# **CONTRACT DOCUMENTS**

#### **FOR**

## **BUCKS COUNTY FREE LIBRARY HVAC REPLACEMENT** BENSALEM AND LEVITTOWN BRANCH LIBRARIES

BENSALEM BRANCH LIBRARY LEVITTOWN BRANCH LIBRARY 3700 HUMEVILLE ROAD BENSALEM, PA 19020

7311 NEW FALLS ROAD **LEVITTOWN, PA 19055** 

10-28/21

October, 2021

#### PREPARED FOR:

**Bucks County Free Library** 150 S Pine Street Doylestown, PA 18901

## PREPARED BY:

Holstein White Engineers 210 E. Street Road Feasterville, PA 19053

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## CONTRACT DOCUMENTS

#### **FOR**

#### BUCKS COUNTY FREE LIBRARY HVAC REPLACEMENT BENSALEM AND LEVITTOWN BRANCH LIBRARIES

BENSALEM BRANCH LIBRARY
3700 HUMEVILLE ROAD
BENSALEM, PA 19020

LEVITTOWN BRANCH LIBRARY
7311 NEW FALLS ROAD
LEVITTOWN, PA 19055

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#### **LEGAL NOTICE**

**Bucks County Free Library/Holstein White** will receive sealed bid responses until 2:00 PM on December 7, 2021 at 150 S. Pine Street, Doylestown, PA 18901 for:

## BUCKS COUNTY FREE LIBRARY HVAC REPLACEMENT BENSALEM AND LEVITTOWN BRANCH LIBRARIES

A **Mandatory** Pre-Bid Meeting will be held at 9:00 AM on November 16, 2021 at Levittown Branch Library, 7311 New Falls Road, Levittown, PA 19055. The site visit to the Bensalem Branch will follow directly after.

A security deposit in the form of a properly executed Bid Bond for 5% of the bid amount is required. Performance and Payment Bonds are required in the amount of 100% of the contract amount. A Maintenance Bond is required in the amount of 10% of the contract. Bidders are advised Prevailing Minimum Wage Rates, determined by the Secretary of Labor and Industry, must be paid to all workers employed on this project.

Get full information and detailed specifications at <a href="http://www.buckslib.org/bids.">http://www.buckslib.org/bids.</a>

Bids will be addressed and sent:
Mr. John Doran, CFO
Bucks county Free Library
150 S Pine Street
Doylestown, PA 18901

Bids shall be received no later than 2:00 PM on December 7, 2021.

LEGAL NOTICE 02-1

#### INSTRUCTIONS TO BIDDERS

#### 1. RECEIPT AND OPENING OF BIDS

Bids will be opened at the **time and place indicated** in the **Legal Notice** and read aloud publicly. Unofficial bid results will be made available to Bidders after the opening of Bids by e-mail from the Library or Engineer.

Complete sets of the Bidding Documents stated in the Legal Notice may be obtained from the Library/Holstein White.

Complete sets of Bidding Documents must be used in preparing Bids; neither OWNER nor ENGINEER assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bidding Documents.

The OWNER may consider non-responsive any bid not prepared and submitted in accordance with the provisions hereto, and may waive any informalities in or reject any and all bids.

Bids must be submitted with a signed Agreement and a Bid Bond properly signed and sealed by the Bidder and Surety Company.

## 2. <u>MODIFICATION AND WITHDRAWAL OF BIDS</u>

A Bid may be modified or withdrawn via e-mail at any time up to the bid due date and time.

#### 3. PREPARATION OF BIDS

Bidders will have been assumed to have carefully examined the Contract Documents for the work, all attached hereto, and to have carefully investigated physical conditions at the site and character of the work to be done, and to have inquired fully into the difficulties of construction of the work before preparing their bid. The OWNER will not be responsible for failure of the Contractor to properly estimate such difficulties and costs, or for overlooking any of the requirements of the Contract Documents.

#### 4. INTENT OF CONTRACT DOCUMENTS

The intent of the Contract Documents is to obtain a complete job, satisfactory to the ENGINEER. It shall be understood that the bidder has satisfied himself as to the full requirements of the Contract, and has based his bid upon such understanding. Compensation for all work and materials required to complete the Contract shall be considered included in the prices bid for the items listed in the Pricing Form.

