. Spec.):
 - A-A-59617 Unions, Brass or Bronze Threaded, Pipe Connections and Solder-Joint Tube Connections
- C. American National Standards Institute (ANSI):
 - American Society of Mechanical Engineers (ASME): (Copyrighted Society)
 - A13.1-(2007) Scheme for Identification of Piping Systems
 - B16.3-(2006) Malleable Iron Threaded Fittings: Classes 150 and 300
 - ANSI/ASME
 - B16.9-2007 Factory-Made Wrought Steel Buttwelding Fittings ANSI/ASME
 - B16.11-2009 Forged Steel Fittings, Socket-Welding and Threaded ANSI/ASME

- B16.15-2006 Cast Copper Alloy Threaded Fittings: Classes 125 and 250
ANSI/ASME
- B31.8-2010 Gas Transmission and Distribution Piping Systems ANSI/ASME
- D. American Society for Testing and Materials (ASTM):
 - A47-99(2009) Standard Specification for Ferritic Malleable Iron Castings
 - A53-10 Standard Specification for Pipe, Steel, Black And Hot-Dipped, Zinc-coated Welded and Seamless
 - A183-09 Standard Specification for Carbon Steel Track Bolts and Nuts
 - A536-09 Standard Specification for Ductile Iron Castings
 - A733-03(2009) Standard Specification for Welded and Seamless Carbon Steel and Austenitic Stainless Steel Pipe Nipples
 - B687-99(2005)e1 Standard Specification for Brass, Copper, and Chromium-Plated Pipe Nipples
- E. National Fire Protection Association (NFPA):
 - 54-2009 National Fuel Gas Code
- F. International Code Council
 - IPC 2009 International Plumbing Code
 - IFGC 2009 International Fuel Gas Code
- G. International Association of Plumbing and Mechanical Officials (IAPMO):
 - Uniform Plumbing Code – 2009
 - IS6-06 Installation Standard
- H. Manufacturers Standardization Society of the Valve and Fittings Industry, Inc. (MSS):
 - SP-72-2010 Ball Valves with Flanged or Butt-Welding For General Service
 - SP-110-2010 Ball Valve Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends

1.5 QUALITY ASSURANCE

- A. Retain one or both of first two paragraphs below for welding supports. Retain first for welded piping supports and retain second for welded steel pipe joints. If retaining, also retain "Welding certificates" Paragraph in "Informational Submittals" Article.
- B. Steel Support Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- C. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

PART 2 PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

- A. Steel Pipe: ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.
 - 1. Malleable-Iron Threaded Fittings: ASME B16.3, Class 150, standard pattern.
 - 2. Wrought-Steel Welding Fittings: ASTM A 234/A 234M for butt welding and socket welding.
 - 3. Unions: ASME B16.39, Class 150, malleable iron with brass-to-iron seat, ground joint, and threaded ends.
 - 4. Forged-Steel Flanges and Flanged Fittings: ASME B16.5, minimum Class 150, including bolts, nuts, and gaskets of the following material group, end connections, and facings:
 - a. Material Group: 1.1.
 - b. End Connections: Threaded or butt welding to match pipe.
 - c. Lapped Face: Not permitted underground.
 - d. Gasket Materials: ASME B16.20, metallic, flat, asbestos free, aluminum o-rings, and spiral-wound metal gaskets.
 - e. Bolts and Nuts: ASME B18.2.1, carbon steel aboveground and stainless steel underground.
 - 5. Protective Coating for exposed exterior Piping: Factory-applied, three-layer coating of epoxy, adhesive, and PE.
 - a. Joint Cover Kits: Epoxy paint, adhesive, and heat-shrink PE sleeves.
 - 6. Mechanical Couplings:
 - a. Steel flanges and tube with epoxy finish. Buna-nitrile seals. Steel bolts, washers, and nuts. Coupling shall be capable of joining PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe. Steel body couplings installed underground on plastic pipe shall be factory equipped with anode.
- B. PE Pipe: ASTM D 2513, SDR 11.
 - 1. PE Fittings: ASTM D 2683, socket-fusion type or ASTM D 3261, butt-fusion type with dimensions matching PE pipe.
 - 2. PE Transition Fittings: Factory-fabricated fittings with PE pipe complying with ASTM D 2513, SDR 11; and steel pipe complying with ASTM A 53/A 53M, black steel, Schedule 40, Type E or S, Grade B.
 - 3. Anodeless Service-Line Risers: Factory fabricated and leak tested.
 - a. Underground Portion: PE pipe complying with ASTM D 2513, SDR 11 inlet.
 - b. Casing: Steel pipe complying with ASTM A 53/A 53M, Schedule 40, black steel, Type E or S, Grade B, with corrosion-protective coating covering.
 - c. Aboveground Portion: PE transition fitting.
 - d. Outlet shall be threaded or flanged or suitable for welded connection.
 - e. Tracer wire connection.

- f. Ultraviolet shield.
 - g. Stake supports with factory finish to match steel pipe casing or carrier pipe.
- 4. Transition Service-Line Risers: Factory fabricated and leak tested.
 - a. Underground Portion: PE pipe complying with ASTM D 2513, SDR 11 inlet connected to steel pipe complying with ASTM A 53/A 53M, Schedule 40, Type E or S, Grade B, with corrosion-protective coating for aboveground outlet.
 - b. Outlet shall be threaded or flanged or suitable for welded connection.
 - c. Bridging sleeve over mechanical coupling.
 - d. Factory-connected anode.
 - e. Tracer wire connection.
 - f. Ultraviolet shield.
 - g. Stake supports with factory finish to match steel pipe casing or carrier pipe.
- 5. Plastic Mechanical Couplings, NPS 1-1/2 (DN 40) and Smaller: Capable of joining PE pipe to PE pipe.
 - a. PE body with molded-in, stainless-steel support ring.
 - b. Buna-nitrile seals.
 - c. Acetal collets.
 - d. Electro-zinc-plated steel stiffener.
- 6. Plastic Mechanical Couplings, NPS 2 (DN 50) and Larger: Capable of joining PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe.
 - a. Fiber-reinforced plastic body.
 - b. PE body tube.
 - c. Buna-nitrile seals.
 - d. Acetal collets.
 - e. Stainless-steel bolts, nuts, and washers.
- 7. Steel Mechanical Couplings: Capable of joining plain-end PE pipe to PE pipe, steel pipe to PE pipe, or steel pipe to steel pipe.
 - a. Steel flanges and tube with epoxy finish.
 - b. Buna-nitrile seals.
 - c. Steel bolts, washers, and nuts.
 - d. Factory-installed anode for steel-body couplings installed underground.

2.2 PIPING SPECIALTIES

A. Y-Pattern Strainers:

- 1. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
- 2. End Connections: Threaded ends for NPS 2 (DN 50) and smaller; flanged ends for NPS 2-1/2 (DN 65) and larger.
- 3. Strainer Screen: 40, 60-mesh startup strainer, and perforated stainless-steel basket with 50 percent free area.
- 4. CWP Rating: 125 psig.

- B. Weatherproof Vent Cap: Cast- or malleable-iron increaser fitting with corrosion-resistant wire screen, with free area at least equal to cross-sectional area of connecting pipe and threaded-end connection.

2.3 JOINING MATERIALS

- A. Joint Compound and Tape: Suitable for natural gas.
- B. Welding Filler Metals: Comply with AWS D10.12/D10.12M for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.

2.4 MANUAL GAS SHUTOFF VALVES

- A. General Requirements for Metallic Valves, NPS 2 (DN 50) and Smaller: Comply with ASME B16.33.
 - 1. CWP Rating: 125 psig.
 - 2. Threaded Ends: Comply with ASME B1.20.1.
 - 3. Dryseal Threads on Flare Ends: Comply with ASME B1.20.3.
 - 4. Tamperproof Feature: Locking feature.
 - 5. Listing: Listed and labeled by an NRTL acceptable to authorities having jurisdiction for valves 1 inch and smaller.
 - 6. Service Mark: Valves 1-1/4 inches to NPS 2 (DN 50) shall have initials "WOG" permanently marked on valve body.
- B. General Requirements for Metallic Valves, NPS 2-1/2 (DN 65) and Larger: Comply with ASME B16.38.
 - 1. CWP Rating: 125 psig.
 - 2. Flanged Ends: Comply with ASME B16.5 for steel flanges.
 - 3. Tamperproof Feature: Locking feature.
 - 4. Service Mark: Initials "WOG" shall be permanently marked on valve body.
- C. Bronze Plug Valves: MSS SP-78.
 - 1. Body: Bronze, complying with ASTM B 584.
 - 2. Plug: Bronze.
 - 3. Ends: Threaded, socket, or flanged.
 - 4. Operator: Square head or lug type with tamperproof feature where indicated.
 - 5. Pressure Class: 125 psig.
 - 6. Listing: Valves NPS 1 (DN 25) and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
 - 7. Service: Suitable for natural-gas service with "WOG" indicated on valve body.
- D. Cast-Iron, Nonlubricated Plug Valves: MSS SP-78.
 - 1. Body: Cast iron, complying with ASTM A 126, Class B.
 - 2. Plug: Bronze or nickel-plated cast iron.
 - 3. Seat: Coated with thermoplastic.

4. Stem Seal: Compatible with natural gas.
5. Ends: Threaded or flanged.
6. Operator: Square head or lug type with tamperproof feature where indicated.
7. Pressure Class: 125 psig.
8. Listing: Valves NPS 1 (DN 25) and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
9. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

E. Cast-Iron, Lubricated Plug Valves: MSS SP-78.

1. Body: Cast iron, complying with ASTM A 126, Class B.
2. Plug: Bronze or nickel-plated cast iron.
3. Seat: Coated with thermoplastic.
4. Stem Seal: Compatible with natural gas.
5. Ends: Threaded or flanged as indicated in "Underground Manual Gas Shutoff Valve Schedule" and "Aboveground Manual Gas Shutoff Valve Schedule" Articles.
6. Operator: Square head or lug type with tamperproof feature where indicated.
7. Pressure Class: 125 psig (862 kPa).
8. Listing: Valves NPS 1 (DN 25) and smaller shall be listed and labeled by an NRTL acceptable to authorities having jurisdiction.
9. Service: Suitable for natural-gas service with "WOG" indicated on valve body.

F. PE Ball Valves: Comply with ASME B16.40.

1. Body: PE.
2. Ball: PE.
3. Stem: Acetal.
4. Seats and Seals: Nitrile.
5. Ends: Plain or fusible to match piping.
6. CWP Rating: 80 psig.
7. Operating Temperature: Minus 20 to plus 140 deg F.
8. Operator: Nut or flat head for key operation.
9. Include plastic valve extension.
10. Include tamperproof locking feature for valves where indicated on Drawings.

G. Valve Boxes:

1. Cast-iron, two-section box.
2. Top section with cover with "GAS" lettering.
3. Bottom section with base to fit over valve and barrel a minimum of 5 inches in diameter.
4. Adjustable cast-iron extensions of length required for depth of bury.
5. Include tee-handle, steel operating wrench with socket end fitting valve nut or flat head, and with stem of length required to operate valve.

2.5 PRESSURE REGULATORS

A. General Requirements:

1. Single stage and suitable for natural gas.
2. Steel jacket and corrosion-resistant components.
3. Elevation compensator.
4. End Connections: Threaded for regulators NPS 2 and smaller; flanged for regulators NPS 2-1/2 and larger.

B. Service Pressure Regulators: Comply with ANSI Z21.80.

1. Body and Diaphragm Case: Cast iron or die-cast aluminum.
2. Springs: Zinc-plated steel; interchangeable.
3. Diaphragm Plate: Zinc-plated steel.
4. Seat Disc: Nitrile rubber resistant to gas impurities, abrasion, and deformation at the valve port.
5. Orifice: Aluminum; interchangeable.
6. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
7. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet, and no pressure sensing piping external to the regulator.
8. Pressure regulator shall maintain discharge pressure setting downstream, and not exceed 150 percent of design discharge pressure at shutoff.
9. Overpressure protection device is optional feature. See Evaluations.
10. Overpressure Protection Device: Factory mounted on pressure regulator.
11. Atmospheric Vent: Factory- or field-installed, stainless-steel screen in opening if not connected to vent piping.
12. Maximum Inlet Pressure: 100 psig.

C. Line Pressure Regulators: Comply with ANSI Z21.80.

1. Body and Diaphragm Case: Cast iron or die-cast aluminum.
2. Springs: Zinc-plated steel; interchangeable.
3. Diaphragm Plate: Zinc-plated steel.
4. Seat Disc: Nitrile rubber resistant to gas impurities, abrasion, and deformation at the valve port.
5. Orifice: Aluminum; interchangeable.
6. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
7. Single-port, self-contained regulator with orifice no larger than required at maximum pressure inlet, and no pressure sensing piping external to the regulator.
8. Pressure regulator shall maintain discharge pressure setting downstream, and not exceed 150 percent of design discharge pressure at shutoff.
9. Overpressure protection device is optional feature. See Evaluations.
10. Overpressure Protection Device: Factory mounted on pressure regulator.
11. Atmospheric Vent: Factory- or field-installed, stainless-steel screen in opening if not connected to vent piping.
12. Maximum Inlet Pressure: 2 psig /5 psig /10 psig.

D. Appliance Pressure Regulators: Comply with ANSI Z21.18.

1. Body and Diaphragm Case: Die-cast aluminum.
2. Springs: Zinc-plated steel; interchangeable.
3. Diaphragm Plate: Zinc-plated steel.
4. Seat Disc: Nitrile rubber.
5. Seal Plug: Ultraviolet-stabilized, mineral-filled nylon.
6. Factory-Applied Finish: Minimum three-layer polyester and polyurethane paint finish.
7. Regulator may include vent limiting device, instead of vent connection, if approved by authorities having jurisdiction.
8. Maximum Inlet Pressure: 1 psig 2 psig 5 psig.

2.6 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.

B. Dielectric Unions:

1. Description: Standard: ASSE 1079.
2. Pressure Rating: 125 psig minimum at 180 deg F 150 psig 250 psig.
3. End Connections: Solder-joint copper alloy and threaded ferrous.

C. Dielectric Flanges:

1. Description: Standard: ASSE 1079.
2. Factory-fabricated, bolted, companion-flange assembly.
3. Pressure Rating: 125 psig minimum at 180 deg F 150 psig 175 psig 300 psig.
4. End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.

D. Dielectric-Flange Insulating Kits:

1. Description: Nonconducting materials for field assembly of companion flanges.
2. Pressure Rating: 150 psig.
3. Gasket: Neoprene or phenolic.
4. Bolt Sleeves: Phenolic or polyethylene.
5. Washers: Phenolic with steel backing washers.

2.7 LABELING AND IDENTIFYING

A. Detectable Warning Tape: Acid- and alkali-resistant, PE film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored yellow.

PART 3 EXECUTION

3.1 INSTALLATION

A. General: Comply with the International Fuel Gas Code and the following:

1. Install branch piping for fuel gas and connect to all fixtures, valves, cocks, outlets, casework, cabinets and equipment, including those furnished by the Government or specified in other sections.
2. Pipe shall be round and straight. Cutting shall be done with proper tools. Pipe, shall be reamed to full size after cutting.
3. All pipe runs shall be laid out to avoid interference with other work.
4. Install valves with stem in horizontal position whenever possible. All valves shall be easily accessible.
5. Install union and shut-off valve on pressure piping at connections to equipment.
6. Pipe Hangers, Supports and Accessories:
 - a. All piping shall be supported per the International Fuel Gas Code, Chapter No. 4.
 - b. Shop Painting and Plating: Hangers, supports, rods, inserts and accessories used for Pipe supports shall be shop coated with red lead or zinc Chromate primer paint. Electroplated copper hanger rods, hangers and accessories may be used with copper tubing.
 - c. Floor, Wall and Ceiling Plates, Supports, Hangers:
 - 1) Solid or split unplated cast iron, chrome plated in finished areas.
 - 2) All plates shall be provided with set screws.
 - 3) Pipe Hangers: Height adjustable clevis type.
 - 4) Adjustable Floor Rests and Base Flanges: Steel.
 - 5) Concrete Inserts: "Universal" or continuous slotted type.
 - 6) Hanger Rods: Mild, low carbon steel, fully threaded or Threaded at each end with two removable nuts at each end for positioning rod and hanger and locking each in place.
 - 7) Riser Clamps: Malleable iron or steel.
 - 8) Rollers: Cast iron.
 - 9) Self-drilling type expansion shields shall be "Phillips" type, with case hardened steel expander plugs.
 - 10) Miscellaneous Materials: As specified, required, directed or as noted on the drawings for proper installation of hangers, supports and accessories.
7. Install cast chrome plated escutcheon with set screw at each wall, floor and ceiling penetration in exposed finished locations and within cabinets and millwork.
8. Penetrations:
 - a. Fire Stopping: Where pipes pass through fire partitions, fire walls, smoke partitions, or floors, install a fire stop that provides an effective barrier against the spread of fire, smoke and gases. Completely fill and seal clearances between piping and openings with the fire stopping materials.
 - b. Waterproofing: At floor penetrations, completely seal clearances around the pipe and make watertight with sealant.

B. Piping shall conform to the following:

1. Fuel Gas:
 - a. Entire fuel gas piping installation shall be in accordance with requirements of NFPA 54.
 - b. Provide fuel gas piping with plugged drip pockets at low points.

3.2 CLEANING OF SYSTEM AFTER INSTALLATION

- A. Clean all piping systems to remove all dirt, coatings and debris. Remove all valves, controls etc., and reinstall after piping system has been cleaned.

3.3 TESTS

- A. General: Test system either in its entirety or in sections after system is installed or cleaned.
- B. Test shall be made in accordance with Section 406 of the International Fuel Gas Code. The system shall be tested at a minimum of 1.5 times maximum working pressure, but not less than 3 psig gage/ 100 psig.

END OF SECTION

SECTION 15625
FUEL FIRED HEATERS

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section includes specifications for fuel-fired heaters.

1.2 RELATED WORK

- A Section 15410 – Natural Gas Piping
- B. Section 15140 - Hangers and Supports for HVAC Piping and Equipment

1.3 SUBMITTALS

- A. Refer to division 1, General Conditions, Submittals.
- B. Include specific manufacturer and model numbers, equipment identification corresponding to project drawings and schedules, dimensions, capacities, materials of construction, ratings, weights, power requirements and wiring diagrams, filter information and information for all accessories.
- C. All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

1.4 APPLICABLE PUBLICATIONS

- A. AGA American Gas Association
- B. ANSI Z83.4 Direct Gas Fired Makeup Air Heaters
- C. ANSI Z83.6 Gas Fired Infrared Heaters
- D. GAMA Gas Appliance Manufacturers Association
- E. NEC National Electrical Code

1.5 WARRANTY

- A. Radiant heat tubes warranted against internal corrosion for 10 years. Remainder of infrared radiant heater components warranted for 1 year from date of startup.

PART 2 PRODUCTS

2.1 INFRA-RED HEATING DEVICES

- A. Approved Manufacturers: Infrared heating system shall be Roberts Gordon infrared heaters, or approved equal.
- B. The entire system shall be AGA certified “Gas Infrared Heaters” conforming to ANSI standard Z83.6. All wiring shall comply with the National Electrical Code.
- C. System configuration and performance as indicated on the drawings and/or equipment schedules.
- D. Burner Box:
 - 1. Natural Gas model, nickel plated steel burner cup, outside air adapter, direct spark ignition, three try ignition module, all components easily accessed, durable spot welded construction, mica flame observation window, balanced air rotor, gas and electric controls are separated from the combustion air stream, and IAS approved. Stainless steel flexible gas line and high-pressure gas cock assembly included.
 - 2. Heater shall be equipped with totally enclosed, permanently lubricated motors with thermal overload protection.
- E. Burner Controls
 - 1. Factory Wired: All burners shall be factory wired for 115 volts AC with transformer for 24 volts AC DSI operation and supplied with a grounded three wire pigtail located at rear of burner.
 - 2. Fail-Safe Controls: To assure a high degree of fail-safe operation, the design shall include an air proving safety pressure switch to verify blower operation before gas valve opens.
 - 3. All gas vacuum-firing burner units shall be equipped with a Direct Spark Ignition Module (DSI). The DSI module shall have a 15-second flame response time per ignition trial before lockout occurs. In addition, the DSI module shall be capable of a minimum of 3 trials for ignition to provide maximum reliability.
- F. Reflectors
 - 1. Provide aluminum, or other highly radiant reflective material reflectors, installed over all heat exchangers. Provide reflector joint pieces over heat exchanger fittings such as elbows so reflector covers heat exchanger continuously. In order to maximize radiant output and minimize convection losses, reflectors are to protrude past the bottom of the heat exchanger pipe.
 - 2. Over all fittings: All reflectors at terminant of the heat exchanger pipe and any elbows shall have end caps to prevent convective heat from escaping.

3. Side Reflectors: System to have perimeter side extension reflector in certain areas of layout as shown on plan where specified. Side reflectors permanently attach to side to top reflector and are secured to the pipe by three side reflector supports and two "Z" clips for each 8 ft. section of side reflector. To prevent convection losses, tilting of reflectors will not be acceptable.
- G. Outside Air: Provide fresh outside air to supply each burner for the support of combustion air as called for on the plans.
- H. Thermostats
1. Provide where indicated, line voltage or low voltage type connected to radiant heater. Mount thermostat 5 ft. 6 in. above finish floor or otherwise as noted on the drawing.
- I. Infrared Piping – Radiant Piping - Heat Exchanger
1. Radiant Tube shall be new 4 in. Aluminized/Hot-Rolled steel tube X 16 gauge wall with an emissivity factor of 0.80 or greater. ALUMITHERM® steel (aluminized steel/titanium alloy) tubing will be supplied on the first 10 ft. of each radiant heater.
 2. Fittings for radiant piping shall be as described in the installation manual.
 3. Hanging Materials: All systems pipe must be supported in accordance with acceptable practices, local codes, seismic requirements, applicable standards and as shown on plans. Heat exchanger tubing shall pitch down at least 1/2 inch in 20 ft. on radiant lines, away from burner box.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install units as shown on plans, as detailed and according to the manufacturer's installation instructions.
- B. Coordinate all power wiring with the electrical consultant. Coordinate all temperature controls with the temperature controls specifications. Clearly identify and coordinate which trade is providing the various wiring.

3.2 INFRA-RED HEATING DEVICES

- A. Suspend units from structure as indicated on the drawings, as instructed by the manufacturer and in compliance with applicable codes. Gas connections to burner shall be made with a flexible connector. Route combustion air and vent piping to outside as indicated on the drawings and terminate per the manufacturer's instructions.