#### 5. ADDENDA AND INTERPRETATIONS

All questions about the meaning or intent of the Bidding Documents are to be submitted via e-mail to Holstein White. Interpretations or clarifications considered necessary in response to such questions will be issued through an Addendum (via e-mail). Questions received less than five (5) days prior to the date for opening of Bids may not be answered. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.

Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by OWNER or ENGINEER.

Failure of any bidder to download any such addenda or interpretations shall not relieve said bidder from any obligations under this bid as submitted. All addenda so issued shall become part of the Contract Documents.

#### 6. DISCLOSURE OF CONTENTS

All proposals/bids and other material submitted becomes the property of the Library and may be returned only at the County's option. Information contained in the proposals/bids will not be disclosed during the evaluation process. Under Pennsylvania's "Right to Know" laws, public records are required to be open to reasonable inspection and reproduction. All proposal/bid information, including detailed price and cost information, will be held in confidence during the evaluation process and prior to the time a Notice of Award is issued. Thereafter, all proposals/bids will become public information; subject to inspection and reproduction in accordance with the PA Right to Know Law (Act 3 of 2008), unless otherwise exempt under the Act.

Not withstanding any terms or conditions contained herein, Consultant/Vendor agrees to comply with all Local, State and Federal laws and regulation. Consultant/Vendor specifically agrees to produce all documents that may be subject to public disclosure pursuant to the Pennsylvania Open Records Law.

Trade secrets and other proprietary data contained in a proposal may be held confidential if such data meets the definitions of confidential proprietary information and/or trade secrets under Section 102 of the Right to Know Law. Material considered confidential by the offeror must be clearly identified and the offeror must include a brief statement that sets out the reasons for the confidentiality and how this information meets the criteria of Section 102 of the law.

#### 7. CONDITIONS OF WORK

Each bidder must inform himself fully of the conditions relating to the construction and labor under which the work will be performed; failure to do so will not relieve the successful bidder of his obligation to furnish all material and labor necessary to carry out the provisions of the Contract Documents and to complete the contemplated work for the consideration set forth in his bid.

At the time of the opening of bids, each bidder will be presumed to have inspected physical conditions at the site and to have read and to be thoroughly familiar with the Contract Documents (including all addenda); the failure or omission of any bidder to receive or examine any form, instrument, or document shall in no way relieve any bidder from any obligation in respect to his bid.

#### 8. TIME FOR COMPLETING WORK AND LIQUIDATED DAMAGES

The time for completion of the work under this Contract shall be (120) calendar days after formal Notice-to-Proceed from the Owner/Library.

All bidders are notified that time is of the essence for this Contract. The successful bidder will be required to prosecute the work so as to ensure its completion within the above number of calendar days set forth. It is mutually agreed that damages to the OWNER for failure of the successful bidder to fully complete the work under this Contract on or before the above-stated date shall be **Two Hundred Dollars (\$200.00)** for each calendar day after said date that shall elapse before the work is fully completed, which amount shall in no event be considered as a penalty, but as liquidated damages due the OWNER because of said delay. The OWNER may retain the amount thereof from any moneys which otherwise would be payable hereunder to the successful bidder.

In addition to the above, in order that the work may be accomplished in the shortest possible time, the successful bidder, weather permitting, shall be required to have qualified workmen with designated foreman at work on-site at all times. Contractor's personnel shall remain on-site throughout the duration of the successful bidder's work. At no time shall Contractor pull off project without the express consent of the OWNER. In addition, no change in foreman shall be permitted without approval from the OWNER. Successful bidder will be required to submit a detailed schedule for completion of work which will be subject to the review and approval of the OWNER.

#### 9. QUALIFICATIONS OF BIDDERS

To demonstrate Bidder's qualifications to perform the Work, Bidder must submit with their Bid a complete Contractor's Qualification Statement. Bidder shall also, submit written evidence such as financial data, previous experience, present commitments and such other data as may be reasonably requested.