- B. Clearances to Combustibles: Do not exceed clearance to combustibles outlined and printed on burner nameplate, and in manufacturer's product data. Measure clearance distance from surface of heat exchanger or as indicated by approval agency's listing.
- C. Venting: Install vent piping as indicated. Terminate where indicated on the drawings with a vent terminal assembly as supplied by the manufacturer. The venting must be installed in accordance with the requirements within the installation operation and service manual and the following codes: United States: Refer to National Fuel Gas Code NFPA 54/ANSI Z223.1 - latest revision. Canada: Refer to Natural Gas and Propane Installation Code CSA B149.1 - latest revision.

3.3 START-UP

- A. Contractor to provide factory authorized representative and/or field personnel knowledgeable with the operations, maintenance and troubleshooting of the system and/or components defined within this section for a minimum period of 4 hours.

3.4 WARRANTY

- A. Provide written warranty, by manufacturer, agreeing to replace/repair, within warranty period, components of gas fired radiant systems furnished by manufacturer, which are defective in either material or workmanship, provided manufacturer's instructions for handling, installing, protecting, and maintaining units have been adhered to during warranty periods follows:
 - 1. Three (3) year warranty on the burner system and on the tubing from date of final acceptance of the infrared heaters..
 - 2. Three (3) from date of final acceptance of all other components including electrical.

END OF SECTION

SECTION 15870
HVAC FANS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section includes specifications for fans that are not an integral part of a manufactured device.

1.2 RELATED WORK

- A. Section 15140 - Hangers and Supports for HVAC Piping and Equipment

1.3 QUALITY ASSURANCE

- A. Refer to Division 1, General Conditions, Equals and Substitutions

1.4 SUBMITTALS

- A. Refer to Division 1, General Conditions, Submittals.
- B. Include dimensions, capacities, fan curves, materials of construction, ratings, weights, motors and drives, sound power levels, appropriate identification and vibration isolation for all equipment. Sound power levels to be based on tests performed in accordance with AMCA Standard 300.
- C. Submit color selection charts for equipment where applicable.
- D. Fan curves shall indicate the relationship of CFM to static or total pressure for various fan speeds. Brake horsepower, recommended selection range, and limits of operation are to also be indicated on the curves. Indicate operating point on the fan curves at design air quantity and indicate the manufacturer's recommended drive loss factor for the specific application. Tabular fan performance data is not acceptable.

1.5 APPLICABLE PUBLICATIONS

- A. AMCA 203 AMCA Fan Application Manual - Troubleshooting
- B. AMCA 210 Laboratory Method of Testing Fans for Rating
- C. AMCA 300 Reverberant Room Method for Sound Testing of Fans
- D. NFPA 90A Standard for the Installation of Air Conditioning and Ventilating Systems
- E. NFPA 96 Standard for Ventilation Control and Fire Protection of Commercial Cooking Operations
- F. UL 762 Power Roof Ventilators For Restaurant Exhaust Appliances

1.6 DESIGN CRITERIA

- A. Tested and certify all fans in accordance with the applicable AMCA test code.
- B. Each fan and motor combination shall be capable of delivering 110% of air quantity scheduled at scheduled static pressure. The motor furnished with the fan shall not operate into the motor service factor when operating under these conditions.
- C. Consider drive efficiency in motor selection according to manufacturer's published recommendation or according to AMCA Publication 203, Appendix L.
- D. Where inlet and outlet ductwork at any fan is changed from that shown on the drawings, provide any motor, drive and/or wiring changes required due to increased static pressure or baffling necessary to prevent uneven airflow or improve mixing.
- E. All internal insulation and other components exposed to the airstream are to meet the flame spread and smoke ratings contained in NFPA 90A.
- F. All roof mounted equipment to be provided with curbs or equipment stands.

1.7 DELIVERY STORAGE AND HANDLING

- A. Promptly inspect shipments to insure that the material is undamaged and complies with specifications.
- B. Cover pipe to eliminate rust and corrosion while allowing sufficient ventilation to avoid condensation. Do not store materials directly on grade. Protect pipe, tube, and fitting ends so they are not damaged. Where end caps are provided or specified, take precautions so the caps remain in place. If end caps are not present on tube bearing the "ACR" designation, clean and re-cap in accordance with ASTM B280. Protect fittings, flanges, and unions by storage inside or by durable, waterproof, above ground packaging.
- C. Offsite storage agreements will not relieve the contractor from using proper storage techniques.
- D. Storage and protection methods must allow inspection to verify products.

PART 2 PRODUCTS

2.1 GENERAL

- A. Use fan size, class, type, arrangement, and capacity as scheduled.

- B. Furnish complete with motors, wheels, drive assemblies, bearings, vibration isolation devices, and accessories required for specified performance and proper operation. All single phase motors to have inherent thermal overload protection.
- C. Provide variable pitch sheaves for drives 3 hp and smaller, fixed pitch sheaves for drives 5 hp and larger. Design all drives for 150% of motor rating.
- D. Use OSHA approved belt guards that totally enclose the entire drive. Construct guards of expanded metal to allow for ventilation; provide tachometer openings at shaft locations.
- E. Statically and dynamically balance all fans so they operate without objectionable noise or vibration.
- F. Use AMCA Type A spark resistant construction for all fans handling flammable or explosive vapors.
- G. All fans handling grease laden vapors shall meet the requirements of UL 762 and NFPA 96.
- H. Provide a corrosion resistant coating on all surfaces exposed to fume and other corrosive exhaust air. Coating to be as scheduled.

2.2 POWER ROOF EXHAUST FANS

- A. Provide upblast or downblast units, as scheduled, with aluminum housing, non-overloading backward inclined aluminum type centrifugal wheel, inlet cone, factory mounted and wired motor and disconnect switch, and bird screen.
- B. Curb cab with prepunched holes. Motor and drives isolated on shock mounts. Ball bearing motors. Adjustable motor pulley and motor plate. Fan shaft mounted in ball bearing pillow blocks. Static resistant belts and corrosion resistant fasteners.
- C. Provide with roof curb, curb seal, bearings with grease fittings.
- D. Hi-Pro Polyester Coating.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install as shown on the drawings, as detailed, and according to manufacturer's installation instructions. On units provided with a drain connection, reduce drain connection down to ½" fitting and leave open.
- B. Contractor shall balance blade assembly of destratification fans after installation to assure stable operation.

END OF SECTION

SECTION 15890
HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section includes specifications for all duct systems used on this project.

1.2 RELATED WORK

- A. Section 15990 - Testing, Adjusting, and Balancing for HVAC
- B. Section 15910 - Air Duct Accessories

1.3 QUALITY ASSURANCE

- A. Refer to Division 1, General Conditions, Equals and Substitutions.

1.4 SUBMITTALS

- A. Refer to Division 1, General Conditions, Submittals.
- B. Include manufacturer's data and/or Contractor data for the following:
 - 1. Fabrication and installation drawings.
 - 2. Schedule of duct systems including material of construction, gauge, pressure class, system class, method of reinforcement, joint construction, fitting construction, and support methods, all with details as appropriate.
 - 3. Duct sealant and gasket material.
 - 4. Duct liner including data on thermal conductivity, air friction correction factor, and limitation on temperature and velocity.

1.5 APPLICABLE PUBLICATIONS

- A. ANSI SS-EN 485-2 Aluminum and Aluminum Alloys-Sheet, Strip and Plate-
Part 2: Mechanical Properties
- B. ASTM B209 Specification for Aluminum and Aluminum-Alloy Sheet and Plate
- C. ASTM A90 Test Method for Weight of Coating on Zinc-Coated (Galvanized)
Iron or Steel Articles
- D. ASTM A167 Specification for Stainless and Heat-Resisting Chromium-Nickel
Steel Plate, Sheet, and Strip
- E. ASTM A623 Standard Specification for Steel Sheet, Zinc-Coated
(Galvanized) by the Hot-Dip Process

F.	ASTM A527	Specification for General Requirements for Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Lock-Forming Quality
G.	ASTM 924	Standard Specification for General Requirements for Sheet Steel, Metallic-coated by the Hot-dip Method
H.	ASTM C 1071	Specification for Fibrous Glass Duct Lining Insulation
I.	ASTM C 411	Test Method for Hot Surface Performance of High Temperature Thermal Insulation
J.	ASTM E 84	Test Method for Surface Burning Characteristics of Building Materials
K.	ASTM C 1338	Test Method for Determining Fungal Resistance of Insulation Materials and Facings
L.	ASTM G 21	Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi
M.	ASTM C 916	Standard Specification for Adhesives for Duct Thermal Insulation
N.	NFPA 90A	Standard for the Installation of Air Conditioning and Ventilating Systems
O.	UL 181	Standard for Safety for Factory Made Air Ducts and Air Connectors.
P.	NAIMA	Fibrous Glass Duct Liner Standard

1.6 DESIGN CRITERIA

- A. Construct all ductwork to be free from vibration, chatter, objectionable pulsations and leakage under specified operating conditions.
- B. Use material, weight, thickness, gauge, construction and installation methods as outlined in the following SMACNA publications, unless noted otherwise:

HVAC Duct Construction Standards, Metal and Flexible, 3rd Edition, 2005

HVAC Air Duct Leakage Test Manual, 2nd Edition, 2012

HVAC Systems - Duct Design, 4th Edition, 2006

Rectangular Industrial Duct Construction Standard, 2nd Edition, 2004

Round Industrial Duct Construction Standards, 2nd Edition, 1999

Thermoplastic Duct (PVC) Construction Manual, 2nd Edition, 1995

Use products which conform to NFPA 90A, possessing a flame spread rating of not over 25 and a smoke developed rating no higher than 50.

1.7 DELIVERY STORAGE AND HANDLING

- A. Promptly inspect shipments to ensure that Ductwork is undamaged and complies with the specification.
- B. Protect Ductwork against damage.
- C. Protect Ductwork by storing inside or by durable, waterproof, above ground packaging. Do not store material on grade. Protect Ductwork from dirt, dust, construction debris and foreign material. Where end caps/packageing are provided, take precautions so caps/packageing remain in place and free from damage.
- D. Offsite storage agreements do not relieve the contractor from using proper storage techniques.
- E. Storage and protection methods must allow inspection to verify products.

PART 2 PRODUCTS

2.1 GENERAL

- A. All sheet metal used for construction of duct shall be 24 gauge or heavier except for round and spiral ductwork and spiral duct take-offs 12" and below may be 26 gauge where allowed in SMACNA HVAC Duct Construction Standards, Metal and Flexible, 3rd Edition, 2005.
- B. Duct sizes indicated on plans are net inside dimensions; where duct liner is specified, dimensions are net, inside of liner.

2.2 DUCTWORK PRESSURE CLASS

- A. Minimum acceptable duct pressure class, for all ductwork except transfer ductwork, is 2 inch W.G. positive or negative, depending on the application. Transfer ductwork minimum acceptable duct pressure class is 1 inch W.G. positive or negative, depending on the application.

2.3 MATERIALS

- A. **GALVANIZED STEEL SHEET:** Use ASTM A 653 galvanized steel sheet of lock forming quality. Galvanized coating to be 1.25 ounces per square foot, both sides of sheet, G90 in accordance with ASTM A90. Provide "Paint Grip" finish or galvalume sheetmetal for ductwork that will be painted.
- B. **ALUMINUM SHEET:** Use ANSI/ASTM B209 aluminum sheet, alloy 3003H-14, capable of double seaming without fracture.

2.4 LOW PRESSURE DUCTWORK (Maximum 2 inch pressure class)

- A. Fabricate and install ductwork in sizes indicated on the drawings and in accordance with SMACNA recommendations, except as modified below.
- B. Construct so that all interior surfaces are smooth. Use slip and drive or flanged and bolted construction when fabricating rectangular ductwork. Use spiral lock seam construction when fabricating round spiral ductwork. Sheet metal screws may be used on duct hangers, transverse joints and other SMACNA approved locations if the screw does not extend more than 1/2 inch into the duct.
- C. Use elbows and tees with a center line radius to width or diameter ratio of 1.5 wherever space permits. When a shorter radius must be used due to limited space, install single wall sheet metal splitter vanes in accordance with SMACNA publications, Type RE 3. Where space will not allow and the C value of the radius elbow, as given in SMACNA publications, exceeds 0.31, use rectangular elbows with turning vanes as specified in Section 23 33 00. Square throat-radius heel elbows will not be acceptable. Straight taps or bullhead tees are not acceptable.
- D. Where rectangular elbows are used, provide turning vanes in accordance with Section 23 33 00.
- E. Provide expanded take-offs or 45 degree entry fittings for branch duct connections with branch ductwork airflow velocities greater than 700 fpm. Square edge 90-degree take-off fittings or straight taps will not be accepted.
- F. Button punch snaplock construction will not be accepted on aluminum ductwork.
- G. Round ducts may be substituted for rectangular ducts if sized in accordance with ASHRAE table of equivalent rectangular and round ducts. No variation of duct configuration or sizes permitted except by written permission of the Engineer.
- H. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible. Divergence upstream of equipment shall not exceed 30 degrees; convergence downstream shall not exceed 45 degrees.

2.5 DUCT SEALANT

- A. Install sealants in strict accordance with manufacturer's recommendations, paying special attention to temperature limitations. Allow sealant to fully cure before pressure testing of ductwork, or before startup of air handling systems.

2.6 GASKETS

- A. 2 INCH PRESSURE CLASS AND LOWER: Soft neoprene or butyl gaskets in combination with duct sealant for flanged joints.
- B. 3 INCH PRESSURE CLASS AND HIGHER: Butyl gaskets.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Verify dimensions at the site, making field measurements and drawings necessary for fabrication and erection. Check plans showing work of other trades and consult with Engineer in the event of any interference.
- B. Make allowances for beams, pipes or other obstructions in building construction and for work of other contractors. Transform, divide or offset ducts as required, in accordance with SMACNA HVAC Duct Construction Standards, except do not reduce duct to less than six inches in any dimension and do not exceed an 8:1 aspect ratio. Where it is necessary to take pipes or similar obstructions through ducts, construct easement as indicated in SMACNA HVAC Duct Construction Standards. In all cases, seal to prevent air leakage. Pipes or similar obstructions may not pass through high pressure or fume exhaust ductwork.
- C. Provide frames constructed of angles or channels for coils, filters, dampers or other devices installed in duct systems, and make all connections to such equipment including equipment furnished by others. Secure frames with gaskets and screws or nut, bolts and washers.
- D. Install duct to pitch toward outside air intakes and drain to outside of building. Solder or seal seams to form watertight joints.
- E. Where two different metal ducts meet, the joint shall be installed in such a manner that metal ducts do not contact each other by using proper seal or compound.
- F. Install all motor operated dampers and connect to or install all equipment furnished by others. Blank off all unused portions of louvers, as indicated on the drawings, with 1-1/2 inch board insulation with galvanized sheet metal backing on both sides.
- G. Do not install ductwork through dedicated electrical rooms or spaces unless the ductwork is serving this room or space.
- H. Locate ducts with sufficient space around equipment to allow normal operating and maintenance activities.
- I. Provide adequate access to ductwork for cleaning purposes.
- J. Provide temporary capping of ductwork openings to prevent entry of dirt, dust and foreign material.
- K. Protect diffusers, registers and grilles with plastic wrap or some other approved form of protection to maintain dirt and dust free and to prevent entry of dirt, dust and foreign material into the Ductwork.
- L. Install prefabricated grease ductwork assemblies in accordance with manufacturer requirements and NFPA 96.

- M. During construction provide temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

3.2 DUCTWORK SUPPORT

- A. Support ductwork in accordance with SMACNA HVAC Duct Construction Standards, except supporting ductwork with secure wire method is not allowed.
- B. Support with 3/32 inch, 7 x 7, stainless steel air-craft cable, with matching fastener rated for 50% of actual load, will be allowed on round ductwork under 12 inches if installed as detailed, with cable double looped on duct and at point of support.

3.3 LOW PRESSURE DUCT (Maximum 2 inch pressure class)

- A. Seal all duct, with the exception of transfer ducts, in accordance with SMACNA seal class "A"; all seams, joints, and penetrations shall be sealed.
- B. Install a manual balancing damper in each branch duct and for each diffuser or grille. The use of splitter dampers, extractors, or grille face dampers will not be accepted for balancing dampers.
- C. Hangers must be wrapped around bottom edge of duct and securely fastened to duct with sheetmetal screws or pop rivets. Trapeze hangers may be used at contractor's option.

3.4 CLEANING

- A. Remove all dirt and foreign matter from the entire duct system and clean diffusers, registers, grilles and the inside of air-handling units before operating fans.
- B. Clean duct systems with high power vacuum machines where systems have been used for temporary heat, air-conditioning, or ventilation purposes during construction. Protect equipment that may be harmed by excessive dirt with filters, or bypass during cleaning.

3.5 LEAKAGE TEST

- A. Test all ductwork in accordance with test methods described in SMACNA HVAC Air Duct Leakage Test Manual. Do not insulate ductwork until it has been successfully tested. Test pressure shall be equal to the duct pressure class.
- B. If excessive air leakage is found locate leaks, repair the duct in the area of the leak, seal the duct, and retest.
- C. Leakage rate shall not exceed more than 5% of the system air quantity for low pressure ductwork, determined in accordance with Appendix C of the SMACNA HVAC Air Duct Leakage Test Manual.

- D. Leakage rate shall not exceed more than 1% of the system air quantity for high pressure ductwork, determined in accordance with Appendix C of the SMACNA HVAC Air Duct Leakage Test Manual.
- E. Leakage test for ductwork downstream of air terminal devices may be omitted but will not relieve the contractor from duct sealing requirements.

END OF SECTION

SECTION 15910
AIR DUCT ACCESSORIES

PART 1 GENERAL

1.1 DESCRIPTION

- A. This sections includes accessories used in the installation of duct systems.

1.2 RELATED WORK

- A. Section 15140 – Hanger and Supports for HVAC Piping and Equipment
- B. Section 15890 – HVAC Ducts and Casings

1.3 QUALITY ASSURANCE

- A. Refer to Division 1, General Conditions, Equals and Substitutions

1.4 SUBMITTALS

- A. Refer to Division 1, General Conditions, Submittals. Submit for all accessories and include dimensions, capacities, ratings, installation instructions, and appropriate identification. Include certified test data on dynamic insertion loss, self-noise power levels, and aerodynamic performance of sound attenuators. Submit manufacturer's color charts where finish color is specified to be selected by the Architect/Engineer.
- B. All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

1.5 REFERENCE STANDARDS

- A. NFPA 90A Standard for Installation of Air Conditioning and Ventilating Systems
- B. SMACNA HVAC Duct Construction Standards - Metal and Flexible, 2nd Edition, 1995
- C. UL 555(6th edition) Standard for Fire Dampers and Ceiling Dampers
- D. UL 555S (4th edition) Leakage Rated Dampers for Use in Smoke Control Systems

PART 2 PRODUCTS

2.1 FLASHINGS

- A. Provide flashing to completely weatherproof connection of ductwork to louvers. Flashing to be constructed of material similar to louver material.
- B. Flashing and counterflashing for roof curbs will be provided by others.
- C. Flashing and curbs for duct and pipe penetrations of roof assemblies to be in accordance with details.

2.2 DUCT FLEXIBLE CONNECTIONS

- A. Material to be fire retardant, be UL 214 listed, and meet the requirements of NFPA 90A.
- B. Connections to be a minimum of 3 inches wide, crimped into metal edging strip, and air tight. Connections to have adequate flexibility and width to allow for thermal expansion/contraction, vibration of connected equipment, and other movement.
- C. Use coated glass fiber fabric for all applications. Material for inside applications other than corrosive environments, fume exhaust, or kitchen exhaust to be double coated with neoprene, air and water tight, suitable for temperatures between -10°F and 200°F, and have a nominal weight of 30 ounces per square yard. Material used for outdoor applications other than corrosive environments, fume exhaust, or kitchen exhaust to be double coated with Hypalon, air and water tight, suitable for temperatures between -10°F and 250°F, and have a nominal weight of 26 ounces per square yard.
- D. For corrosive environments or fume exhaust applications indoors or outdoors, use a material coated with Teflon that is air and water tight, suitable for temperatures between -20°F and 500°F, and has a nominal weight of 14 ounces per square yard.

2.3 LOUVERS

- A. Provide minimum of 30 inches from bottom of louver to finished roof, bottom of areaway or grade. For some louvers it may be desirable to locate the louvers above the first floor to prevent the intentional contamination of air.
- B. Extruded aluminum alloy not less than 12 gauge (.081" thick), 6063 series frame and blades, all-welded assembly, 35 degree or 45 degree blades with water baffle, 6 inches thick. Provide with bird screen of 1/2" x 1/2" mesh aluminum in 12 gauge aluminum frame and an aluminum sill. Locate the bird screen inside of the louver unless noted otherwise.
- C. Louver to bear the AMCA certified ratings seal for both air performance and water penetration, having a free area not less than 50% based on a 48" x 48" section, a water penetration less than 0.1 oz/square foot under AMCA test at

1000 feet per minute, and an intake pressure drop less than 0.20 inches of water at 1000 feet per minute.

- D. Finish to be anodized or Kynar 500 in a custom color to be selected by the Architect or Owner. Furnish sufficient paint in the same color as the louver to paint the outer surface of panels over unused portions of louvers and to paint the interior portion of ductwork visible through the louvers.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Flashing for roof curbs, equipment supports or rails located on roof, will be installed by others.
- B. Install at all duct connections to rotating or vibrating equipment, including air handling units (unless unit is internally isolated), fans, or other motorized equipment in accordance with SMACNA. Install thrust restraints to prevent excess strain on duct flexible connections at fan inlets and outlets; see Related Work.

For applications in corrosive environments or fume exhaust systems, use a double layer of the Teflon coated fabric when making the connector.

- C. Connect outside air intake duct to the louver, sealing all connections air and water tight.

Provide bird screen on active louver area where none is provided with louvers. Where louvers are equipped with inside birdscreen, remove screen at all locations where duct connections are not made.

Install insulated metal panel on unused portion of louver. Panels must be sealed weathertight to louver assembly with flashing as required for proper drainage to outside of building. Paint outside surface of panel to match louver prior to installation. Where ductwork is visible through louver when viewed from outside the building, paint inside of duct to match louver color.

END OF SECTION

SECTION 15980
INSTRUMENTATION AND CONTROL DEVICES FOR HVAC

PART 1 GENERAL

1.1 DESCRIPTION

- A. This sections includes control system specifications for all HVAC work as well as related control for systems found in other specification sections.

1.2 RELATED WORK

- A. Section 15990 - Testing, Adjusting, and Balancing for HVAC - Coordination
- B. Section 15985 - Sequence of Operation for HVAC Controls
- C. Section 15910 - Air Duct Accessories

1.3 QUALITY ASSURANCE

- A. Indicate in letter of authorization that installing contractor has successfully completed all necessary training required for engineering, installation, and commissioning of equipment and systems and that such authorization has been in effect for a period of not less than three years.

1.4 SUBMITTALS

- A. Manufacturer's data sheets indicating model number, pressure/temperature ratings, capacity, methods and materials of construction, installation instructions, and recommended maintenance. General catalog sheets showing a series of the same device is not acceptable unless the specific model is clearly marked.
- B. Schematic flow diagrams of systems showing fans, pumps, coils, dampers, valves, and other control devices. Label each device with setting or adjustable range of control. Indicate all wiring, clearly, differentiating between factory and field installed wiring. Wiring should be shown in schematics that detail contact states, relay references, etc. Diagrammatic representations of devices alone are not acceptable.
- C. Details of construction, layout, and location of each temperature control panel within the building, including instruments location in panel and labeling. Also include on drawings location of mechanical equipment controlled (room number), horsepower and flow of motorized equipment (when this data is available on plans), locations of all remote sensors and control devices (either by room number or column lines).
- D. Schedule of control dampers indicating size, leakage rating, arrangement, pressure drop at design airflow, and number and size of operators required.

- E. Schedule of control valves indicating system in which the device is to be used, rated capacity, flow coefficient, flow required by device served, actual pressure drop at design flow, size of operator required, close-off pressure, and locations where valves are to be installed.
- F. A complete description of each control sequence for equipment.
- G. Prior to request for final payment, submit record documents which accurately record actual location of control components including panels, thermostats, wiring, and sensors. Incorporate changes required during installation and start-up.

1.5 REFERENCE STANDARDS

- A. ANSI B16.22 Wrought Copper and Wrought Copper Alloy Solder Joint Pressure Fittings
- B. ANSI/ASTM B32 Specification for Solder Metal
- C. ASTM B75 Seamless Copper Tube
- D. ASTM D1693 Environmental Stress-Cracking of Ethylene Plastics
- E. ASTM D 635 Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position
- F. UL 94 Tests for Flammability of Plastic Materials for Parts in Devices and Appliances
- G. AMCA 500-D Laboratory Method of Testing Dampers for Rating

1.6 DESIGN CRITERIA

- A. Size all control apparatus to properly supply and/or operate and control the apparatus served.
- B. Provide control devices subject to corrosive environments with corrosion protection or construct them so they are suitable for use in such an environment.
- C. Provide devices exposed to outside ambient conditions with weather protection or construct them so they are suitable for outdoor installation.
- D. Use only UL labeled products that comply with NEMA Standards. Electrical components and installation to meet all requirements of the electrical sections (Division 26) of project specifications.

PART 2 PRODUCTS

2.1 CONTROL DAMPERS

- A. Provide control dampers shown on the plans and as required to perform the specified functions. Dampers shall be rated for velocities that will be encountered at maximum system design and rated for pressure equal or greater than the ductwork pressure class as specified in Section 23 31 00 of the ductwork where the damper is installed.
- B. Use only factory fabricated dampers with mechanically captured replaceable resilient blade seals, stainless steel jamb seals and with entire assembly suitable for the maximum temperature and air velocities encountered in the system.
- C. All dampers in stainless steel, PCD coated steel, PVC, PTFE, or fiberglass ductwork shall be constructed of stainless steel.
- D. All dampers in aluminum ductwork shall be constructed of stainless steel or aluminum.
- E. Dampers in galvanized ductwork shall be constructed of galvanized steel and/or aluminum.
- F. All dampers, unless otherwise specified, to be rated at a minimum of 180° F working temperature. Leakage testing shall be certified to be based on latest edition of AMCA Standard 500-D and all dampers, unless otherwise specified, shall have leakage ratings as follows:

Damper Class	Differential Pressure	Leakage
Class IA	1" w.g.	≤3 CFM/ft ²
Class I	4" w.g.	≤8 CFM/ft ²
Class I	8" w.g.	≤11 CFM/ft ²
Class I	12" w.g.	≤14 CFM/ft ²

- G. Leakage rate dampers for differential pressures that they will encounter at maximum system design pressures.
- H. Dampers used for directed mixing of airstreams, i.e. outside air and return air, to be parallel blade type and sized for an air velocity of 1800 to 2000 fpm with the damper blades shall be arranged so that the air streams are directed at one another to facilitate mixing. Dampers used for throttling or modulating applications other than air stream mixing to be opposed blade type. Two position dampers may be parallel or opposed blade type.
- I. Dampers used for isolation on the discharge of centrifugal fans shall have damper blades perpendicular to the fan shaft to minimize system effect. Dampers mounted with blades vertically shall be designed for vertical blade orientation.
- J. Dampers for applications other than fume exhaust to have frames of not less than 16 gauge galvanized steel or 12 gauge extruded aluminum. Blades to be two-ply steel airfoil of not less than 2 x 20 gauge galvanized steel (14 gauge equivalent) or extruded aluminum airfoil, with stainless steel, acetal, Celcon,

bronze, or nylon bearings. Maximum allowable blade width is 8 inches. Use plated steel linkage hardware.

- K. Dampers used for laboratory fume or general exhaust systems shall have not less than 8" wide x 14 gauge frames and not less than 16 gauge two-ply airfoil blades. Laboratory fume exhaust damper frames, blades, and axles to be constructed of 304 stainless steel. Laboratory general exhaust damper frames, blades, and axles to be constructed of galvanized steel. Dampers shall be selected for a minimum rating of 10" water gauge at a velocity of 4000 FPM and rated at a minimum of 250° F. Blade bearings to be constructed of stainless steel or Teflon. Blade seals to be silicone. Leakage testing shall be certified to be based on latest edition of AMCA Standard 500-D and laboratory fume exhaust dampers, shall have leakage ratings as follows:

Damper Class	Differential Pressure	Leakage
Class I	1" w.g.	≤4 CFM/ft ²
Class I	4" w.g.	≤8 CFM/ft ²
Class I	8" w.g.	≤11 CFM/ft ²
Class I	12" w.g.	≤14 CFM/ft ²

- L. Maximum damper width is 48 inches; where required width exceeds 48 inches, use multiple damper sections. Inside frame free area shall be a minimum of 90% of total inside duct area.
- M. Multiple width damper sections shall utilize jack shaft linkages unless noted below. Sections over 144 inches wide shall be actuated from two locations on the jack shaft. Double width damper sections for two-position operation may be actuated without jack shafts if each damper section is actuated separately. Dampers that have multiple width and multiple vertical sections shall have a jackshaft for each vertically stacked set of dampers and be provided with crossover linkages between jack shafts to transfer uneven loading.
- N. Jack shafts shall be extended outside of the ductwork for external actuator mounting. Provide bearings on the point of exit for support of damper shafts to prevent wear on the shaft and the ductwork. If locating actuators out of the air stream is impossible, obtain mounting location approval from the designer unless the contract documents indicate in air stream mounting is acceptable. In no cases shall damper actuators for fume exhaust systems be located in the air stream or require entering the air stream to service an actuator.
- O. Provide weatherproof NEMA 4 enclosures that have removable covers that have clasps or machine screws (no sheet metal screws) and that do not require removing fasteners from the ductwork to prevent actuator failure or freeze-up when mounting in locations exposed to harsh environments or outdoor locations.
- P. Size operators for smooth and positive operation of devices served, and with sufficient torque capacity to provide tight shutoff against system temperatures and pressure encountered. For pneumatic actuation, use rolling diaphragm, piston type operators with adjustable stops. For electric modulating actuation, use fully proportional actuators with zero and span adjustments. For two-position

electric actuation use 24 VAC for DDC controlled actuators, 120 VAC actuators may be used for hardwire interlocking. All electric actuators will be provided with overload protection to prevent motor from damage when stall condition is encountered. Equip operators with spring return or stored energy fail-safe return for applications involving fire, freeze protection, moisture protection or specified normally open/closed operation. Provide damper end switches with form "C" contacts where control sequences require damper position indication. End switches shall not contain mercury.

- Q. All power required for electric actuation shall be provided by this contractor.
- R. Provide operators with linkages and brackets for mounting on device served.
- S. Provide pilot positioners for pneumatic operators serving all modulating outside air, return air, relief air, and face and bypass dampers, where more than one operator is controlled in sequence, or where required to provide sufficient power to the operator.

2.2 THERMOSTAT GUARDS

- A. Provide clear plastic locking covers keyed the same. For locations that are subject to physical abuse, provide cast aluminum guard.

2.3 ELECTRIC/ELECTRONIC THERMOSTATS

- A. **ELECTRIC THERMOSTATS:** For single setpoint applications, provide line or low voltage electric type suitable for heating or heating and cooling as required. Provide the required number of heating and/or cooling stages required for the application. For line voltage ventilation applications utilizing fans and where otherwise specified in the sequence of operations, provide an integral manual On/Off/Auto selector switch. Minimum contact rating shall be equal to electrical load of device being controlled.
- B. **LOW VOLTAGE ELECTRONIC THERMOSTATS:** Where unoccupied setpoints are specified, provide electronic programmable type with seven day setup/setback scheduling with a minimum of two occupied and unoccupied schedules per day through keypad entry on front of unit. For heating and cooling applications, provide automatic heating/cooling switchover. For applications that control fans, provide fan override switch. For ventilation or packaged economizer applications provide a dry contact for ventilation damper or economizer initiation. For thermostat control of economizer, provide a 0-10VDC modulated output for economizer damper control.
- C. **LOW LIMIT THERMOSTATS (freezestats):** Electric two-position type with temperature sensing element and manual reset for all applications except integral face and bypass steam heating coils which shall have auto-reset freezestats and latching relays (see execution section for details). Unit to be capable of opening control circuit if any one-foot length of sensing element is subject to a temperature below the setpoint. Length of sensing element to be not

less than one lineal foot per square foot of coil surface areas. Unless otherwise indicated, set low limit controls at 36°F.

- D. AQUASTATS: Line voltage type with single pole, double throw switch of adequate rating for the applied load.
- E. REMOTE BULB THERMOSTATS: Line voltage type with single pole, double throw switch of adequate rating for the applied load. Thermostat to have adjustable setpoint suitable for controlled load.
- F. IMMERSION TYPE THERMOSTAT SENSORS: Rod and tube type with linear output. Provide separable wells with heat conductive fluid for installation in pipeline. Units shall be factory calibrated.
- G. DUCT THERMOSTATS: Pneumatic, one or two-pipe proportioning type, with adjustable setpoint and throttling range. Units shall be direct or reverse acting to match device being controlled. Sensing element to be averaging type, temperature compensated, armored, with minimum length of 8 feet.

2.4 POWER SUPPLIES

- A. Provide all required power supplies for transducers, sensors, transmitters and relays. All low voltage transformers shall have a resettable secondary circuit breaker and be listed as class 2 power supplies.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install system with trained mechanics and electricians employed by the control equipment manufacturer or an authorized representative of the manufacturer. Where installing contractor is an authorized representative of the control manufacturer, such authorization shall have been in effect for a period of no less than three years.
- B. Install all control equipment, accessories, wiring, and piping in a neat and workmanlike manner. All control devices must be installed in accessible locations. This contractor shall verify that all control devices furnished under this Section are functional and operating the mechanical equipment as specified.
- C. Label all control devices with the exception of dampers, valves, and terminal unit devices with permanent printed labels that correspond to control drawings. Temperature control junction and pullboxes shall be identified utilizing spray painted green covers.
- D. All control devices and electrical boxes mounted on insulated ductwork shall be mounted over the insulation. Provide mounting stand-offs where necessary for adequate support. Cutting and removal of insulation to mount devices directly on

ductwork is not acceptable. This contractor shall coordinate with the insulation contractor to provide for continuous insulation of ductwork.

- E. Mounting of electrical or electronic devices shall be protected from weather if the building is not completely enclosed. This Contractor shall be solely responsible for replacing any equipment that is damaged by water that infiltrates the building if equipment is installed prior to the building being enclosed.
- F. Provide all electrical relays and wiring, line and low voltage, for control systems, devices and components. Install all high voltage and low voltage wiring (includes low voltage cable) in metal conduit, Electrical Non-metallic Tubing (ENT), or Electrical Metallic Tubing (EMT), as scheduled below and hereafter referred to generically as conduit. See Wire and Air Piping Conduit Installation Schedule below for specific conduit or tubing to be used. All conduit must be installed in accordance with electrical sections (Division 26) of this specification and the National Electrical code.
- G. Conduit shall be a minimum of 1/2 " for low voltage control provided the pipe fill does not exceed 40%.
- H. Minimum low voltage wiring gauge to be 18 AWG for outputs and 20 AWG for inputs. All low voltage wiring to be stranded.
- I. Low voltage wiring can be run without conduit above accessible lay-in tile ceilings. All wiring in mechanical rooms, above inaccessible hard ceilings, exterior locations, and in any exposed areas, and in all other locations should be in conduit. Wire for wall sensors must be run in conduit. Wiring for radiation valves shall be run in conduit where routed through walls.
- J. Wiring shall utilize the cable tray wherever possible.
- K. Wiring shall run at right angles and be kept clear of other trades work.
- L. Wiring shall be supported utilizing "J" or "Bridal-type" steel mounting rings anchored to ceiling concrete, piping supports, walls above ceiling or structural steel beams. Mounting rings shall be of open design (not a closed loop) to allow additional wire to be strung without being threaded through the ring. For mounting rings that do not completely surround the wire, attach the wire to the mounting ring with a strap.
- M. Supports shall be spaced at a maximum 4-foot interval unless limited by building construction. If wiring "sag" at mid-span exceeds 6-inches; another support shall be used.
- N. Wiring shall never be laid directly on the ceiling grid or attached in any manner to the ceiling grid wires.
- O. Wall penetrations shall be sleeved.

- P. Wiring shall not be attached to existing cabling, existing tubing, plumbing or steam piping, ductwork, ceiling supports or electrical or communications conduit.
- Q. Control panels serving equipment fed by emergency power shall also be served by emergency power. This contractor shall be responsible for all 120VAC power, not provided in the Division 26 specifications, required for equipment provided under this section.
- R. After completion of installation, test and adjust control equipment. Submit data showing set points and final adjustments of controls.

3.2 WIRE AND AIR PIPING CONDUIT AND TUBING INSTALLATION SCHEDULE

- A. The following conduit schedule shall apply to both polyethylene tubing and wire in conduit where conduit is specified for air tubing or wiring.
- B. Conduit other than that specified below for specific applications shall not be used.
- C. Underground Installations within Five Feet of Foundation Wall: Rigid steel conduit.
- D. Underground Installations More than Five Feet From Foundation Wall: Rigid steel conduit. Plastic-coated rigid steel conduit. Schedule 40 PVC conduit.
- E. Under Slab on Grade Installations: Schedule 40 PVC conduit.
- F. Exposed Outdoor Locations: Rigid steel conduit.
- G. Concealed in Concrete and Block Walls: Rigid steel conduit. Schedule 40 PVC conduit. Electrical Nonmetallic Tubing (ENT).
- H. Within Concrete Slab: Rigid steel conduit. Schedule 40 PVC conduit. Electrical Nonmetallic Tubing (ENT).
- I. Wet Interior Locations: Rigid steel conduit. Schedule 40 PVC conduit PVC coated rigid steel conduit.
- J. Concealed Dry Interior Locations: Rigid steel conduit. Intermediate metal conduit. Electrical metallic tubing.
- K. Exposed Dry Interior Locations: Rigid steel conduit. Intermediate metal conduit. Electrical metallic tubing.

3.3 CONTROL DAMPERS

- A. All control dampers furnished by the control manufacturer are to be installed by the Mechanical Contractor under the coordinating control and supervision of the Control Contractor in locations shown on plans or where required to provide specified sequence of control.

- B. Coordinate installation with the sheetmetal installer to obtain smooth duct transitions where damper size is different than duct size. Blank off plates will not be accepted.
- C. Each operator shall serve a maximum damper area of 36 square feet. Where larger dampers are used, provide multiple operators.

3.4 ROOM THERMOSTATS AND TEMPERATURE SENSORS

- A. Check and verify location of thermostats, humidistats, and other exposed control sensors with plans and room details before installation. Locate room thermostats and sensors 48 inches above floor. Align with light switches and humidistats. For drywall installations, thermostat mounting shall use a back-box attached to a wall stud, drywall anchors are not acceptable.
- B. Any room thermostats or sensors mounted on an exterior wall shall be mounted on a thermally insulated sub-base. Subbase to provide a minimum of one half inch of insulation.
- C. Where thermostats or sensors are mounted on exterior walls or in any location where air transfer will affect the measured temperature or humidity seal the conduit and any other opening that will effect the measurement.
- D. Provide guards on thermostats and sensors in entrance hallways, other public areas, or in locations where thermostat is subject to physical damage.

END OF SECTION

SECTION 15985
SEQUENCE OF OPERATION FOR HVAC CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION

- A. This section includes control sequences for HVAC equipment as well as equipment furnished by others that may need monitoring or control.

1.2 RELATED WORK

- A. Applicable provisions of Division 1 govern work under this Section.
- B. Section 15980 – Instrumentation and Control Devices for HVAC
- C. Section 15990 - Testing, Adjusting, and Balancing for HVAC – Coordination

1.3 SUBMITTALS

- A. Refer to Division 1, General Conditions, Submittals.
- B. Shop drawings shall be provided by contractor(s) providing equipment. The contractor providing the equipment shall provide a complete narrative of the sequence of operation for equipment that is controlled directly from that equipment. The narrative of the sequence of operation shall not be a verbatim copy of the sequences contained herein, but shall reflect the actual operation as applied by the contractor.
- C. All operations and maintenance data shall comply with the submission and content requirements specified under section GENERAL REQUIREMENTS.

PART 2 - PRODUCTS

- 2.1 Not applicable to this Section

PART 3 - EXECUTION

3.1 CONTROL SEQUENCES

- A. EXHAUST FANS (EF-1 and 2)
 - 1. Exhaust fans shall run and be interlocked with motorized dampers at louvers (L-1, 2, 3 and 4) to open when manual switch at door is activated or room temperature rises above thermostat setpoint (90°F adj.).

B. INFRARED HEATERS - IR-1/IR-2

1. Remote thermostats (location field verified) set at 65 degrees F (adj.) maintains constant space temperature by initiating associated burner system operation.

END OF SECTION

SECTION 15990
TESTING, ADJUSTING AND BALANCING FOR HVAC

PART 1 GENERAL

1.1 DESCRIPTION

- A. This section includes air and water testing, adjusting and balancing for the entire project. Included are the following topics:

1.2 RELATED WORK

- A. Section 15010 Common Work Results for HVAC
- B. Section 15980 Instrumentation and Control Devices for HVAC

1.3 QUALITY ASSURANCE

- A. An independent Firm specializing in the Testing and Balancing of HVAC systems for a minimum of 3 years. A Firm not engaged in the commerce of furnishing or providing equipment or material generally related to HVAC work other than that specifically related to installing Testing and Balancing components necessary for work in this section such as, but not limited to sheaves, pulleys, and balancing dampers.
- B. A certified member of AABC or certified by NEBB or TABB in the specific area of work performed. Maintain certification for the entire duration of the project. If certification of firm or any staff performing work is terminated or expires during the duration of the project, contact Owner immediately.
- C. Technicians on this project must have satisfactorily completed work on a minimum of (3) three projects of at least 50% in size, and of similar complexity. Size is defined as the quantity of each specific individual item requiring testing and balancing such as, but not limited to, equipment, devices, terminal devices, and grilles and diffusers.
- D. Submit Qualifications of firm and project staff to Engineer upon request.

1.4 REFERENCE STANDARDS

- A. AABC National Standards for Total System Balance, Sixth Edition, 2002.
- B. ASHRAE ASHRAE Handbook, 2007 HVAC Applications, Chapter 37, Testing Adjusting and Balancing.
- C. NEBB Procedural Standards for Testing Adjusting Balancing of Environmental Systems, Seventh Edition, 2005.
- D. TABB Tab Procedural Guide, First Edition, 2003.

1.5 DESCRIPTION

- A. The Contractor will separately contract with an independent test and balance agency to perform all testing, adjusting, and balancing of air and hydronic systems required for this project. Work related to the testing, adjusting, and balancing that must be performed by the installing mechanical contractor is specified in other section of these specifications.
- B. Provide total mechanical systems testing, adjusting and balancing. Requirements include the balance of air and water distribution, adjustment of new and existing systems and equipment to provide design requirements indicated on the drawings, electrical measurement and verification of performance of all mechanical equipment, all in accordance with standards published by AABC, NEBB, or TABB.
- C. Test, adjust and balance all air and hydronic systems so that each room, piece of equipment or terminal device meets the design requirements indicated on the drawings and in the specifications.
- D. Accomplish testing, adjusting and balancing work in a timely manner that allows partial occupancy of major buildings, occupancy of one building when the project involves many buildings, and completion of the entire project in the time stated in the Instruction to Bidders and in accordance with the completion schedule established for this project.
- E. Verify that provisions are being made to accomplish the specified testing, adjusting and balancing work. If problems are found, handle as specified in Part 3 under Deficiencies.

1.6 SUBMITTALS

- A. See also Related Work in this section.
- B. Submit testing, adjusting and balancing reports bearing the seal and signature of the NEBB, AABC or TABB Certified Test and Balance Supervisor. The reports certify that the systems have been tested, adjusted and balanced in accordance with the referenced standards; are an accurate representation of how the systems have been installed and are operating; and are an accurate record of all final quantities measured to establish normal operating values of the systems.

Submission:

Format: Cover page identifying project name, project number and descriptive title of contents. Divide the contents of the report into the below listed divisions:

General Information
Summary
Air Systems
Special Systems

Contents: Provide the following minimum information, forms and data:

General Information: Inside cover sheet identifying Test and Balance Agency, Contractor, Architect, Engineer, Project Name and Project Number. Include addresses, contact names and telephone numbers. Also include a certification sheet containing the seal and signature of the Test and Balance Supervisor.

Summary: Provide summary sheet describing mechanical system deficiencies. Describe objectionable noise or drafts found during testing, adjusting and balancing. Provide recommendations for correcting unsatisfactory performances and indicate whether modifications required are within the scope of the contract, are design related or installation related. List instrumentation used during testing, adjusting and balancing procedures.

The remainder of the report to contain the appropriate standard NEBB, AABC, or TABB forms for each respective item and system. Fill out forms completely. Where information cannot be obtained or is not applicable indicate same.