#### 10. BID SECURITY

Each bid must be accompanied by a Bid Bond, duly executed by the bidder as principal and having as surety thereon a surety company approved by the OWNER, in an amount not less than five percent (5%) of the amount of the base bid. Bid Bonds will be covered with surety of a company authorized to do business in the Commonwealth of Pennsylvania. Bid Bonds provided as surety will not be returned to the bidder after award unless bidder specifically requests the County do so. **Bids submitted with a Bid Bond must be properly signed and sealed by the Bidder and Surety Company.** 

#### 11. CONTRACT

The bidder to whom the Contract is awarded shall, within **ten (10)** days after the official notice of acceptance of their bid, submit all required Bonds and Insurance to the OWNER. The time for such submittal may be extended at the election of the OWNER and for the sole benefit of the OWNER. Failure or refusal of the bidder to do so will be considered an abandonment of the Contract, and the security posted with said bid shall be forfeited to and become the property of the OWNER in an amount not to exceed the difference between the amount specified in said bid and such larger amount for which the OWNER may in good faith contract with another party to perform the work covered by said bid.

It is expressly understood and agreed by the Bidders that the contractual obligations of the Library to the Bidders are effective only after the execution of a contract signed by all parties AND the issuance of a Purchase Order by Library for the goods and/or services requested. It is further expressly understood and agreed the mere issuance of a contract between the Library and a Bidder will not oblige the Library in any fashion unless and until a Purchase Order is received by the Bidder.

#### 12. BONDS AND INSURANCE

The successful bidder must deliver to the OWNER executed certificates of insurance as stipulated in the General Conditions or in the Supplementary Conditions and executed bonds as security for the faithful performance of his Contract and for the payment of all persons performing labor or furnishing materials in connection therewith, and for maintenance of the work for the designated period after it has been accepted by the OWNER.

The Performance and Payment Bonds shall each be in the amount of 100% of the Contract Price and the Maintenance Bond shall be in the amount of 10% of the Contract Price, and shall cover a maintenance period of one year.

All bonds shall be prepared in the form of bonds attached hereto and have as security thereon such surety company or companies as are acceptable to the OWNER and as are authorized to transact business in this state. Alterations made in the terms of the Specifications, and/or quantities of work shall in no way violate the bonds.

#### 13. BASIS OF AWARD

The Contract will be awarded on the basis of competitive bidding to the responsible bidder submitting the lowest responsive bid. The Library reserves the right to award locations individually or combine locations as determined to be in our best interest.

#### 14. REJECTION OF BIDS

The OWNER reserves the right to reject any or all bids, or to accept any bid should it deem it to be for its best interest to do so. Bids which are incomplete, conditional, or obscure, or which contain additions not called for, erasures, alterations or irregularities of any kind, may be rejected as non-responsive. The right to reject or accept bids shall be solely for the benefit of the OWNER, and shall create no right, entitlement or expectation in any bidder.

#### 15. **PROGRESS PAYMENTS**

Refer to General Conditions for details on progress payments and retainage.

#### 16. **TRADE NAMES**

Wherever trade names are used either on the Drawings or in the Specifications, it is understood that such names and designations indicate a type or kind of material and/or equipment. Approved equal in kind, type, and/or quality will be accepted at the discretion of the OWNER. The Contractor shall submit manufacturers' specifications, etc., sufficient for the ENGINEER to determine equivalency of material and/or equipment as directed in the Instructions to Bidders, Article 23.

#### 17. **POWER OF ATTORNEY**

Attorneys-in-fact who execute contract bonds must file with each bond a certified copy of their power of attorney to sign said bonds.