PART 2 PRODUCTS

2.1 INSTRUMENTATION

- A. Provide all required instrumentation to obtain proper measurements. Application of instruments and accuracy of instruments and measurements to be in accordance with the requirements of NEBB, AABC, or TABB Standards and instrument manufacturer's specifications.
- B. All instruments used for measurements shall be accurate, and calibration histories for each instrument to be available for examination upon request. Calibration and maintenance of all instruments to be in accordance with the requirements of NEBB, AABC, or TABB Standards

PART 3 EXECUTION

3.1 PRELIMINARY PROCEDURES

- A. Review preconstruction meeting report, applicable construction bulletins, applicable change orders and approved shop drawings of equipment, outlets/inlets and temperature controls.
- B. Check filters for cleanliness, dampers and valves for correct positioning, equipment for proper rotation and belt tension, temperature controls for completion of installation and hydronic systems for proper charge and purging of air.
- C. Notify Project Representative on a daily basis during balancing. Identify deficiencies preventing completion of testing, adjusting and balancing procedures. Do not proceed until systems are fully operational with all components necessary for complete testing, adjusting and balancing. Installing Contractors are required to provide personnel to check and verify system

completion, readiness for balancing and assist Balancing Agency in providing specified system performance.

3.2 PERFORMING TESTING, ADJUSTING AND BALANCING

- A. Perform testing, adjusting and balancing procedures on each system identified, in accordance with the detailed procedures outlined in the referenced standards except as may be modified below.
- B. Unless specifically instructed in writing, all work in this specification section is to be performed during the normal workday.
- C. In areas containing ceilings, remove ceiling tile to accomplish balancing work; replace tile when work is complete and provide new tile for any tile that are damaged by this procedure. If the ceiling construction is such that access panels are required for the work of this section and the panels have not been provided, inform the owner's project representative.
- D. Cut insulation, ductwork and piping for installation of test probes to the minimum extent necessary for adequate performance of procedures. Patch using materials identical to those removed, maintaining vapor barrier integrity and pressure rating of systems.
- E. In air systems employing filters, blank off sufficient filter area to simulate a pressure drop that is midway between that of a clean filter and that of a dirty filter.
- F. Measure and record system measurements at the fan and/or pump to determine total flow. Adjust equipment as required to yield specified total flow at terminals. Proceed taking measurements in mains and branches as required for final terminal balancing. Perform terminal balancing to specified flows balancing branch dampers, deflectors, extractors and valves prior to adjustment of terminals.
- G. Measure and record static air pressure conditions across fans, coils and filters. Indicate in report if cooling coil measurements were made on a wet or dry coil and if filter measurements were made on a clean or dirty filter. Spot check static air pressure conditions directly ahead of terminal units.
- H. Adjust outside air, return air and relief air dampers for design conditions at both the minimum and maximum settings and record both sets of data. Balance modulating dampers at extreme conditions and record both sets of data. Balance variable air volume systems at maximum air flow rate, full cooling, and minimum flow rate, full heating; record all data.
- I. Adjust register, grille and diffuser vanes and accessories to achieve proper air distribution patterns and uniform space temperatures free from objectionable noise and drafts within the capabilities of the installed system.
- J. Provide fan and motor drive sheave adjustments necessary to obtain design performance. Provide drive changes specifically noted on drawings, if any. If

work of this section indicates that any drive or motor is inadequate for the application, advise the owner's project representative by giving the representative properly sized motor/drive information (in accordance with manufacturers original service factor and installed motor horsepower requirements); Confirm any change will keep the duct/piping system within its design limitations with respect to speed of the device and pressure classification of the distribution system. Required motor/drive changes not specifically noted on drawings or in specifications will be considered an extra cost and will require an itemized cost breakdown submitted to owner's project representative. Prior authorization is needed before this work is started.

- K. Areas or rooms designed to maintain positive, negative or balanced air pressures with respect to adjacent spaces, as indicated by the design air quantities, require special attention. Adjust fan drives, distribution dampers, terminals and controls to maintain indicated pressure relationship.

Final air system measurements to be within the following range of specified cfm:

Fans	0% to +10%
Supply grilles, registers, diffusers	0% to +10%
Return/exhaust grilles, registers	0% to -10%
Room pressurization air	-5% to +5%

- L. Contact the temperature control Contractor for assistance in operation and adjustment of controls during testing, adjusting and balancing procedures. Cycle controls and verify proper operation and setpoints. Include in report description of temperature control operation and any deficiencies found.
- M. Permanently mark equipment settings, including damper and valve positions, control settings, and similar devices allowing settings to be restored. Set and lock memory stops.
- N. Leave systems in proper working order, replacing belt guards, closing access doors and electrical boxes, and restoring temperature controls to normal operating settings.
- O. Coordinate air handling unit minimum outside air set points with the Temperature Control Contractor.

3.3 DEFICIENCIES

- A. Division 15990 contractor to correct any installation deficiencies found by the test and balance agency that were specified and/or shown on the Contract Documents to be performed as part of that division of work. Test and balance agency will notify the Project Representative of these items and instructions will be issued to the Division 15 Contractor for correction of the deficient work. All corrective work to be done at no cost to the Owner. Retest mechanical systems, equipment, and devices once corrective work is complete as specified.

END OF SECTION

SECTION 16010
ELECTRICAL WORK - GENERAL

PART 1. GENERAL

1.1 CONTRACT DOCUMENTS

- A. The General Provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this section.
- B. Carefully examine the General and Electrical Contract Drawings. If any discrepancies occur between the Contract Drawings or between the Contract Drawings and the specifications, report such discrepancies to the Engineer in writing and obtain written instructions as to the manner in which to proceed. No departures from the Contract Drawings shall be made without prior written approval of the Engineer.

1.2 DESCRIPTION OF WORK

- A. The Contractor shall furnish all labor and materials and perform all work necessary for proper completion, operation and use of the electrical systems as herein specified and as shown on the Contract Drawings.
- B. The Contract Drawings and these Specifications are complimentary, each to the other, and any labor or material called for by either whether or not by both, or necessary for the successful operation of any of the particular types of equipment furnished under this Contract, shall be furnished and installed.
- C. The Contract Drawings are intended to indicate only diagrammatically the extent, general character, and approximate locations of the work included. Work indicated, but having minor details obviously omitted, shall be furnished complete to perform the functions intended without extra cost to the Owner.
- D. The Contractor shall familiarize himself with the other sections of these specifications in order that he may know the electrical requirements of these sections and be prepared to furnish all electrical work and materials required for equipment under those sections.
- E. The work shall include, but not necessarily be limited to, furnishing the following items:
 - 1. All wire, cable, control wire and any other cable associated with the project
 - 2. All conduit, wiremold, wireway
 - 3. Panelboard, circuit breakers and all appurtenances
 - 4. Lighting fixtures and all appurtenances
 - 5. Wiring devices and all appurtenances
 - 6. Installation of service entrance conductors and connection to existing service entrance transformer(s).

- 7. All demolition associated with the scope of work shown on the drawings and defined in these specifications.
- F. The number of conductors shown on the Contract Drawings is not necessarily the correct number required. As many conductors as are required in each case shall be installed.

1.3 CODES

- A. All work shall be executed in strict conformance to the requirements of the latest edition of the following codes and standards:
 - 1. National Electrical Code
 - 2. National Bureau of Standards Handbook H-30
 - 3. State and Local Codes, and all other authorities having jurisdiction
 - 3. Underwriters' Laboratories, Inc.
 - 4. American National Standards Institute, Inc.
 - 5. Institute of Electrical and Electronics Engineers
 - 6. National Electrical Manufacturer's Association
 - 7. National Board of Fire Underwriters
 - 8. Insulated Power Cable Engineers Associated Specifications
 - 9. American Society for Testing Materials and Specifications
 - 11. Federal Department of Labor Occupational Safety and Health Standards as contained in the Federal Register Volume 36, Number 105, dated May 29, 1971, or the latest revision thereof
 - 10. All other authorities having jurisdiction over this section of work
- B. If the Contractor performs any work contrary to any of the above codes and regulations, he shall be held fully responsible for such violations, and shall assume any and all costs arising therefrom to conform to them.

1.4 PERMITS AND FEES

The Contractor shall obtain all permits, pay all fees and furnish the Engineer with evidence of the permits before commencing the Contract work. A certificate of inspection shall be submitted, properly executed, to the Engineer prior to final acceptance of the work. This certificate shall be issued from an inspection agency acceptable to the local electrical utility and/or authority having jurisdiction.

1.5 COORDINATION

- A. The work under this section of the Specifications shall be performed so that the progress of the entire project, including all trades, shall not be delayed nor interfered with. Material and equipment shall be installed as fast as conditions will permit.
- B. The Contractor shall check dimensions, examine drawings and coordinate his/her work so that the electrical work shall be coordinated with the other trades to avoid any conflicts of equipment. Conflicting conditions shall be resolved with the Engineer before installation. No additional compensation will be approved for modifying installations made prior to the resolution of the conflict.

1.6 OBTAINING INFORMATION

The Contractor shall obtain detailed information from the manufacturers of equipment which he is to furnish and install, as to the proper method of installation. Shop drawings of all equipment shall be examined for service and outlet locations. Any conflict shall be brought to the attention of the Engineer for resolution. Failure to do so prior to installation will require the Contractor to make changes at his own expense as may be required by the Engineer.

1.7 PHASE IDENTIFICATION

- A. Wires 8 AWG and smaller shall have continuous colored outer covering.
- B. Wires larger than 6 AWG shall be identified at all periods of termination by colored, gummed or plastic tape applied to the wires as follows:

<u>Applicable System Voltage</u>	<u>Phase A</u>	<u>Phase B</u>	<u>Phase C</u>
120/208, 3 phase, 4 wire	Black	Red	Blue
277/480, 3 phase, 4 wire	Brown	Yellow	Orange

- C. Neutral wires shall be white.
- D. Equipment ground wires shall be green.
- E. The same colors shall be used for the same phases throughout the entire project.
- F. Color coding for multi-conductor or control cables shall comply with UL and NEC requirements.
- G. Bus bars in transfer switches and panelboards shall be properly identified by the color codes specified for the various voltages.
- H. Every coil or reel of wire shall bear the manufacturer's name, the Underwriters' label, type, voltage, size, length and manufacturing date, and shall be delivered to the job in original containers for inspection. Wire shall be manufactured in the USA.

1.8 SUBSTITUTIONS REQUIRING ADDITIONAL WORK

Electrical work is designed for specific acceptable items of equipment and systems. If, by substitution of an alternate item or system, extra work is involved, it shall be the responsibility of the Contractor and he shall assume any and all costs for such extra work. The allowance of a substitute item or system shall in no way relieve him of full responsibility for the work.

1.9 TESTING

- A. Provide any tests of equipment, wiring or insulation deemed necessary by an inspection department or by the Engineer and provide all apparatus, meters, materials, and labor required to make such tests. Remove any material or equipment which is found to be defective during the tests and replace with new at no additional cost to the Owner.

- B. Test all equipment which is furnished to this Contractor by other parties in the presence of an authorized representative of such part to determine whether or not the operation is satisfactory and that the equipment performs the function intended.

1.10 RECORD DRAWINGS

- A. The Engineer will provide one set of prints which shall be maintained by the Contractor at the site, on which the Contractor shall mark clearly, promptly and accurately as the work progresses, the work as actually installed, including any and all revisions. At the completion of the work, the Contractor shall submit to the Engineer the complete set of annotated Contract Drawings.
- B. Markings on the record Contract Documents shall show all changes as well as the actual plan location and elevation of all underground and concealed conduit.
- C. After verification, the Engineer will submit the record Contract Drawings to the Owner. Non-availability of record Contract Drawings or inaccuracies therein shall be grounds for postponement of final payment, until such time as the discrepancy or availability has been corrected.

1.11 PROTECTION OF ELECTRICAL EQUIPMENT

- A. Electrical equipment shall be protected from the weather, especially from water dripping or splashing upon it, at all times during shipment, storage and construction.
- B. Should any apparatus be subjected to injury by water, it shall be dried out thoroughly and put through a special dielectric test as directed at the expense of the Contractor, or shall be replaced by the Contractor without additional charge.
- C. Electrical equipment shall also be protected from dust, dirt, debris, etc. by suitable care and/or covering until the work is completed and turned over to the Owner. If any damage is caused by exposure to these hazards, the equipment shall be repaired, cleaned, painted or replaced, as necessary, without additional charge to restore it to its proper condition.
- D. All temporary electrical work shall meet the requirements of the National Electrical Code and the applicable sections of the Federal Department of Labor, Occupational Safety and Health Regulations for Construction as contained in the Federal Register, Volume 36, Number 75, dated April 17, 1971, or the latest revision thereof.

1.12 INSTRUCTIONS

- A. The Contractor shall thoroughly instruct the Owner's representative in the proper operations of all systems. Manufacturer's representatives and other skilled personnel necessary shall be retained as long as necessary for the purpose.

- B. The Contractor shall collect three (3) sets of complete instructions for operation and maintenance of all equipment, spare parts lists, fixtures, line per wire diagrams, and systems for all pieces of equipment furnished under this Contract.
- C. Bind the data in a commercial quality 8 1/2 x 11 inch three-ring binders with hardback, cleanable, and plastic covers. When multiple binders are used, correlate data into related consistent groupings. Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS, list title of Project and identify subject matter of contents. Prepare Table of Contents for each binder, arrange content by system and suitably indexed. Upon conclusion of the work, deliver five (5) sets of notebooks to the Owner's representative.

1.13 IDENTIFICATION

- A. All switches, control devices, generators, panelboards, and all appurtenances thereto shall be provided with an approved engraved nameplates. Nameplates shall be made of laminated sheet plastic approximately 1/8 inch thick engraved to provide white letters on a black background. All nameplates shall be secured in their proper location with finished screws. The nameplate shall identify the name of the equipment, and the control or the usage of the device.
- B. Submit a type written list of nameplates for approval before ordering. All nameplates shall be exclusively as described above.

1.14 LOCAL CONDITIONS

- A. The Contractor shall provide and place all sleeves for conduits penetrating floors, walls, and partitions, etc. The Contractor shall locate all necessary slots for this work and these shall be formed before concrete is poured.
- B. All cutting and patching shall be done in a thoroughly workmanlike manner.

PART 2. PRODUCTS

2.1 GENERAL

- A. All materials shall be new, of first quality, and shall conform to the standards of Underwriter's Laboratories, Inc., National Electrical Manufacturer's Association, Insulated Power Cable Engineers, American National Standards Institute, Institute of Electrical and Electronics Engineers, and American Society of Testing Materials in every case where such a standard has been established for the particular type of material in question. Where no specific make of materials, apparatus and/or equipment is mentioned hereinafter, any first-class product of reputable manufacturer may be used provided such product conforms to the Contract Drawings and Specifications and has a written approval of acceptance by the Engineer.
- B. Where there is more than one item of similar equipment required under this Contract, all such similar equipment shall be the product of one manufacturer.

- C. All articles shall have the name or trademark of the manufacturer and rating in volts and amperes or other proper units marked where they can be observed readily after the device is installed.
- D. Defective equipment or equipment damaged in the course of installation or test shall be replaced or repaired in a manner meeting the approval of the Engineer.

PART 3. EXECUTION

3.1 GENERAL

- A. All work shall be executed in a workmanlike manner, and shall present a neat and mechanical appearance when completed.
- B. Surface-mounted panel boxes, junction boxes, conduit, etc. shall be supported by spacers to provide a clearance between wall and equipment.
- C. Load Balance. The Contractor shall check the load balance on the phases of the various systems and reconnect where necessary as approved by the Engineer to provide equal division of the loads between the phases of the various systems.

END OF SECTION 16010

SECTION 16030
ELECTRICAL FIELD ACCEPTANCE TESTS

PART 1. GENERAL

1.1 CONTRACT DOCUMENTS

- A. The General Provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this Section.

1.2 DESCRIPTION OF WORK

- A. Tests will be made under the supervision and direction of the Engineer to insure that all apparatus function as designed.
- B. All defective material and workmanship disclosed as the result of the tests given herein shall be corrected. The Contractor shall show by demonstration in service that all circuits and devices are in good operating condition. Tests shall be such that each item of control equipment will function not less than five times. The cost of the tests shall be borne by the Contractor, including expense incident to retests occasioned by defects and failures of equipment to meet the Specification.
- C. Unless otherwise specified, the Contractor shall supply electric current necessary for the tests.

PART 2. PRODUCTS

2.1 TEST EQUIPMENT

The Contractor shall furnish all equipment, meters, etc. necessary for field acceptance tests. Calibration certificate(s) for the equipment to be used shall be provided to the Owner and Engineer in English language.

PART 3. EXECUTION

3.1 INSULATION RESISTANCE OF CIRCUITS

All electric systems shall be tested for insulation resistance after all wiring is completed and connected ready for the attachment of fixtures and equipment, and again when fixtures and equipment are connected ready for use. Tests shall be made with an instrument capable of measuring accurately the resistance involved and having a voltage rating of 1000 volts. Readings shall be taken after the voltage has been applied continuously for one minute. The insulation resistance between conductors and also between each conductor and ground shall be measured. For wiring completed and connected ready for the attachment of fixtures and equipment, the values of insulation resistance shall not be less than one (1) megohm per 1000 volts of service voltage.

3.2 ACCEPTANCE TESTS

- A. The final operating tests shall be conducted in the presence of the Engineer and shall be subject to his approval. He shall be notified seven calendar days or more in advance when any test is to take place, and it shall not be started without his permission.
- B. Each motor, with its control, shall be run as nearly as possible under operating conditions for a length of time sufficient to demonstrate correct alignment, wiring capacity, speed and satisfactory operation. All main switches and circuit breakers shall be operated. Tests shall demonstrate the proper functioning of all control equipment and instrumentation.
- C. These tests shall be in addition to, and not in substitution form the tests of the individual items at the manufacturer=s plant, or for the tests specified under the other sections of the Specifications.

END OF SECTION 16030

SECTION 16110
RACEWAYS

PART 1. GENERAL

1.1 CONTRACT DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

- A. The Contractor shall furnish all labor and material to install the raceway systems necessary for a complete electrical system.
- B. Types of raceways in this section include the following:
 - 1. Rigid conduit.
 - 2. Flexible metal conduit.
 - 3. Liquid tight flexible metal conduit.
 - 4. Wiremold 700

1.3 QUALITY ASSURANCE

- A. Installer - Qualified with at least 3 years of successful installation experience on projects with electrical raceway work similar to that required for this project.
- B. National Electrical Manufacturers Association (NEMA) Compliance - Comply with applicable requirements of NEMA standards pertaining to raceways.
- C. Underwriters Laboratory (UL) Compliance and Labeling - Comply with provisions of UL safety standards pertaining to electrical raceway systems and provide products and components which have been UL-listed and labeled.
- D. National Electrical Code (NEC) Compliance - Comply with requirements as applicable to construction and installation of raceway systems.
- E. Referenced Standards:
 - 1. American National Standards Institute (ANSI):
 - a. C80.6, Intermediate Metal Conduit - Zinc-Coated.
 - 2. American Society for Testing and Materials (ASTM):
 - a. A123, Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
 - b. D1784, Standard Specification for Rigid Poly(Vinyl Chloride) (PVC) Compounds and Chlorinated Poly(Vinyl Chloride) (CPVC) Compounds.
 - c. D1788, Standard Specification for Rigid Acrylonitrile-Butadiene-Styrene (ABS) Plastics.
 - d. D2564, Solvent Cements for (PVC) Plastic Pipe, Tubing, and Fittings.
 - e. F512, Standard Specification for Smooth-Wall Poly(Vinyl Chloride) (PVC) Conduit and Fittings for Underground Installation.

3. ETL Testing Laboratories, INC (ETL).
4. National Electric Manufacturers Association (NEMA):
 - a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
5. National Fire Protection Association (NFPA):
 - a. 70, National Electric Code(NEC).
6. Underwriters Laboratories Inc (UL):
 - a. 1, Flexible Metal Conduit.
 - b. 6, Rigid Metal Conduit.
 - c. 360, Liquid-Tight Flexible Steel Conduit.
 - d. 467, Grounding and Bonding Equipment.
 - e. 514, Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers.
 - f. 1242, Intermediate Metal Conduit.

PART 2. PRODUCTS

2.1 METAL CONDUIT AND TUBING

- A. Provide metal conduit, tubing and fittings of all types, grades, sizes and weights (wall thicknesses) for each service indicated. Where types and grades are not indicated, provide proper selection determined by Installer to fulfill wiring requirements and comply with applicable portions of NEC for raceways.
- B. Size all conduit as indicated on the Contract Drawings and/or in accordance with Table 1, Chapter 9 of the NEC. Minimum interior raceway size shall be 3/4 inch, and exterior raceway size shall be 1 inch, unless specified otherwise.
- C. Intermediate Metal Conduit (IMC)
 1. IMC shall be made of hot-dipped galvanized steel. Galvanizing shall be applied to both the inside and outside of the conduit.
 2. IMC fittings shall be malleable iron, zinc plated as manufactured by O-Z/Gedney or equivalent. No fittings shall be compression or set-screw type.
- D. Flexible Galvanized Steel Conduit (Flex)
 1. Formed of continuous, spiral wound, hot-dipped galvanized steel strip with successive convolutions securely interlocked.
 2. Standard: UL 1.
 3. Acceptable Manufacturers:
 - a. International Metal Hose Company.
 - b. Flexible Metal Hose Company.
 - c. Triangle PWC Inc.
 - d. LTV Steel Company.

2.2 CONDUIT FITTINGS AND ACCESSORIES

- A. Fittings for use with IMC in Non-Hazardous locations:
 1. Expansion couplings:

- a. 2 or 4 IN nominal straight-line conduit movement in either direction.
 - b. Weathertight.
 - c. Insulating bushing.
 - d. Sleeve-steel, zinc plated.
 2. Expansion/deflection couplings:
 - a. 3/4 IN nominal straight-line conduit movement in either direction.
 - b. 30-Degree nominal deflection from the normal in all directions.
 - c. Watertight.
 - d. Insulating bushing.
 - e. End couplings/hubs - bronze; or steel zinc-plated with aluminum cellulose lacquer finish.
 - f. Outer jacket neoprene.
 - g. Jacket clamps-stainless steel.
 - h. Inner sleeve (when used) - molded plastic.
 3. Pulling elbows and tees:
 - a. Raintight.
 - b. Cover - steel, zinc-plated.
 4. Mogul pulling elbows:
 - a. Die cast copper free aluminum.
- C. Fittings for use with FLEX:
 1. Fittings shall meet the following minimum requirements unless otherwise noted:
 2. Malleable iron, zinc-plated.
 3. Fittings shall be squeeze or clamp-type.
 4. Set screw type shall not be used.
 5. Standard: UL 514.
- D. Fittings for use with FLEX-LT:
 1. Fittings shall meet the following minimum requirements unless otherwise noted.
 2. Body: Malleable iron, zinc-plated.
 3. Ferrule: Steel, zinc-plated.
 4. Locknuts and compression nuts: Malleable iron, zinc-plated.
 5. Sealing ring: Neoprene.
 6. Standard: UL 514.
- E. Acceptable Manufacturers:
 1. Adalet.
 2. Carlon.
 3. Crouse-Hinds.
 4. OZ Gedney Company.
 5. Perma-Cote.
 6. Rob-Roy Ind.
 7. Thomas and Betts.

2.3 CONDUIT SUPPORT SYSTEMS

- A. For use with IMC:

1. Acceptable Manufacturers:
 - a. Unistrut Building Systems.
 - b. B-Line Systems Inc.
 - c. Kindorf.
2. All components shall be hot-dipped galvanized.
 - a. Standard: ASTM A153.
3. Channels and brackets:
 - a. Formed from hot rolled carbon steel sheet and strip.
 - b. Standards: ASTM A570.
4. Fittings: Formed from structural steel or hot-rolled carbon steel sheet and strip.
 - a. Standards: ASTM A36 and A635.
5. Clamps:
 - a. Formed from low carbon hot rolled steel sheet and strip.
 - b. Standard: ASTM A569.
6. Channel nuts:
 - a. Formed from mild steel bar stock, case hardened.
 - b. Standard: ASTM A575.
7. Screws, nuts, bolts and continuous threaded rods.
 - a. Formed from mild steel bar stock.
 - b. Standards: ASTM A307 and A563.

2.4 ALL CONDUIT FITTINGS

- A. Mark Products:
1. UL listed.
 2. Identify the nominal trade size on the product.
 3. Stamp with the name or trademark of the manufacturer.

2.5 WIREMOLD 700

- A. The surface metal raceway system specified herein for branch circuit wiring or data network, voice, video and other low-voltage wiring shall be the V500 System as manufactured by The Wiremold Company. Systems of other manufacturers may be considered equal if, in the opinion, and the written approval of the engineer, they meet all the performance standards specified herein.
- B. The raceway and all system components must be UL Listed. They shall be manufactured of steel; zinc plated, galvanized and/or finished in ivory ScuffCoat™ (a polyester topcoat over ivory base) and shall be suitable for field repainting to match surroundings.
1. The raceway shall be a one-piece design with a base and cover factory assembled. Total width shall be 0.75" by 0.53" [19.05mm by 13.46mm] deep with a cross sectional area of 0.20 square inches [129mm²]. The raceway base and cover shall have an approximate thickness of .040" [1.016mm]. The raceway shall be available in 5' and 10' [1.52m and 3.048m] lengths.

2. A hand operated cutting tool shall be available for the base and cover to ensure clean, square cuts.
3. A full compliment of fittings must be available including but not limited to mounting clips and straps, couplings, flat, internal and external elbows, cover clips, tees, entrance fittings, conduit connectors and bushings. The covers shall be painted with an enamel finish, ivory in color to match the V500 Raceway. They shall overlap the raceway to hide uneven cuts. All fittings shall be supplied with a base where applicable. A transition fitting shall be available to adapt to other raceways manufactured by The Wiremold Company.
4. Device boxes shall be available for mounting standard devices and faceplates. A device box shall be available in single- and multiple-gang configurations, up to six-gang. Single-gang boxes shall allow for snap-on and fastener application. They shall range in depth from 0.94" to 2.75" [23.88mm to 69.85mm]. Extension boxes shall be available to adapt to existing standard flush switch and receptacle boxes. Round fixture and extension boxes shall be available to mount fixtures and other devices with mounting centers of 1 15/32", 1 5/8", 1 23/32", 1 27/32", 2 3/4", 3 1/2" and 4 1/16" [37.29mm, 41.27mm, 43.65mm, 46.83mm, 69.85mm, 88.90mm, and 103.12mm] diameters. Round fixture and extension boxes shall be available in depths ranging from 0.47" to 1.00" [11.94mm to 25.4mm] and in diameters of 3.00", 4.75", 5.50" and 6.38" [76.2, 120.65, 139.7, and 162.05]. All device and fixture box covers shall be painted with an enamel finish, ivory in color to match the raceway cover.
4. The raceway manufacturer will provide a complete line of connectivity outlets and modular inserts for UTP/STP, Fiber Optic, Coaxial and other cabling types with face plates and bezels to facilitate mounting. A complete line of preprinted station and port identification labels, snap-in icon buttons as well as write-on station identification labels shall be available.

PART 3. EXECUTION

3.1 INSTALLATION OF ELECTRICAL RACEWAYS

- A. Install electrical raceways where indicated, in accordance with manufacturers= written instructions, the applicable requirements of NEC and complying with recognized industry practices.
- B. Coordinate with other work, as necessary, to interface installation of electrical raceways and components with other work.
- C. Conduits shall be routed in the field unless otherwise indicated.
 1. Whenever possible avoid routing conduits through areas of high ambient temperature or radiant heat.

2. Raceway runs shall be installed level, square and parallel to building structure.
- D. Complete installation of electrical raceways before starting installation of cables/wires within raceways.
- E. Conduit runs:
 1. All conduits within a structure shall be installed exposed.
 2. Conduit shall not be routed on the exterior of structures except as specifically indicated on the Drawings.
- F. Conduit shall not interfere with, or prevent access to, piping, valves, etc., or other equipment for operation, maintenance and repair.
- G. Total of Bends in Conduit Run:
 1. Less than 360 degrees.
 2. Provide pull boxes, conduits, or pulling elbows or tees as needed.
- H. Raceway runs, where shown, indicate the preferred location. Site conditions may affect actual routing. Coordinate routing and measurement with other trades and with equipment suppliers to avoid interference with equipment, piping, etc.
- I. FLEX-LT
 1. Install as the final conduit to motors, electrically operated valves, primary elements (instrumentation), final connections to light fixtures, step-down transformers, and electrical equipment that is liable to vibrate.
 2. Shall not be used as a conduit run:
 - a. Maximum length shall not exceed:
 - 1) 36 IN to motors.
 - 2) 24 IN to all other equipment.
- J. Conduit Support Systems:
 1. Compatible with the material and finish of the conduit supported.
 - a. Hot-dipped galvanized steel for use with IMC.
- K. Field Bending and Cutting of Conduits:
 1. Utilize tools and equipment recommended by the manufacturer of the conduit, designed for the purpose and the conduit material to make all field bends and cuts.
 2. Do not reduce the internal diameter of the conduit when making conduit bends.
 3. Degrease thread after threading and apply a zinc rich paint.
 4. Debur interior and exterior after cutting.
- L. Conduit Installation:
 1. Install conduit and fittings, as required (including offsets and crossovers), for a complete system that has a neat appearance and is in compliance with all applicable codes.
 2. Accessible conduit:
 - a. Run in straight lines parallel to or at right angles to building lines.

- 1) Install conduit adjacent to walls and floors.
 - 2) Maintain minimum 6 IN separation between instrumentation and power circuits.
 - b. Maintain minimum 6 IN separation from process, gas, air and water pipes.
3. Conduit support systems:
 - a. Support conduit from the building structure.
 - 1) Do not support conduit from process, gas, air or water piping; or from other conduits.
 - b. Provide hangers and brackets to limit the maximum uniform load on a single support to 25 LBS; or to the maximum uniform load recommended by the manufacturer if the support is rated less than 25 LBS.
 - 1) Do not exceed maximum concentrated load recommended by the manufacturer on any support.
 - 2) Conduit hangers: Continuous threaded rods combined with struts or conduit clamps:
 - a) Do not use perforated strap hangers and iron bailing wire.
 - c. Conduit support system fasteners:
 - 1) Use sleeve-type expansion anchors as fasteners in masonry wall construction. Do not use concrete nails and power-driven fasteners.
 - d. Maximum spacing between conduit supports:
 - 1) IMC: 10FT.
 - 2) Rigid nonmetallic conduit:
 - a) 1/2 to 2 IN: 3FT.
 - b) 2-1/2 to 6 IN: 6FT.
 - e. Support all conduits within 3 FT of the conduit termination.
 - f. Support all conduits at 90-degree bends and at vertical drops.
 - g. Provide substantial vertical support for all conduit drops for stability and to minimize vibration.
4. Male threads of conduit systems shall be coated with an electrically conductive anti-seize compound.
5. Threaded connections shall be made wrench-tight.
6. Conduit joints shall be watertight.
 - a. Where exposed to possible submersion.
 - b. In areas classified as wet.
 - c. Underground.
7. Conduits shall be installed to eliminate moisture pockets. Where water cannot drain to openings, provide drain fittings in the low spots of the conduit run.
8. Rigid non-metallic conduit and fittings shall be joined utilizing solvent cement.
 - a. Immediately after installation of conduit and fittings, the fitting or conduit shall be rotated 1/4 turn to provide uniform contact.
9. Install expansion fittings:
 - a. Where conduits span structural expansions joints, with copper bonding jumpers.
 - b. In long conduit runs.

- c. Elsewhere as identified on the Drawings.
 - 1) Provide fittings with 2 IN straight-line movement in either direction.
 - 2) Except where identified on the Drawings as requiring 4 IN straight-line movement in either direction.
 - 10. Install expansion/deflection fittings:
 - a. Where conduits enter a structure.
 - 1) Except electrical manholes and handholes.
 - 2) Except where the ductbank is tied to the structure with rebar.
 - b. Elsewhere as identified on the Drawings.
 - c. Provide fittings with 3/4 IN straight line movement in either direction and 30 degree deflection.
 - 1) Except where identified on the Drawings as requiring 2 IN straight line movement in either direction.
 - 11. Provide conduit seals:
 - a. Not more than 18 IN from where they are required.
 - 12. Terminate conduits:
 - a. In all type enclosures:
 - 1) With an insulated grounding bushing on the interior.
 - 2) With a locknut on the exterior.
 - b. When stubbed up through the floor:
 - 1) With an insulated grounding bushing.
 - 13. No conduit to be supported from pipe, etc.
 - 14. Multiple runs supported on trapeze. Provided 25% spare capacity on all trapeze support systems.
 - 15. No horizontal runs in masonry walls or partitions.
 - 16. Cap all vertical stubs.
- M. The protective coating integrity of conduits, fittings, and accessories shall be maintained.
- 1. Repair IMC utilizing a zinc rich paint.
 - 2. Repair surfaces which will be inaccessible after installation prior to installation.
- N. Remove moisture and debris from conduit before wire is pulled into place.
- 1. Pull mandrel with diameter nominally 1/4 IN smaller than the interior of the conduit, to remove obstructions.
 - 2. Swab conduit by pulling a clean, tight-fitting rag through the conduit.
 - 3. Tightly plug ends of conduit with tapered wood plugs or plastic inserts until wire is pulled.
- O. Only nylon or polyethylene rope shall be used to pull wire and cable in conduit systems.
- P. System and equipment grounding and bonding in strict accordance with NEC, Article 250.
- Q. All non-metallic or flexible conduit shall contain a separate grounding conductor in addition to the circuit conductors.

- R. Existing conduits which are reused shall be checked for proper grounding and continuity and corrections made as required.
- S. No welding permitted on conduits.
- T. All underground electrical systems shall include buried identification tape. The tape shall be continuous for the entire length of underground electrical system.
- U. Where ceiling, wall or other surfaces do not allow for conduit to be concealed, or in areas where concealing conduit would create excessive demolition or an unsightly installation, Wiremold is to be utilized for all wiring and device installation. The Engineer and Owner shall make the final determination on any areas in question.
- V. Fill openings in walls, floors, and ceilings and finish flush with surface.

3.2 CLEANING

Upon completion of installation of raceways, inspect interiors of raceways, remove burrs, dirt and construction debris.

END OF SECTION 16110

SECTION 16120
WIRES AND CABLES – 600 VOLT AND BELOW

PART 1. GENERAL

1.1 CONTRACT DOCUMENTS

The General Provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this section.

1.2 DESCRIPTION OF WORK

- A. The Contractor shall furnish all labor and material necessary for a complete electrical system.
- B. The Contractor shall furnish and install all wire required for a complete electrical power distribution, operational control and instrumentation systems and as indicated on the Contract Documents.

PART 2. PRODUCTS

2.1 WIRES AND CABLES

- A. Wire and cable sizes shall be as indicated on the Contract Drawings; however, in no case shall their size be smaller than required by the National Electrical Code.
- B. Wire and cable shall be annealed, 98 percent conductivity, soft drawn copper. All wire and cable shall be the product of a single manufacturer and shall not have been manufactured more than six months prior to delivery to the site.
- C. Wire and cable shall be 600 volt class insulation and shall bear the Underwriters' Labels unless specified otherwise.
- D. Usage of Insulation Types:
 - 1. Type XHHW shall be used for underground feeds, service entrance conductors and for branch circuits No. 6 AWG and larger except for control circuits.
 - 2. Type THHN/THWN shall be used for interior branch circuits No. 8 AWG and smaller.
- E. Conductors 8 AWG and larger sizes shall be stranded. Conductors 10 AWG and smaller shall be solid.
- F. All conductors, 8 AWG and smaller sizes, shall have a continuous colored outer cover as specified in Section 16010.
- G. Conductor size limitations:
 - 1. Power conductors shall not be smaller than No. 12 AWG unless otherwise indicated on the drawings.

2. Control conductors shall not be smaller than No. 14 AWG unless otherwise indicated on the drawings.
 3. Instrumentation conductors shall not be smaller than No. 18 AWG unless otherwise indicated on the drawings.
- H. Color coding for multi-conductor control cables shall comply with the requirements of the National Electrical Code.
- I. Shielded cable shall be two conductor twisted plus common, three pair, 600 volt, polyethylene insulated, aluminum tape shield with polyvinyl chloride jacket as manufactured by Belden, General Cable, or equivalent, unless specified elsewhere.
- J. Color code all wiring as follows:
1. Lighting and power wiring:

	120/208V	480V
	=====	=====
Phase 1	Black	Brown
Phase 2	Red	Yellow
Phase 3	Blue	Orange
Neutrals	White	White
Ground	Green	Green

2.2 SPLICES AND TAPS

- A. Utilize mechanical splicing devices and lugs for splices and terminations in wires 6 AWG and larger. For wires 2 AWG and larger, use a type of splicing device in which the contact pressure on the wire is obtained by two or more screws or bolts, and so designed that the failure of any one screw, bolt or nut will not result in a total loss of contact pressure. Acceptable manufacturer is 3M Scotchlok Lugs and Connectors, or equivalent. Mechanical splicing devices shall have insulating covers whenever obtainable, and shall otherwise be insulated with plastic tape, 3M, or equivalent.
- B. Splices in conductors 8 AWG and smaller shall be made with pressure connectors consisting of cone shaped sprongs with insulating covers, "Scotchlok", or equivalent. The terminations of 8 AWG and smaller wires shall be made by forming the wires about the terminal screws in the case of solid wires. All stranded wires shall be provided with spade lugs attached to the wires by a crimped sleeve.
- C. All splices and terminations made in wet or damp locations shall utilize mechanical splicing lugs and heat shrink kits as manufactured by Raychem Corporation.
- D. No splices shall be permitted in conduit, they shall be made in a junction box.
- E. Motor lead splices shall be made with a UL listed motor splicing kit, 3M kit number 5300 series or equivalent. Splice may be either pigtail type or inline, depending on the space available in the motor connection compartment.

2.3 CONNECTORS AND TERMINAL LUGS

- A. Unless otherwise specified, connectors and terminal lugs used on wire sizes 8 AWG or larger shall be of the mechanical or clamp type.
- B. All wires connected to terminal boards, terminal blocks, or to other similar terminals shall terminate by means of pressure vinyl insulated ring terminals equal to Stakon pressure terminal manufactured by the Thomas Betts Company, Inc., Buchanan Electric Products Corporation; or equivalent.

2.4 ACCEPTABLE MANUFACTURERS

- A. Building wire, power and control cable:
 - 1. Subject to compliance with Contract Documents, the following manufacturers are acceptable:
 - a. American Insulated Wire Corporation.
 - b. Carol Cable Company, Inc.
 - c. Rome Cable Corporation.
 - d. Southwire Company.
 - 2. Conform to ICEA/NEMA S-66-524/WC 7 and UL 44 for type XHHW insulation.
 - 3. Conform to ICEA/NEMA S-61-402/WC 5 and UL 83 for type THHN/THWN insulation.
 - 4. UL listed.
 - 5. Surface mark with manufacturers name or trademark, conductor size, insulation type and UL label.
- B. Instrumentation Cable:
 - 1. Subject to compliance with Contract Documents, the following manufacturers are acceptable:
 - a. Alpha Wire Corporation.
 - b. American Insulated Wire Corporation.
 - c. Belden Wire and Cable.
 - d. Carol Cable Company.
 - 2. Conform to UL 444, Communications Cable, NEC type CMP, tinned copper conductors, 100 percent shield coverage. Teflon insulated with Teflon jacket.
 - 3. UL listed.
 - 4. Surface mark with manufacturers name or trademark, conductor size, insulation type and UL label.
- C. Splices and Taps:
 - 1. Subject to compliance with Contract Documents, the following manufacturers are acceptable:
 - a. Burndy Corporation.
 - b. Ideal.
 - c. Penn Union.
 - d. Thomas and Betts.

- D. Pulling Lubricant: Cable manufacturer's standard containing no petroleum or other products which will deteriorate insulation.

PART 3. EXECUTION

3.1 WIRE INSTALLATION

- A. All wiring shall be installed in accordance with the applicable provisions of the National Electrical Code and as indicated on the Contract Drawings. It shall be installed in a manner so as not to damage the insulation.
- B. The Contractor shall install as many wires and conduits as are required and necessary for a complete electrical system and shall provide adequately for the equipment actually to be installed.
- C. All conductors to be contained within a single conduit shall be drawn in at the same time. Only UL approved wire pulling compound shall be used as a lubricant in Contract Drawing conductors through the conduits.
- D. A reasonable amount of slack shall be left in each conductor in panelboards, outlet boxes and other devices to facilitate the making of joints and connections to fixtures and equipment.
- E. Raceways shall be clean and dry before conductors are installed. Should the drag wire or pulling cable indicate that the raceway is not clean or dry, correct the condition before wires are installed.
- F. Nowhere shall power and control wiring be installed in the same conduit.
- G. Install all wiring in raceways unless otherwise indicated on the drawings.
- H. Feeder, branch, control and instrumentation circuits shall not be combined in conduit, wireway, junction or pull boxes; except as permitted in the following:
 - 1. Where specifically indicated on the drawings or field conditions dictate and written permission is obtained from the Engineer.
 - a. Feeder and branch circuits shall be isolated from each other and from all control and instrumentation circuits.
 - b. Control circuits shall be isolated from feeder, branch and instrumentation circuits.
 - 1) Where combining of control circuits is permitted the combinations shall comply with the following:
 - a) 12 VDC, 24 VDC and 48 VDC may utilize a common raceway.
 - 2) 125 VDC shall be isolated from all other AC and DC circuits.
 - 3) AC control circuits shall be isolated from all DC circuits.
- I. Maintain electrical continuity of the shield when splicing twisted shielded conductors.

- J. Make splices and taps only at pull or junction boxes.
 - 1. Crimp or indenter-type connectors: Installation shall be made using a ratchet type compression tool.
 - 2. Insulated conical spring type connectors may be used for wire smaller than #6 AWG.
 - 3. Solderless lugs and screw type connectors may be used for #6 AWG and larger wire.

3.2 WIRE IDENTIFICATION

- A. Number all feeder and branch circuit wires at all terminations and junction points with adhesive numbered labels, attached to wire within six (6) inches of the termination point. The labels shall be in accordance with the approved wiring diagrams. Numbered labels shall have vinyl plastic face with adhesive back as made by T&B, or equivalent.
- B. All control wires shall be identified on each end using the wire numbers from the schematic Contract Documents.
 - 1. Number shall be typed on the heat shrinkable labels with permanent ink. Hand lettered labels are not acceptable. Manufactured by Raychem Corp.
 - 2. Labels shall be installed approximately 1 inch from the termination point and shrunk to a tight fit on the wire with a heat gun.
 - 3. Labels shall be oriented so that they are right side up and readable after the wire is connected to the terminal block.

END OF SECTION 16120

SECTION 16130
ELECTRICAL BOXES

PART 1. GENERAL

1.1 CONTRACT DOCUMENTS

Drawings and General Provisions of this Contract, including General and Supplementary Conditions and General Requirements, apply to work specified in this section.

1.2 DESCRIPTION OF WORK

- A. Extent of electrical box work is indicated on the Contract Drawings.
- B. Types of electrical boxes in this section include the following:
 - 1. Outlet boxes.
 - 2. Junction boxes.
 - 3. Pull boxes.

1.3 QUALITY ASSURANCE

- A. Manufacturers shall be firms regularly engaged in the manufacture of electrical boxes, of types and sizes required, whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Installer shall be qualified with at least three years of successful installation experience on projects with electrical installation work similar to that required for project.
- C. National Electrical Code (NEC) Compliance - Comply with NEC as applicable to construction and installation of electrical wiring boxes.
- D. Underwriters Laboratory (UL) Compliance - Provide electrical boxes which have been UL listed and labeled.

PART 2. PRODUCTS

2.1 OUTLET BOXES

- A. Provide outlet box accessories as required for each installation, including mounting brackets, wallboard hangers, extension rings, fixture studs, cable clamps and metal straps for supporting outlet boxes, which are compatible with outlet boxes for being used and fulfilling requirements of individual wiring situations.
- B. Interior surface mount boxes shall be cast metal outlet wiring boxes, of types, shapes and sizes, including depth of boxes, with threaded conduit ends and cast metal face plates.

- C. Ceiling and wall outlet boxes, which are to support fixtures, shall have short galvanized 3/8-inch fixture studs inserted from back of box. Mounting bolts of outlet boxes shall not be used for the support of fixtures. Adequately support each outlet box containing a fixture study so it is capable of sustaining, without damage, a dead load of at least twice the fixture weight. Where the ceiling construction requires it, anchor each fixture outlet box with an approved bar or stud box hanger.
- D. Weatherproof outlet boxes shall be aluminum cast metal, of types, shapes and sizes, including depth of boxes, with threaded conduit ends and aluminum face plates with spring hinged waterproof caps suitably configured for each application, including face plate gaskets and corrosion resistant fasteners.
- E. Where raceways are exposed, outlet boxes for wiring devices on walls, partitions, or steel framework, shall be Crouse-Hinds, or equivalent, Type FS or FD condulets as required with covers to fit. All outlet boxes that are exposed to weather shall be cast aluminum with gasketed covers.
- F. OUTLET AND DEVICE BOXES
 - 1. Sheet Steel: One-piece drawn type, zinc- or cadmium-plated.
 - 2. Cast Metal:
 - (1) Box: Malleable iron or cast ferrous metal.
 - (2) Cover: Gasketed, weatherproof, malleable iron, or cast ferrous metal with stainless steel screws.
 - (3) Hubs: Threaded.
 - (4) Lugs (Cast Mounting) Manufacturer:
 - (1) Crouse-Hinds; Type FS or FD.
 - (2) Appleton; Type FS or FD.
 - 3. Cast Aluminum:
 - a. Material:
 - (1) Box: Cast, copper-free aluminum.
 - (2) Cover: Gasketed, weatherproof, cast copper-free aluminum with stainless steel screws.
 - (3) Hubs: Threaded.
 - (4) Lugs: Cast mounting.
 - b. Manufacturers:
 - (1) Crouse-Hinds; Type FS-SA or FD-SA.
 - (2) Appleton; Type FS or FD.
 - 4. PVC-Coated Sheet Steel:
 - a. Type: One-piece.
 - b. Material: Zinc- or cadmium-plated.
 - c. Coating: All surfaces; 40-mil PVC.
 - d. Manufacturer: Appleton.

G. JUNCTION AND PULL BOXES

1. Outlet Boxes Used as Junction or Pull Box: As specified under Article OUTLET AND DEVICE BOXES.
2. Large Sheet Steel Box: NEMA 250, Type 1.
 - a. Box: Code-gauge, galvanized steel.
 - b. Cover: Full access, screw type.
 - c. Machine Screws: Corrosion-resistant.
3. Large Cast Metal Box: NEMA 250, Type 4 and 12.
 - a. Box: Cast malleable iron or ferrous metal with drilled and tapped conduit entrances.
 - b. Cover: nonhinged or hinged with screws.
 - c. Hardware and Machine Screws: ASTM A167, Type 316 stainless steel.
 - d. Manufacturers, Surface Mounted Type:
 - (1) Crouse-Hinds; Series W.
 - (2) O.Z./Gedney; Series Y.
 - e. Manufacturers, Recessed Type:
 - (1) Crouse-Hinds; Type WJBF.
 - (2) O.Z./Gedney; Series YR.
4. Large Stainless Steel Box: NEMA 250, Type 4X.
 - a. Box: 14-gauge, ASTM A240, Type 316 stainless steel, with white enamel painted interior mounting panel.
 - b. Cover: Hinged with clamps.
 - c. Hardware and Machine Screws: ASTM A167, Type 316 stainless steel.
 - d. Manufacturers:
 - (1) Hoffman Engineering Co.
 - (2) Robroy Industries.
 - (3) Or Engineer Equivalent.
5. Wireway is not an acceptable substitute for junction or pull boxes.
6. Provide holes in pull and junction boxes to receive entering raceways. There shall be no holes except those used by raceways. Provide a separate section for each wiring system of light, power and low tension in each pull box. Boxes shall not be smaller than the size required by the NEC.

2.3 AREA APPLICATIONS

- A. Submit requests for substitution in accordance with Specification.
- B. Pull and Junction Boxes for General Use Unclassified Areas:

1. Material: 14 GA galvanized steel with seams continuously welded, ground smooth and no knockouts.
 2. Zinc rich coating on all seams.
 3. Stainless steel captivated cover screws threaded into sealed wells.
 4. Flat door with oil resistant gasket.
 5. UL listed.
- C. Pull and Junction Boxes for Wet Areas:
1. Material: 14 GA steel with polyester powder coating inside and out over phosphatized surfaces.
 2. Seams continuously welded, ground smooth, no knockouts.
 3. Stainless steel clamps on four sides.
 4. Flat cover with oil resistant gasket.
 5. NEMA 4 classification.
 6. UL listed.

PART 3. EXECUTION

3.1 INSTALLATION OF ELECTRICAL BOXES

- A. General - Install electrical boxes in compliance with recognized industry practices to ensure that products fulfill requirements.
- B. Wire fill according to NEC.
- C. Coordinate installation of electrical boxes with wire/cable and raceway installation work.
- D. Provide weatherproof outlets for interior and exterior locations exposed to weather or moisture.
- E. Boxes in masonry walls shall be 4" square, deep boxes with raised square cut corners designed for masonry.
- F. In exposed cinder block or masonry, boxes shall be flush with surface of block. Holes cut with masonry saw.
- G. Junction and pull boxes:
 1. Use where necessary.
 2. Relocate at no additional cost if any part is covered by piping or otherwise inaccessible.
 3. Identify system contained in box with indelible waterproof marking pen. Identify covers, screw attached, on both sides.
 4. Where more than one circuit is contained in a box, identify each circuit wire with circuit number.
 5. Make covers of boxes inaccessible.
 6. Install boxes rated for the area classification.
- H. Provide knockout closures to cap unused knockout holes where blanks have been removed.

- I. Install boxes and conduit bodies in those locations to ensure ready accessibility of electrical wiring.
- J. Fasten boxes rigidly to substrates or structural surfaces to which attached, or solidly embed electrical boxes in concrete or masonry.
- K. Provide electrical connections for installed boxes.
- L. Cover outlet boxes that serve as junction boxes with a blank switch plate if it occurs on the wall, and by a round flat galvanized cover if it occurs on the ceiling.
- M. Use locknut and bushing for boxes in non-classified areas.
- N. Use cast metal boxes with threaded conduit hubs in hazardous areas.
- O. Use Type FS And FD boxes in wet areas and where exposed IMC steel conduit is required.
- P. Use epoxy resin coated, stainless steel, cast aluminum or fiberglass boxes for corrosive areas.
- Q. Fill unused punched-out, tapped, or threaded hub openings with insert plugs.
- R. Use outlet boxes sized to accommodate quantity of conductors enclosed.
- S. Use boxes sized to accommodate tying in box.
- T. Install IMC conduit squarely into boxes which do not have hubs or are drilled and tapped. Install with locknut on the outside and bushing on inside.
- U. Install conduit into boxes with hubs, or that are tapped, using thread lubricant.
- V. Do not use back-to-back boxes on this Project.
- W. Seal all points of conduit entry into fiberglass cable pulling enclosures for a waterproof installation.

END OF SECTION 16130

SECTION 16140
WIRING DEVICES

PART 1. GENERAL

1.1 CONTRACT DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this section.
- B. This section is a Division-16 Basic Materials and Methods section and is a part of each Division-16 section making reference to wiring devices specified herein.

1.2 DESCRIPTION OF WORK

- A. The extent of wiring device work is indicated by Contract Drawings and schedules. Wiring devices are defined as single discrete units of electrical distribution systems which are intended to carry but not utilize electrical energy.
- B. Types of electrical wiring devices in this section include the following:
 - 1. Receptacles
 - 2. Switches
 - 3. Wall Plates

1.3 QUALITY ASSURANCE

- A. Manufacturers shall be firms regularly engaged in manufacture of wiring devices, of types, sizes and ratings required, whose products have been in satisfactory use in similar services for not less than 3 years.
- B. Installer shall be qualified with at least 2 years of successful installation experience on projects with electrical installation work similar to that required for project.
- C. National Electrical Code Compliance (NEC) - Comply with NEC as applicable to construction and installation of electrical wiring devices.
- D. Underwriters= Laboratory (UL) Compliance and Labeling - Provide electrical wiring devices which have been UL listed and labeled.
- E. National Electrical Manufacturer=s Association (NEMA) Compliance - Comply with NEMA standards for general and specific purpose wiring devices.

PART 2. PRODUCTS

2.1 GENERAL

Provide factory fabricated wiring devices, in types, colors, and electrical ratings for applications indicated and complying with NEMA Standards Pub. No. WD-1. Where

types and grades are not indicated, provide proper selection as determined by Installer to fulfill wiring requirements and complying with NEC and NEMA standards for wiring devices. Provide brown color devices and stainless steel wall plates except as indicated otherwise. Final color selection shall be verified by the Contractor with the Engineer.

2.2 WIRING DEVICES

A. Switches:

1. NEMA WD 1 and FS W-S-896E.
2. Specification grade, totally-enclosed, ac type, with quiet tumbler switches and screw terminals.
3. Capable of controlling 100 percent tungsten filament and fluorescent lamp loads.
4. Rating: 20 amps, 120/277 volts.
5. Color:
 - a. All Other Areas: Ivory.
6. Manufacturers:
 - a. Bryant.
 - b. Leviton.
 - c. Hubbell.
 - d. Pass and Seymour.

B. Receptacle, Single and Duplex:

1. NEMA WD 1 and FS W-C-596.
2. Specification grade, two-pole, three-wire grounding type with screw type wire terminals suitable for No. 10 AWG.
3. High strength, thermoplastic base color.
4. Color:
 - a. All Other Areas: Ivory.
5. Contact Arrangement: Contact to be made on two sides of each inserted blade without detent.
6. Rating: 125 volts, NEMA WD 1, Configuration 5-20R, 20 amps.
7. Manufacturers:
 - a. Bryant.
 - b. Leviton.
 - c. Hubbell.
 - d. Pass and Seymour.
 - e. Sierra.

C. Receptacle, Ground Fault Interrupter - Duplex

1. Specification grade, tripping at 5 mA.
2. Color:
 - a. All Other Areas: Ivory.
3. Rating: 125 volts, NEMA WD 1, Configuration 5-20R, 20 amps, capable of interrupting 5,000 amps without damage.
 - a. Size: For 2-inch by 4-inch outlet boxes.
 - b. Standard Model: NEMA WD 1, with No. 12 AWG copper USE/RHH/RHW-XLPE insulated pigtails. Provide screw terminals and provisions for testing.
 - c. Feed-Through Model: Not permitted.
4. Manufacturers:

- a. Pass and Seymour.
- b. Bryant.
- c. Leviton.
- d. Hubbell.

2.3 DEVICE PLATES

- A. General: Sectional type plates not permitted.
- B. Plastic:
 - 1. Material: Specification grade, 0.10-inch minimum thickness, noncombustible, thermosetting.
 - 2. Color: To match associated wiring device.
 - 3. Mounting Screw: Oval-head metal, color matched to plate.
- C. Metal:
 - 1. Material: Specification grade, one-piece, 0.040-inch nominal thickness stainless steel.
 - 2. Finish: ASTM A167, Type 302/304, satin.
 - 3. Mounting Screw: Oval-head, finish matched to plate.
- D. Cast Metal:
 - 1. Material:
 - a. Malleable ferrous metal with gaskets.
 - b. Copper-free aluminum with gaskets.
 - 2. Screw: Oval-head stainless steel.
- E. Engraved:
 - 1. Character Height: 3/16-inch.
 - 2. Filler: white (plastic), black (metal).
- F. Weatherproof:
 - 1. For Receptacles: Gasketed, cast metal or stainless steel, with individual cap over each receptacle opening.
 - a. Mounting Screw: Stainless steel.
 - b. Cap Spring: Stainless steel.
 - c. Manufacturers:
 - 1. General Electric.
 - 2. Bryant.
 - 3. Hubbell.
 - 4. Sierra.
 - 5. Pass and Seymour.
 - 6. Crouse-Hinds; Type WLRD or WLRS.
 - 7. Bell.
 - 2. For Switches: Gasketed, cast metal incorporating external operator for internal switch.
 - a. Mounting Screw: Stainless steel.
 - b. Manufacturers:
 - 1. Crouse-Hinds; DS-181 or DS-185.
 - 2. Appleton; FSK-1VTS or FSK-1VS.

- G. Raised Sheet Metal: 2-inch high zinc- or cadmium-plated steel designed for one-piece drawn type sheet steel boxes.

PART 3. EXECUTION

3.1 INSTALLATION OF WIRING DEVICES

- A. Install wiring devices as indicated, in compliance with NEMA's ^AStandard of Installation[®], and in accordance with recognized industry practices to fulfill project requirements.
- B. Coordinate with other work, including painting, electrical box and wiring work, as necessary to interface installation of wiring devices with other work.
- C. Install wiring devices only in electrical boxes which are clean, free from excess building materials, dirt and debris.
- D. Install switches on knob side of door 4 feet, 0 inch above floor.
- E. Install outside receptacles 24 inches above finished grade.
- F. Delay installation of wiring devices until wiring work is completed.
- G. Delay installation of wall plates until after painting work is completed.

3.2 GROUNDING

Provide electronically continuous, tight grounding connections for wiring devices, unless otherwise indicated.

3.3 TESTING

Prior to energizing circuitry, test wiring devices for electrical continuity and proper polarity connections. After energizing circuitry, test wiring devices to continue to demonstrate compliance with requirements.

END OF SECTION 16140

SECTION 16170
CIRCUIT DISCONNECTS

PART 1. GENERAL

1.1 CONTRACT DOCUMENTS

- A. The General Requirements - Section D-O and Standard Contract Provisions - Section F apply to work specified in this section.
- B. This section is a division 16 Basic Materials and methods sections and is a part of each Division 16 section making reference to circuit and motor disconnects specified herein.

1.2 DESCRIPTION OF WORK

- A. Extent of circuit disconnect work is indicated by the Contract Drawings and schedules.
- B. Types of circuit disconnects in this section include the following:
 - 1. Equipment disconnects

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. Section 01300 - SUBMITTALS
- B. DIVISION 16 - ELECTRICAL

1.4 QUALITY ASSURANCE

- A. Manufacturers shall be firms regularly engaged in manufacture of circuit and motor disconnects of types, ratings and characteristics required, whose products have been in satisfactory use in similar service for not less than five years.
- B. Installer shall be qualified with at least three years of successful installation experience on projects with electrical work similar to that required for this project.
- C. National Electrical Code Compliance (NEC) - Comply with NEC as applicable to wiring methods, construction and installation of circuit and motor disconnects.
- D. Underwriters' Laboratory (UL) Compliance and Labeling - Provide units which have been UL listed and labeled.
- E. National Electrical Manufacturer's Association (NEMA) Compliance - Comply with applicable portions of NEMA Standards pertaining to circuit and motor disconnects.

PART 2. PRODUCTS

2.1 NONFUSED SWITCH, INDIVIDUAL, 0 TO 600 VOLTS

- A. NEMA KS 1.
- B. Quick-make, quick-break, motor rated, load-break, heavy-duty (HD) type with external markings clearly indicating ON/OFF positions.
- C. Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.
- D. Enclosure: NEMA 250, Type 12 (Industrial Use), 3R (Outdoor Use), 4X (Corrosive), unless otherwise shown.
- E. Interlock: Enclosure and switch to prevent opening cover with switch in the ON position.
- F. Manufacturers:
 - 1. Cutler-Hammer.
 - 2. General Electric.
 - 3. Siemens.
 - 4. Square D.

2.2 FUSIBLE DISCONNECTS

- A. Disconnects shall be heavy duty type with current carrying parts constructed of high conductivity copper with silver tungsten type switch contacts. They shall be rated at 600 volts unless specified otherwise.
- B. Fuse clips shall be positive pressure type, reinforced.
- C. Disconnects shall have visible knife-type blades incorporating quick-break operating mechanism with an external operating handle which is an integral part of the box. Handle shall clearly indicate the ON-OFF position of the switch. It shall have a defeatable door interlock which prevents opening the switch cover when the handle is in the ON position. The handle shall be padlockable in the OFF position.
- D. Disconnect shall be of the 3-blade, 4-pole, 1 solid neutral construction. Enclosure shall be NEMA 12 for interior installations and NEMA 4 stainless steel for exterior installations unless specified otherwise.
- E. Manufacturers:
 - 1. Allen-Bradley
 - 2. General Electric
 - 3. Square D Company
 - 4. Cutler-Hammer/Westinghouse

2.3 FUSE, 0 TO 600 VOLTS

- A. Current-limiting, with 200,000 ampere rms interrupting rating.
- B. Provide to fit mountings specified with switches and features to reject Class H fuses.
- C. Motor and Transformer Circuits, 0- to 600-Volt:
 - 1. Amperage: 0 to 600.
 - 2. UL 198E, Class RK-1, dual element, with time delay.
 - 3. Manufacturers:
 - a. Bussmann; Type LPS-RK.
 - b. Littelfuse; Type LLS-RK.
- D. Motor and Transformer Circuits, 0- to 250-Volt:
 - 1. Amperage: 0 to 600.
 - 2. UL 198E, Class RK-1, dual element, with time delay.
 - 3. Manufacturers:
 - a. Bussmann; Type LPN-RK.
 - b. Littelfuse; Type LLN-RK.
- E. Feeder and Service Circuits, 0- to 600-Volt:
 - 1. Amperage: 0 to 600.
 - 2. UL 198E, Class RK-1, dual element, with time delay.
 - 3. Manufacturers:
 - a. Bussmann; Type LPS-RK.
 - b. Littelfuse; Type LLS-RK.
- F. Feeder and Service Circuits, 0- to 250-Volt:
 - 1. Amperage: 0 to 600.
 - 2. UL 198E, Class RK-1, dual element, with time delay.
 - 3. Manufacturers:
 - a. Bussmann; Type LPN-RK.
 - b. Littelfuse; Type LLN-RK.

PART 3. EXECUTION

3.1 INSTALLATION OF DISCONNECTS

- A. Install circuit disconnect switches as indicated, complying with manufacturers' written instructions, applicable requirements of NEC, NEMA Standards, and in accordance with recognized industry practices to ensure that products fulfill requirements.

- B. Coordinate circuit disconnect switch installation work with electrical raceway and cable work, as necessary for proper interface.
- C. Install fuses in fusible disconnects. Fuse size and type shall be as recommended by supplier of equipment which fuse is protecting.

END OF SECTION 16170

SECTION 16470
PANELBOARDS

PART 1. GENERAL

1.1 CONTRACT DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the work specified in this section.
- B. This section is a Division 16 Basic Materials and Methods section and is a part of each Division 16 section making reference to panelboards specified herein.

1.2 DESCRIPTION OF WORK

- A. Extent of panelboards, load-center, and enclosure work, including cabinets and cutout boxes is indicated by drawings and schedules. Panelboards that are installed in chases where fire rating must be maintained, shall either be of a type to maintain the fire rating of the chase, or be enclosed so that the fire rating of the chase is not compromised by the installation of the panelboard.
- B. Types of panelboards and enclosures in this section include the following:
 - 1. Lighting and Power Distribution panelboards.

1.3 RELATED WORK SPECIFIED ELSEWHERE

Refer to other Division 16 sections for cable/wire, connectors and electrical raceway work required in conjunction with panelboards and enclosures, not work of this section.

1.4 QUALITY ASSURANCE

- A. Manufacturers shall be firms regularly engaged in manufacture of panelboards and enclosures, of types, sizes and ratings required, whose products have been in satisfactory use in similar service for not less than 5 years.
- B. Installer shall be qualified with at least 3 years of successful installation experience on projects with electrical installation work similar to that required for project.
- C. Underwriters= Laboratory (UL) Compliance and Labeling - Comply with applicable UL safety standards pertaining to panelboards and accessories, and enclosures, provide units which have been UL listed and labeled.
- D. National Electrical Code Compliance (NEC) - Comply with NEC as applicable to installation of panelboards, cabinets, and cutout boxes. Comply with NEC articles pertaining to installation of wiring and equipment in hazardous locations.
- E. National Electrical Manufacturer's Association (NEMA) Compliance - Comply with NEMA Standards, Publication No. 250, AEnclosures for Electrical Equipment

(1000 bolt maximum)@, Publication No. 1, Panelboards and installation portion of Publication No. PB 1.1, AInstructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.

PART 2. PRODUCTS

2.1 GENERAL

Except as otherwise indicated, provide panelboards, enclosures and ancillary components, of types, sizes and ratings indicated, which comply with manufacturer's standard materials, design and construction in accordance with published product information, equip with number of unit panelboard devices as required for complete installation. Where types, sizes, or ratings are not indicated, comply with NEC, UL and established industry standards for applications indicated.

2.2 LIGHTING AND POWER DISTRIBUTION PANELBOARD

- A. NEMA PB 1, NFPA 70, and UL 67.
- B. Panelboards and Circuit Breakers: Suitable for use with 75 degrees C wire at full NFPA 70, 75 degrees C ampacity.
- C. Short-Circuit Current Equipment Rating: Fully rated; series connected unacceptable.
- D. Rating: Applicable to a system with available short-circuit current of the indicated value rms symmetrical amps, volts as indicated on drawings.
- E. Material: Code-gauge, hot-dip galvanized sheet steel, with reinforced steel frame.
- F. Wiring Gutter: Minimum 4-inch square; both sides, top and bottom.
 - 1. Front: Fastened with adjustable clamps.
 - a. Trim Size:
 - (1) Surface Mounted: Same as box.
 - (2) Flush Mounted: : -inch larger than box on all sides.
 - b. Finish: Rust inhibitor prime, with manufacturer's standard baked enamel or lacquer.
 - 2. Interior:
 - a. Factory assembled, complete with circuit breakers.
 - b. Capable of circuit breaker replacement without disturbing adjacent circuit breakers or without removing main bus.
 - c. Spaces: Cover openings with easily removable metal cover.
 - 3. Door Hinges: Concealed.
 - 4. Locking Device:
 - a. Flush type.
 - b. Doors Over 30 Inches in Height: Multipoint.
 - c. Identical keylocks, with two milled keys each lock.
 - 5. Circuit Directory: Metal frame with transparent plastic face and enclosed

card on interior of door.

G. Bus Bar:

1. Material: Tin-plated copper full sized throughout length.
2. Provide for mounting of future circuit breakers along full length of bus regardless of number of units and spaces shown. Machine, drill, and tap as required for current and future positions.
3. Neutral: Insulated, rated same as phase bus bars with at least one terminal screw for each branch circuit.
4. Ground: Copper, installed on panelboard frame, bonded to box with at least one terminal screw for each circuit.
5. Lugs and Connection Points:
 - a. Suitable for either copper or aluminum conductors.
 - b. Solderless main lugs for main, neutral, and ground bus bars.
 - c. Subfeed or through-feed lugs as shown.
6. Bolt together and rigidly support bus bars and connection straps on molded insulators.

I. Circuit Breakers:

1. NEMA AB 1 and UL 489.
2. Thermal-magnetic, quick-make, quick-break, trip free, molded case, of the indicating type showing ON/OFF and TRIPPED positions of operating handle.
3. Noninterchangeable, in accordance with NFPA 70.
4. Locking: Provisions for handle padlocking, unless otherwise shown.
5. Type: Bolt-on circuit breakers in all panelboards.
6. Multipole circuit breakers designed to automatically open all poles when an overload occurs on one pole.
7. Do not substitute single-pole circuit breakers with handle ties for multipole breakers.
8. Do not use tandem or dual circuit breakers in normal single-pole spaces.
9. Ground Fault Interrupter:
 - a. Equip with conventional thermal-magnetic trip and ground fault sensor rated to trip in 0.025 second for a 5-milliampere ground fault (UL 943, Class A sensitivity).
 - b. Sensor with same rating as circuit breaker and a push-to-test button.
10. Provide Main Circuit Breakers that are intended for use as such and with bracing kit where applicable.

J. Subfeed Lugs

1. All panelboards provided shall be capable of being field modified with subfeed lugs should the need arise to add additional loads and or subfeed panels to the original design intent.

K. Manufacturers:

1. Square D.
2. Cutler-Hammer.

- 3. General Electric
- 4. Approved Equivalent

2.3 ACCESSORIES

Provide panelboard accessories and devices, including, but not necessarily limited to, cartridge and plug time delay type fuses, circuit breakers, ground fault protection units, etc., as recommended by panelboard manufacturer for ratings and applications indicated.

PART 3. EXECUTION

3.1 INSTALLATION OF PANELBOARDS

- A. Install panelboards and enclosures where indicated, in accordance with manufacturer's written instructions, applicable requirements of NEC and in compliance with recognized industry practices to ensure that products fulfill requirements.
- B. Insure that, if applicable, fire rating of area in which panelboard is installed is not compromised by panelboard installation. Provide all necessary fire-safing per Specification Section 07841.
- C. Coordinate installation of panelboards and enclosures with cable and raceway installation work.
- D. Anchor enclosures firmly to walls and structural surfaces, ensuring that they are permanently and mechanically secure.
- E. Provide electrical connections within enclosures. Wiring inside panelboards shall be bundled and tied in a neat orderly manner.
- F. Each panelboard shall have an identification label on the front cover indicating the voltage, phase and identification designation.
- G. Provide typewritten panelboard's circuit directory card upon completion of installation work.

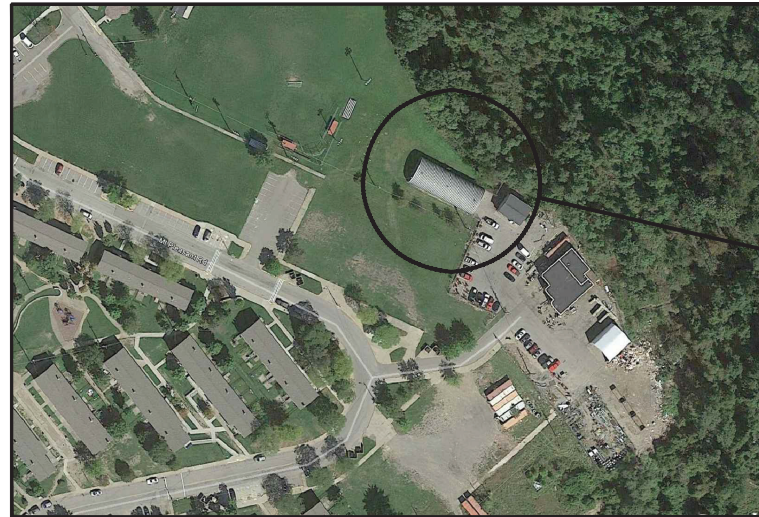
END OF SECTION 16470

HOUSING AUTHORITY of the CITY of PITTSBURGH

DEVELOPMENT AND MODERNIZATION DEPARTMENT
100 ROSS STREET, 2ND FLOOR
PITTSBURGH, PENNSYLVANIA 15219

HACP MANAGEMENT # 7381
TASK ORDER #38
REBUILDING
OF THE
QUONSET HUT
NORTHVIEW HIGHRISE FACILITY
SERVICES SITE

FEBRUARY 1, 2017



NORTHVIEW
HEIGHTS
QUONSET HUT

LOCATION MAP
100 0 100 200
SCALE IN FEET

DRAWING INDEX

DRAWING NO.	DESCRIPTION
CS	COVERSHEET
A-01	ARCHITECTURAL - REPAIR WORK FLOOR PLAN, DETAILS AND PICTURES
A-02	ARCHITECTURAL - REPAIR WORK ELEVATIONS AND DETAILS
A-03	ARCHITECTURAL - REPAIR WORK FLOOR PLAN AND DETAILS
H-01	HVAC - HVAC NOTES, SYMBOLS, LEGENDS, DETAILS AND SCHEDULES
H-02	HVAC - PLAN AND NOTES
E-01	ELECTRICAL - GENERAL NOTES, LEGEND, ABBREVIATIONS, DETAILS, BUILDING CODE, LIGHT FIXTURE SCHEDULE AND SITE PLAN
E-02	ELECTRICAL - NEW WORK FLOOR PLAN AND SECTIONS
E-03	ELECTRICAL - PICTURES, DETAILS AND PANELBOARD SCHEDULE

PROJECT TEAM:



D & D ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
Elmo Technical Center, Suite 102, 412-781-1550
35 Wilson Street, 412-781-1551
Pittsburgh, PA 15223, info@ddengr.com



Tusick & Associates Architects, Inc.
21 WINDSOR ROAD, voice: 412-781-8896
PITTSBURGH, PA 15215, fax: 412-781-6947
info@tusickarchitects.com



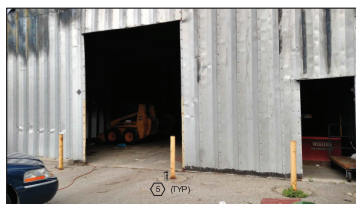
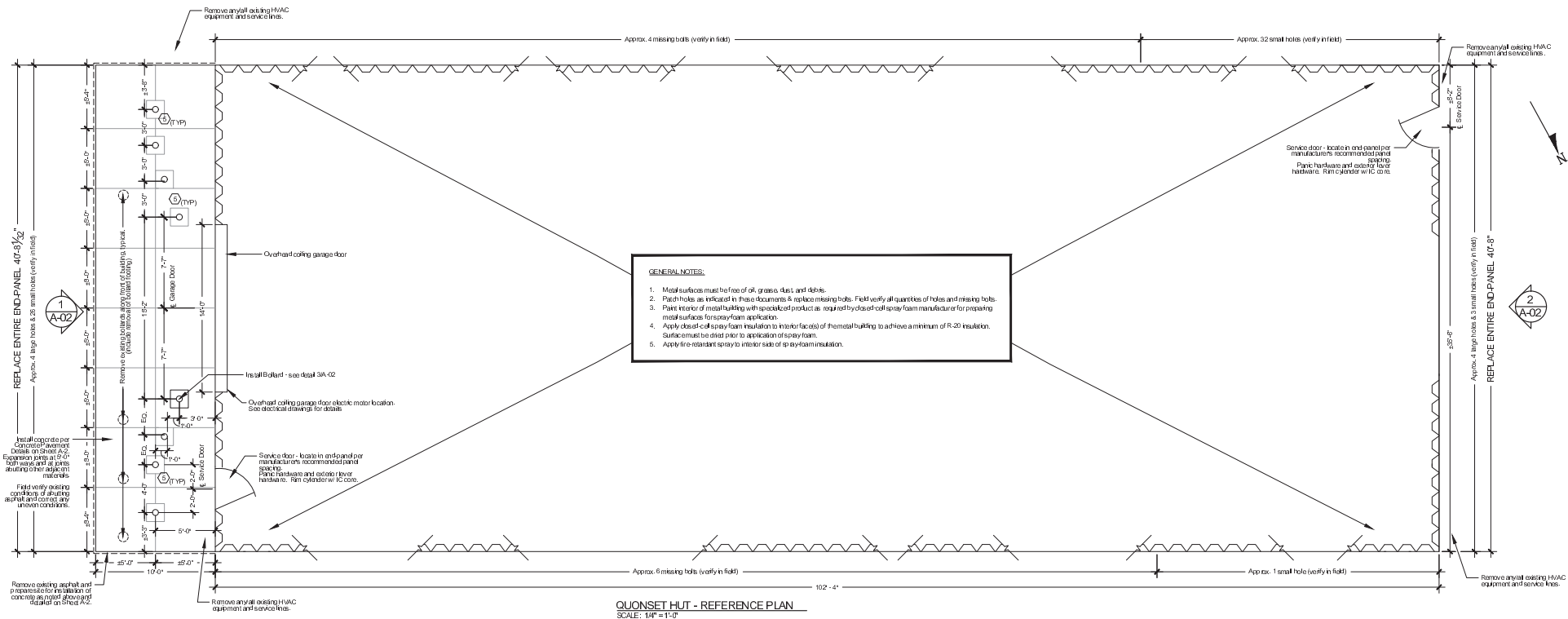
OLANDER Engineering, Inc.
227 E. Main Street, Phone: (412) 279-1810
Carnegie, Pa 15106, Fax: (412) 279-1805
e-mail: joland@olanderengr.com



DRAWING NUMBER

CS

SHEET NUMBER
1 OF 9



EXISTING MAIN FRONT ROLL-UP AND PERSON DOOR

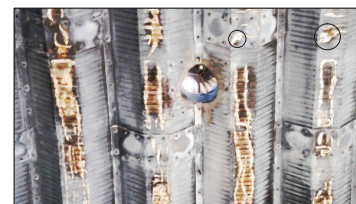
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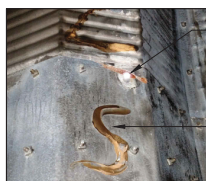
INTERIOR HOLES IN - STRUCTURAL PANELS

SCALE: NONE



REAR WALL

SCALE: NONE



BOLT HOLES & METAL PROFILE W/ OLD MASTIC

SCALE: NONE

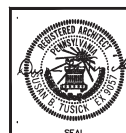
KEYED NOTES:

1. EXISTING SERVICE ENTRANCE AND PANEL TO BE DEMOLISHED AND REPLACED. SEE DRAWING E-03 FOR NEW PANELBOARD SCHEDULE.
2. ALL HOLES MISSING FASTENERS, OR OTHERS ARE TO BE COMPLETELY SEALED AND MADE WEATHER TIGHT.
3. LARGER HOLES MULTIPLE INCHES IN DIAMETER IN END PANELS. END PANELS SHALL BE REPLACED IN ENTIRETY AND SHOP DRAWINGS SHALL BE ISSUED BY MANUFACTURER TO DESIGN TEAM FOR REVIEW.
4. EXISTING FRONT ROLL-UP DOOR TO BE REPLACED WITH NEW 14-FOOT WIDE DOOR. ALL MODIFICATIONS TO EXISTING OPENING TO BE MADE TO MAINTAIN INTEGRITY OF STRUCTURE.
5. EXISTING BOLLARDS TO BE REMOVED AND REPLACED ONCE NEW DOOR IS INSTALLED. ADDITIONAL BOLLARDS TO BE INSTALLED AS INDICATED ALONG ENTIRE FRONT OF BUILDING.

Building Code Summary

International Existing Building Code 2009
International Building Code 2009
International Electrical Code 2009
International Energy Conservation Code 2009

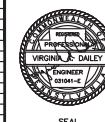
Existing (1-story) Single-use Building Type: VB
Occupancy Type(s): S-1
Non-Sprinkled
Building Square Footage: 4,000 s.f.



**Tusick & Associates
Architects, Inc.**
21 WINDSOR ROAD
PITTSBURGH, PA 15215
voice: 412-781-8896
fax: 412-781-8947
email: info@tusickarchitects.com

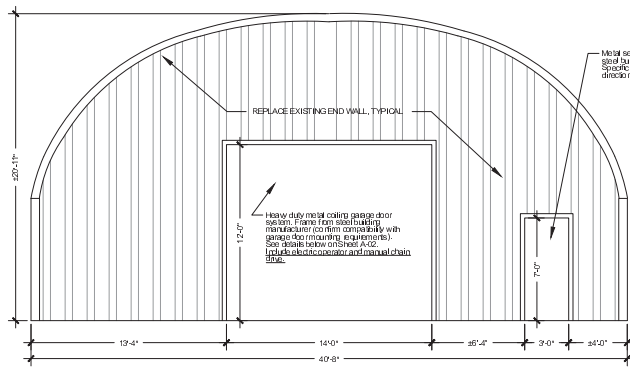


D & D ENGINEERING, INC.
CONSULTING ELECTRICAL ENGINEERS
Elmo Technical Center - Suite 102
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E-Mail: info@dengr.com • Web: www.dengr.com



PROJECT REBUILDING OF THE QUONSET HUT NORTHVIEW HEIGHTS FACILITY SERVICES SITE			
DRAWING TITLE ARCHITECTURAL REPAIR WORK FLOOR PLAN, DETAILS, & PICTURES			
DRAWN BY DACHose	CHECKED BY VAD	DATE 2/7/2017	SCALE AS SHOWN
PROJECT NO. 16008		DRAWING NO. 2 OF 9	

A-01

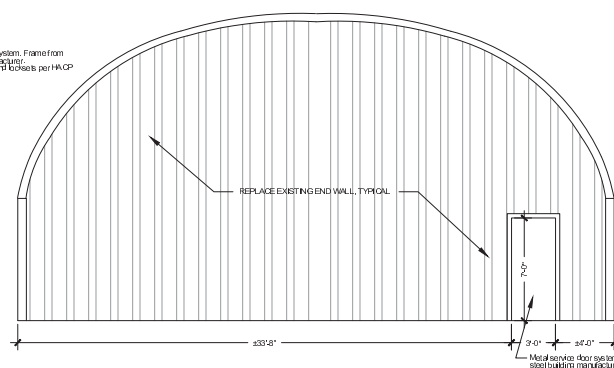


FRONT END-WALL - EXTERIOR

SCALE: 1/4"=1'-0"

(FIELD VERIFY DIMENSIONS)

1
A-02

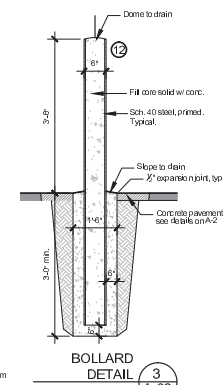


REAR END-WALL - EXTERIOR

SCALE: 1/4"=1'-0"

(FIELD VERIFY DIMENSIONS)

2
A-02

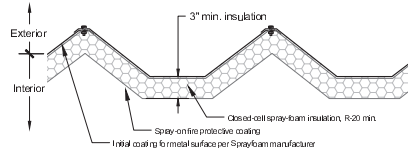


BOLLARD DETAIL

SCALE: 3/4"=1'-0"

3
A-02

- GENERAL NOTES:**
- Closed-Cell Spray Foam product: CertainTeed CertaSpray Closed Cell Foam, or approved equal (approved by Architect BEFORE bids are submitted) Call 412-781-8896.
 - Initial pre-coating for metal surfaces as per CertainTeed CertaSpray product, or equal, requirements.
 - Fire protective coating (applied to all foam surfaces) to achieve a 15-minute fire-rated barrier, minimum. Product as recommended and approved for closed cell foam product manufacturer.

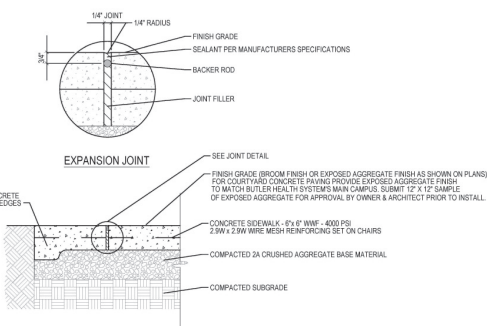


METAL SIDING INSULATION

SCALE: 1 1/2"=1'-0"

(FIELD VERIFY DIMENSIONS)

4
A-02



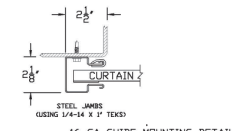
EXPANSION JOINT

NOTES:
1. SCORE LINES TO BE 1/8" W x 1" D.
2. EXPANSION JOINT PATTERN AS APPROVED BY ARCHITECT.

CONCRETE PAVEMENT	CONC. WALK	DRIVEWAY
CONCRETE THICKNESS	6"	6"
CRUSHED COMPACTED AGGREGATE BASE MATERIAL	6"	6"

CONCRETE PAVEMENT

NOT TO SCALE



16 GA GUIDE MOUNTING DETAIL

NOTES:

- OPERATION TYPE MAY BE PUSH-UP, HAND CHAIN OR ELECTRIC.
- CLEARANCES SHOWN ARE MINIMUM. LESSER CLEARANCES MAY BE POSSIBLE.
- UNLESS OTHERWISE NOTED, BOLTS SHALL BE PROVIDED WITH SLIDE LOCKS AT EACH END OF BOTTOM BAR, ENGAGING GUIDES IN THE LOCKED POSITION.
- ALL SPRING PREPARATION, ELECTRICAL POWER AND FIELD PAINTING SHALL BE PROVIDED BY OTHERS.
- SEWER SAGE IS AN INSULATED SERIES SAGE.
- CURTAIN FINISH SHALL BE SILICONE POLYESTER PRE-PAINT OVER GALVANIZED GRADE 60 STEEL.
- GUIDE, BRACKET, BOTTOM BAR ANGLE AND HEAD STOPS ARE ZINC COATED.
- VISION PANELS ARE AVAILABLE.

BRACKET ATTACHMENT:

CONCRETE/MASSIVE POWERS VERGE-BOLT, 3/8" X 3-3/4" LONG

FOR HAND CHAIN OPERATION: 4-1/4"

FOR ELECTRIC OPERATION: 4-1/4"

FOR ELECTRIC OPERATION: 3-3/4"

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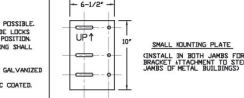
FOR ELECTRIC OPERATION: 3-3/4"

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FOR ELECTRIC OPERATION: 3-3/4"

FOR ELECTRIC OPERATION: 3-3/4"



SMALL MOUNTING PLATE

INSTALL IN BOTH JAMBS FOR BRACKET ATTACHMENT TO STEEL JAMBS OF MET. BOLLARD

FOR PUSH-UP OPERATION: 4-1/4"

FOR ELECTRIC OPERATION: 4-1/4"

FOR ELECTRIC OPERATION: 3-3/4"

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FOR ELECTRIC OPERATION: 3-3/4"

GENERAL NOTES:

- NO LOADS OTHER THAN THOSE GIVEN UNDER "DESIGN DATA" BELOW BE IMPOSED ON THE "STRUCTURE".
- THE FOUNDATION SHALL BE TOUNDED ON NATURAL UNDISTURBED SOIL CAPABLE OF SAFELY SUSTAINING 2000 PSF, AND AT LEAST 12 IN. BELOW FINISHED GRADE.
- SLAB ON GRADE SHALL BE PLACED ON SOIL CAPABLE OF SUSTAINING 500 PSF, WITHOUT APPROPRIATE SETTLEMENT.
- BUILDING MUST BE GROUTED INTO TROUGH, INSIDE AND OUT TO MAINTAIN STRUCTURAL INTEGRITY EXCEPT WHEN USING WELDED BASE PLATE CONNECTORS.
- CROSS TIES MUST BE INCASED IN CONCRETE WHEN CONCRETE SLAB IS NOT USED.

ARCH DATA:

DESIGN DATA:

STEEL GAGE: 18/20

50 KSI MIN. YIELD

GALVALUME SHEET STEEL

LIVE LOAD: 21 PSF

BASIC WIND SPEED: 80 MPH

3 SECOND GUST WIND SPEED: 100 MPH

MATERIALS:

1. CONCRETE STRENGTH AT 28 DAYS TO BE 2500 PSI

2. REINFORCING STEEL TO BE DEFORMED BARS, GRADE 60

3. ALL MATERIALS SHALL CONFORM TO THE APPROPRIATE ASTM SPECIFICATIONS.

ORIGINAL MFR. NOTES

SCALE: 1"=1'-0"

(ORIGINAL MANUFACTURER: AMERICAN STEEL SPAN)

(www.AmericanSteelSpan.com • 800-457-2208)

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A-02

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A-02

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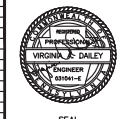
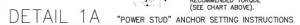
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FIRE EXTINGUISHER
MOUNTING DETAIL

SCALE: NOT TO SCALE

B
A-03



GENERAL NOTES:

- THE MECHANICAL DRAWINGS ARE DIAGRAMMATIC AND ARE NOT INTENDED TO SHOW EXACT LOCATION OF EQUIPMENT, PIPING, DUCTWORK AND OTHER DEVICES UNLESS DIMENSIONS ARE GIVEN OR OTHERWISE IMPLIED. CONTRACTOR SHALL CONFORM TO ACTUAL BUILDING CONDITIONS.
- TRANSITIONS, OFFSETS, DROPS, ETC. SHALL BE PROVIDED AS REQUIRED FOR DUCTWORK AND PIPING, WHETHER SHOWN OR NOT ON PLANS. THE CONTRACTOR SHALL FULLY COORDINATE THE MECHANICAL WORK WITH ITSELF AND WITH THE WORK OF ALL OTHER TRADES TO PROVIDE COMPLETE AND OPERABLE SYSTEMS WITHOUT INTERFERENCES.
- PROVIDE ACCESS PANELS/DOORS WHERE REQUIRED FOR ADEQUATE ACCESS TO ALL CONCEALED EQUIPMENT, VALVES, DAMPERS AND CONTROLS, WHETHER SHOWN OR NOT ON DRAWINGS.
- INSTALL DUCTWORK AND PIPING TIGHT TO UNDERSIDE OF STRUCTURE UNLESS OTHERWISE INDICATED.
- ALL WORK SHALL BE PERFORMED IN AN ORDERLY MANNER WITHOUT DAMAGE TO EXISTING SYSTEMS/STRUCTURES.
- AS AN INTEGRAL PART OF THESE DOCUMENTS, THE CONTRACTOR SHALL REFER TO THE SPECIFICATIONS FOR ADDITIONAL INFORMATION.
- SYSTEMS SHALL BE DESIGNED AND INSTALLED FOR EFFICIENT UTILIZATION OF ENERGY IN ACCORDANCE WITH THE INTERNATIONAL ENERGY CONSERVATION CODE (IECC).
- PIPING SHALL NOT BE INSTALLED ABOVE ELECTRICAL PANELS.
- ALL PIPING DISCONNECTED AND INTENDED FOR REUSE SHALL BE TEMPORARILY CAPPED UNTIL NEW CONNECTIONS ARE COMPLETED.
- CONTRACTOR SHALL REFER TO FLOW DIAGRAMS, DETAILS, PLANS AND SPECIFICATIONS FOR ALL MECHANICAL SYSTEM CONNECTIONS.
- SLEEVES SHALL BE INSTALLED AT ALL WALL AND FLOOR PENETRATIONS FOR PIPING AND DUCTWORK, WHETHER SHOWN ON DRAWINGS OR NOT.
- PATCH AND SEAL ALL OPENINGS IN FLOORS, WALLS AND ROOF RESULTING FROM DEMOLITION OR NEW WORK WITH MATERIALS AND FINISHES TO MATCH EXISTING.
- CONTRACTOR SHALL VISIT THE SITE AND VERIFY EXISTING CONDITIONS PRIOR TO THE BEGINNING OF ANY WORK. FAILURE TO VISIT THE SITE SHALL IN NO WAY RELIEVE THE CONTRACTOR FROM ANY RESPONSIBILITY.
- ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH APPLICABLE CODES AND REGULATIONS.
- CONTRACTOR SHALL USE CARE WHEN PERFORMING SELECTIVE DEMOLITION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DAMAGE TO BUILDING FINISHES, EQUIPMENT, STRUCTURE, AND MEP SYSTEMS AND EQUIPMENT. SHOULD ANY DAMAGE OCCUR, THE CONTRACTOR SHALL RESTORE ITEMS AREA TO ITS ORIGINAL CONDITION.
- CONTRACTOR SHALL NOTIFY AND COORDINATE WITH THE OWNER ANY UTILITY OUTAGES.

GENERAL SYMBOLS

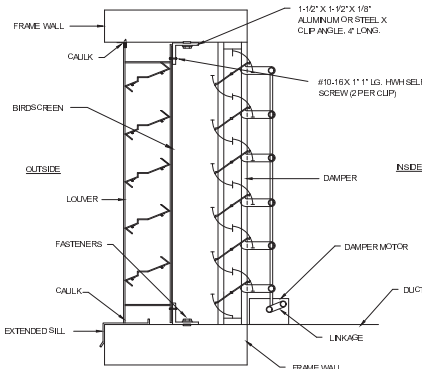
	DETAIL NUMBER SHEET LOCATION
	EQUIPMENT TAG FOR SCHEDULES
	NEW TO EXISTING CONNECTION
	SPECIFIC DRAWING NUMBERED NOTE
	THERMOSTAT
	WALL SWITCH

PIPING SYMBOLS:

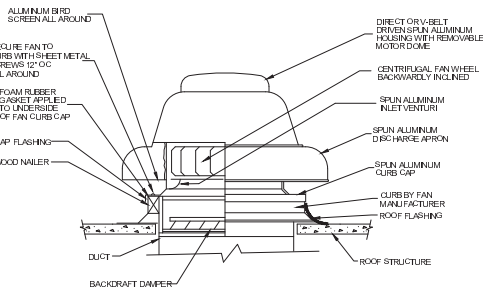
	PLUS VALVE
	CAPPED LINE
	ELBOW TURNING DOWN
	ELBOW TURNING UP
	45° OR 90° BOTTOM CONNECTION
	45° OR 90° TOP CONNECTION
	PIPE BREAK

ABBREVIATIONS:

CFM	CUBIC FEET PER MINUTE
DB	DRY BULB
EAT	ENTERING AIR TEMPERATURE
EF	EXHAUST FAN EFFICIENCY
EX SP	EXTERNAL STATIC PRESSURE
HPM	FEET PER MINUTE
HP	HORSEPOWER
IN WC	INCHES OF WATER COLUMN
IR	INFRARED HEATER
KW	KILOWATT
L	LOUVER
LAT	LEAVING AIR TEMPERATURE
MBH	1000 BTU/H
MCA	MAXIMUM CIRCUIT AMPACITY
MOCP	MAX. OVERCURRENT PROTECTION
OA	OUTSIDE AIR
REF	REFRIGERANT
RPM	REVOLUTIONS PER MINUTE
RTU	ROOFTOP UNIT
SEN	SENSIBLE
SD	SMOKE DETECTOR
TYP	TYPICAL
WB	WET BULB



1. THE LOUVER/DAMPER INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS FOR METAL BUILDINGS.



1. THE ROOF EXHAUST FAN INSTALLATION SHALL BE IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS FOR METAL BUILDINGS.



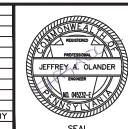
Olander Engineering, Inc.
22 E. Main Street • Carnegie, PA 15106
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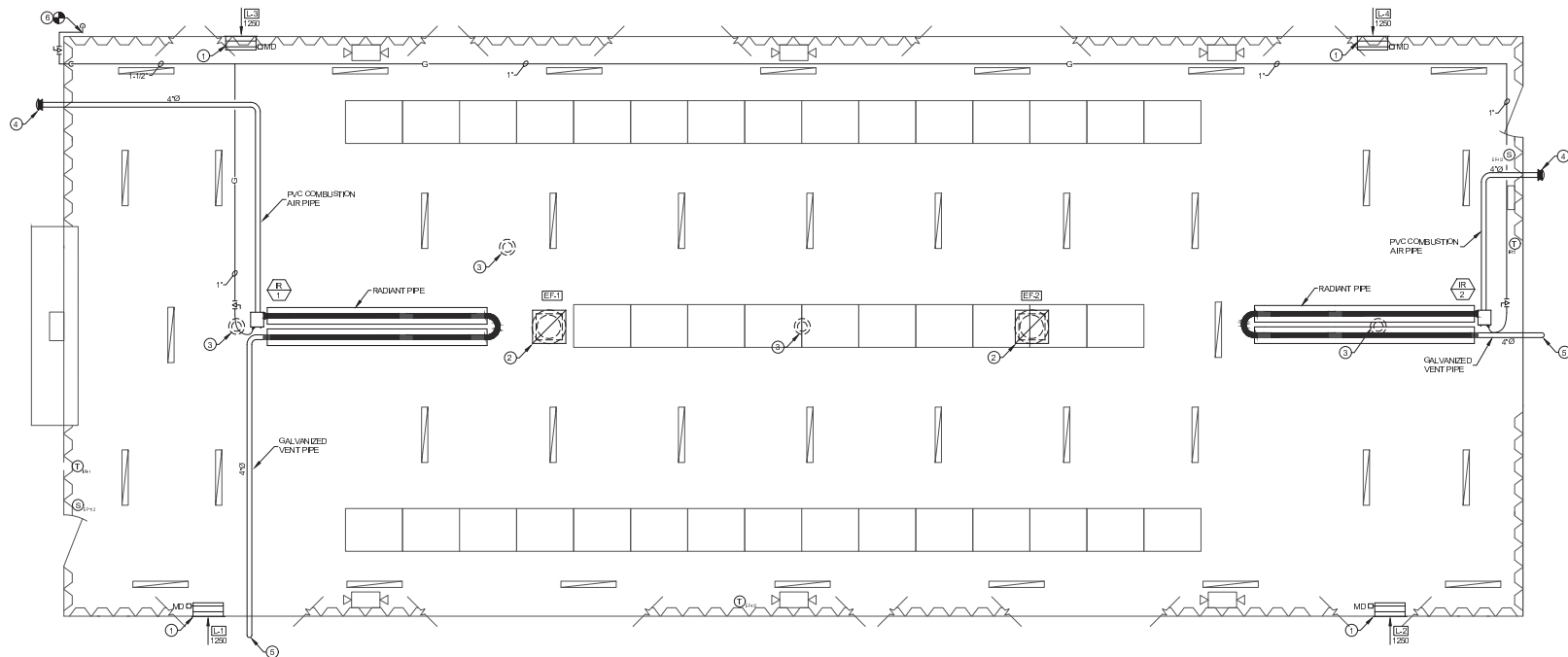
PROJECT
REBUILDING OF THE QUONSET HUT
NORTHVIEW HIGHRISE
FACILITY SERVICES SITE

DRAWING TITLE
HVAC NOTES, SYMBOLS, LEGENDS,
DETAILS AND SCHEDULES

DRAWN BY: JAO CHECKED BY: JAO DATE: 2/01/2017 SCALE: AS SHOWN PROJECT NO: 16008

H-01

5 OF 9



1 HVAC PLAN
H-02 SCALE: 1/4"=1'-0"

NEW WORK CODED NOTES:

- ① INSTALL NEW LOUVER W/ MOTORIZED DAMPER IN WALL ACCORDING TO MANUFACTURERS INSTRUCTIONS FOR METAL BUILDINGS. PROVIDE WALL OPENING TO ACCOMMODATE NEW EQUIPMENT, MIN. 18" ABOVE GRADE.
- ② INSTALL NEW EXHAUST FAN ON ROOF ON CURB, ACCORDING TO MANUFACTURERS INSTRUCTIONS FOR METAL BUILDINGS WITH BACKDRAFT DAMPER. TRANSITION FROM FAN CONNECTION DOWN THRU ROOF AND TRANSITION TO 38/28 HIGH TO CEILING WITH SCREEN ON OPEN END. FIELD VERIFY FAN LOCATION AND ROOF OPENING PRIOR TO INSTALLATION.
- ③ REMOVE VENT ON ROOF IN ITS ENTIRETY AND SEAL ROOF AIRWATER TIGHT WITH LIKE MATERIALS. REFER TO ARCHITECTURAL DRAWINGS FOR SEALING INFORMATION.
- ④ INFRARED HEATER COMBUSTION AIR INTAKE. SEE DETAIL NO. 1, DWG. H-1 AND REFER TO MANUFACTURERS INSTRUCTIONS.
- ⑤ INFRARED HEATER HORIZONTAL VENT SYSTEM. SEE DETAIL NO. 3, DWG. H-1 AND REFER TO MANUFACTURERS INSTRUCTIONS.
- ⑥ CONNECT NEW 1-1/2" NATURAL GAS PIPING TO EXISTING AND ROUTE THRU WALL THRU EXISTING OPENING. SEAL OPENING AIR TIGHT.



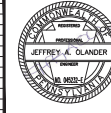
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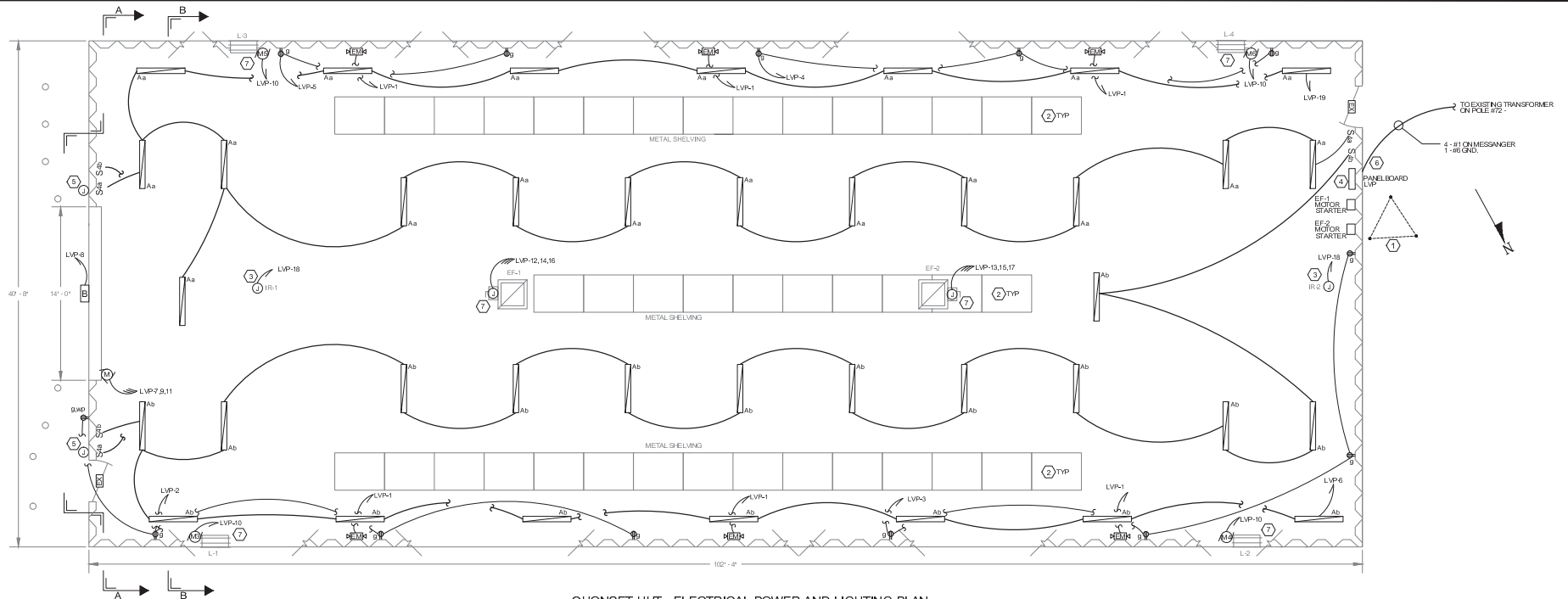
PROJECT
REBUILDING OF THE QUONSET HUT
NORTHVIEW HIGHRISE
FACILITY SERVICES SITE

DRAWING TITLE
HVAC PLAN AND NOTES

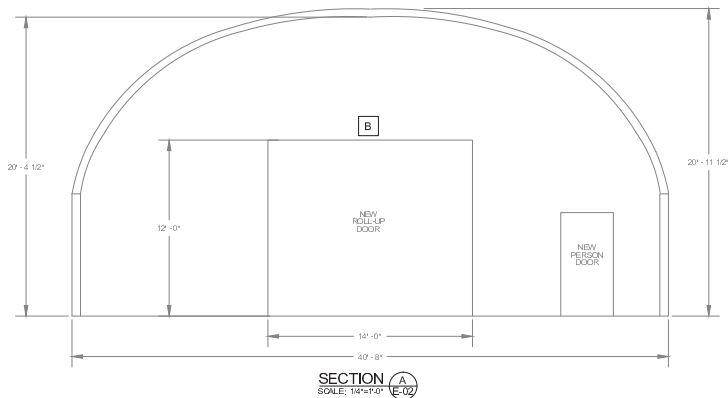
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JAO	JAO	2/01/2017	AS SHOWN	16008	6 OF 9

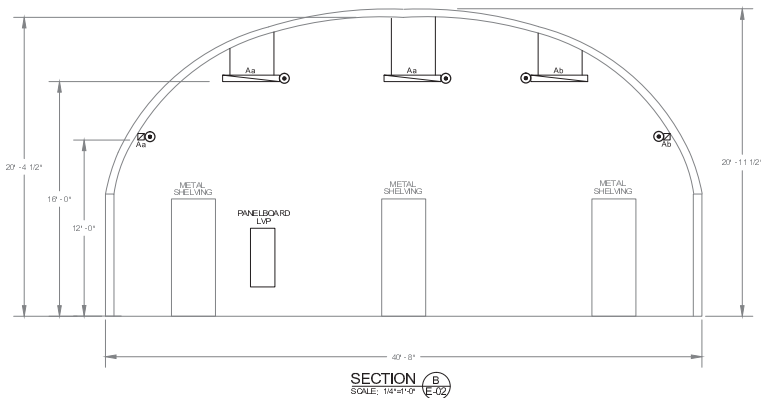
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QUONSET HUT - ELECTRICAL POWER AND LIGHTING PLAN
SCALE: 1/4" = 1'-0"



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



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

- KEYED NOTES:**
- 1 SEE GROUNDING DETAILS, DRAWING E-01.
 - 2 SHELVING TO BE PROVIDED AND INSTALLED PER SPECIFICATION SECTION.
 - 3 SEE DRAWING H-02 FOR LOCATION OF ELECTRICAL CONNECTION FOR RADIANT HEAT.
 - 4 SEE DRAWING E-03 FOR PANELBOARD SCHEDULE.
 - 5 LOCATION FOR CONNECTION INTO EXISTING HACR SECURITY ACCESS AND LOCATION OF LOCK CONTROL ACCESS.
 - 6 SEE DRAWING E-01 FOR SERVICE ENTRANCE DETAIL.
 - 7 SEE DRAWING H-02 FOR CONTROLS OF LOUVERS AND EXHAUST FANS.

MOTOR SCHEDULE									
MOTOR NO.	MOTOR DESCRIPTION	MOTOR VOLTS	F.L.A.	HP	BREAKER		STARTER SIZE	MOTOR CIRCUIT	
					FRAME	TRIP SETTING		WIRE	CONDUIT
1	EF-1 EXHAUST FAN NO. 1	208	1.6	3/4	20	-	-	4 - #12	3/4"
2	EF-2 EXHAUST FAN NO. 2	208	1.6	3/4	20	-	-	4 - #12	3/4"
3	L-1 LOUVER	120	-	-	20	-	-	3 - #12	3/4"
4	L-2 LOUVER	120	-	-	20	-	-	3 - #12	3/4"
5	L-3 LOUVER	120	-	-	20	-	-	3 - #12	3/4"
6	L-4 LOUVER	120	-	-	20	-	-	3 - #12	3/4"

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PROJECT REBUILDING OF THE QUONSET HUT NORTHVIEW HIGHRISE FACILITY SERVICES SITE			
DRAWING TITLE ELECTRICAL NEW WORK FLOOR PLAN AND SECTIONS			
DRAWN BY JEM/ele	CHECKED BY VAD	DATE 02/01/2017	SCALE AS SHOWN
PROJECT NO. 16008		DRAWING NO. 8 OF 9	

E-02



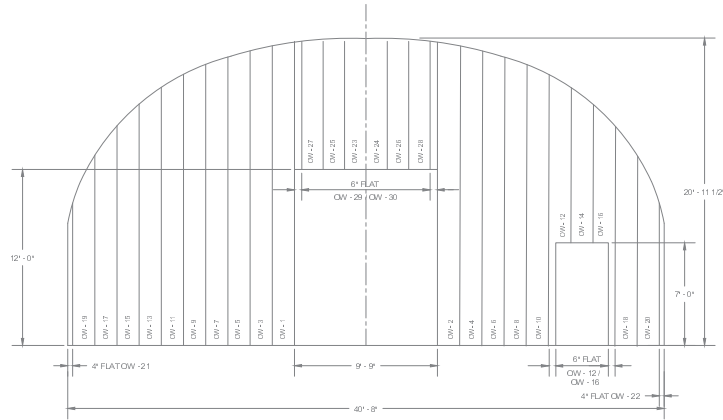
REAR WALL 1
SCALE: NONE



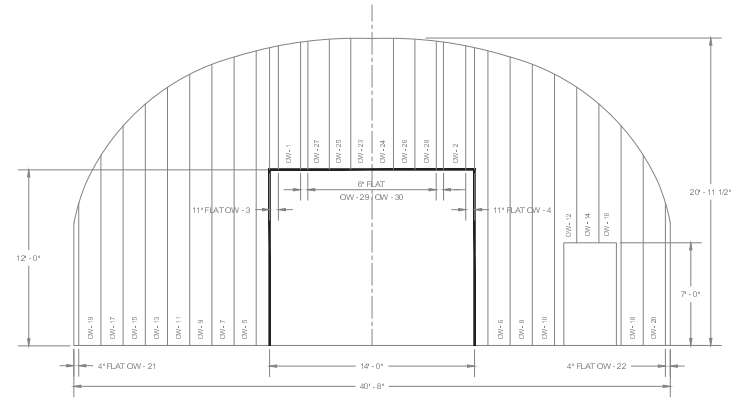
EXISTING MAIN FRONT ROLL-UP
AND PERSON DOOR 2
SCALE: NONE

KEYED NOTES:

- ① EXISTING SERVICE ENTRANCE AND PANEL TO BE DEMOLISHED AND REPLACED. SEE THIS DRAWING FOR NEW PANELBOARD SCHEDULE.
- ② EXISTING FRONT ROLL-UP DOOR TO BE REPLACED WITH NEW 14-FOOT WIDE DOOR. ALL MODIFICATIONS TO EXISTING OPENING TO BE MADE TO MAINTAIN INTEGRITY OF STRUCTURE.
- ③ EXISTING BOLLARDS TO BE REMOVED AND REPLACED ONCE NEW DOOR IS INSTALLED. ADDITIONAL BOLLARDS TO BE INSTALLED AT THREE-FOOT INTERVALS ALONG ENTIRE FRONT OF BUILDING.
- ④ THIS DRAWING INFORMATION PROVIDED BY SHOP DRAWINGS SUPPLIED BY HOUSING AUTHORITY, CITY OF PITTSBURGH. CONTRACTOR SHALL VERIFY INFORMATION AS IT PERTAINS TO INSTALLATION OF NEW ROLL-UP DOOR.



DETAIL - FRONT ENDWALL WITH EXISTING DOOR SIZE - 12H X 10W OPENING ①
SCALE: 1/4" = 1'-0"



② DETAIL - FRONT ENDWALL WITH NEW DOOR SIZE - 12H X 14W OPENING ②
SCALE: 1/4" = 1'-0"

PANELBOARD SCHEDULE LVP

MAINS: 100A MCB

VOLTAGE: 200/120V

PHASE: 3 WIRES: 4

MOUNTING: SURFACE

A/C

REMARKS

10000

NO	PH	KW	DESCRIPTION	C/B	C/B	KW	DESCRIPTION	PH	NO		
1	A	1.20	EMERGENCY LIGHTING	20/1	20/1	0.80	OUTLETS	A	2		
3	B	0.80	OUTLETS	20/1	20/1	0.80	OUTLETS	B	4		
5	C	0.80	OUTLETS	20/1	20/1	0.80	LIGHTING	C	6		
7	A			20/1	20/1	0.40	EXTERIOR LIGHTING	A	8		
9	B	1.50	ROLL UP DOOR	20/3	20/1	0.10	LOUVERS	B	10		
11	C							C	12		
13	A				20/3	1.50	EF-1	A	14		
15	B	1.50	EF-2	20/3				B	16		
17	C				20/1	0.20	IR CONTROL BOXES	C	18		
19	A	0.80	LIGHTING	20/1	20/1		SPARE	A	20		
21	B		SPARE	20/1	20/1		SPARE	B	22		
23	C		SPARE	20/1	20/1		SPARE	C	24		
25	A		SPARE	20/1	20/1		SPARE	A	26		
27	B		SPARE	20/1	20/1		SPARE	B	28		
29	C		SPARE	20/1	20/1		SPARE	C	30		
A 2.00				TOTALS				A 4.70		2.70 A	
B 3.80				B 4.70				0.90 B		0.90 B	
C 0.80				C 1.80				1.00 C		1.00 C	

NOTES:

LOCATION:

CONNECTED LOAD

11.20 KW

CONNECTED AMPS

31.12 A

NOTES:

LOCATION: CONNECTED LOAD 11.20 KW CONNECTED AMPS 31.12 A



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PROJECT
REBUILDING OF THE QUONSET HUT
NORTHVIEW HIGHRISE
FACILITY SERVICES SITE

DRAWING TITLE
ELECTRICAL
PICTURES, DETAILS AND
PANELBOARD SCHEDULE

E-03

DRAWN BY JEM/ter CHECKED BY VAD DATE 02/01/2017 SCALE AS SHOWN PROJECT NO. 16008 DRAWING NO. 9 OF 9