#### 18. PERMITS, APPROVALS AND LICENSES

Each Contractor shall be required to determine the necessity for and obtain all necessary permits, licenses and approvals from the municipality or other public authorities, and shall give all notices required by law or municipal ordinances for this work. The Contractor is solely and exclusively responsible for adherence

to any existing historical, cluding permit costs.	local, state,	and federal	codes and	regulations,	and all requ	ired permits, in-

#### 19. PROGRESS SCHEDULE

Within seven (7) consecutive calendar days after the award of the Contract to him, the Contractor shall submit a proposed program of operation, showing clearly how he proposes to conduct the work so as to bring about the completion of his work within the time limit specified. This program shall outline the proposed sequence of operations, the rates of progress and the dates when his work will be sufficiently finished to permit the installation of the work under other contracts. The work under this contract shall be so scheduled that as structures are completed, they can be placed in use or operation with a minimum of delay. The program shall be subject to the approval of the OWNER and shall be updated by the Contractor at any time during performance of the Contract, should the OWNER determine that the Contractor's actual progress does not correspond to that projected in the then-existing progress schedule.

#### 20. OTHER CONTRACTS

Bidders are advised that work other than the work covered under their Contract may be in progress at the site of the work during the performance of the work covered by these documents. Accordingly, bidders are warned that coordination of construction activities at the site must be such as to avoid interference. UNDER NO CIRCUMSTANCES SHALL THE OWNER OR ENGINEER BE HELD RESPONSIBLE TO THE CONTRACTOR FOR DELAYS OR EXTRA WORK OCCASIONED BY INTERFERENCE OF OTHER CONTRACTORS.

#### 21. ESTIMATED QUANTITIES

The quantities given in the Pricing Form, if any, are approximate only, being given as a basis for the uniform comparison of bids, and the OWNER does not expressly or by implication warrant that the actual amount of work will correspond therewith.

#### 22. <u>SAFETY</u>

It shall be the single and sole responsibility of the Contractor to ensure that its activities comply with applicable safety requirements. Neither the ENGINEER nor the OWNER shall owe any duty under this Contract or otherwise to the Contractor or its agents, employees or guests to inspect the work or otherwise ensure compliance by the Contractor with applicable safety requirements. No increases in the contract price or extensions in contract completion time shall be given by the OWNER as the consequence of the Contractor's failure to so comply.

#### 23. PRODUCT SPECIFICATIONS

The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents without consideration of possible substitute or "or-equal" items. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to the OWNER, application for such acceptance will be documented on a Substitution Request Form (Similar to CSI From 13.1A in Appendicies).

The OWNER reserves the right to reject any unspecified product or products submitted which requires changes in design, construction, or other changes which may increase the contract price for the performance of the work. The substitute or "or-equal" product submitted by the Contractor shall meet the requirements of the Specifications and shall, in all respects, be equal to the products specified by name herein. The OWNER shall be the sole judge as to the equality of the proposed alternate product.

#### 24. <u>SUPPLEMENTARY CONDITIONS</u>

The bidder's attention is directed to the Supplementary Conditions of these Specifications. The Supplementary Conditions amend and supplement portions of the General Conditions as required for this project.

## 25. <u>EMPLOYMENT VERIFICATION ACT</u>

The PA Public Works Employment Verification Act (Act 127 of 2012) will apply to this Contract. This Act requires public works contractors and subcontractors to verify employment eligibility; provides for the powers and duties of the Department of General Services; prescribes sanctions; and establishes good faith immunity under certain circumstances.

#### 26. PAST PERFORMANCE

Any bidder who has demonstrated poor performance during either a current or previous agreement with Bucks County may be considered as an unqualified source and their bid may be rejected. Bucks County reserves the right to exercise this option as is deemed proper and/or necessary.

#### 27. ACCESS TO ACCOUNTING RECORDS

The Contractor shall check all materials, equipment and labor entering into the Work and shall keep such full and detailed accounts as may be necessary for proper financial management under this Agreement, and the system shall be satisfactory to the OWNER. The OWNER or its representative shall be afforded access to all the Contractor's records, books, correspondence, instructions, drawings, receipts vouchers, memoranda, and similar data relating to this contract, and the Contractor shall preserve all such records for a period of three years, or for such longer period as may be required by law, after the final payment.

#### 28. ASSIGNMENT OF REFUND RIGHTS

The Contractor agrees to assign and transfer to the OWNER all its rights to sales and use tax which may be refunded as a result of a claim for refund or materials purchased in connections with this contract. The Contractor further agrees that it will not file a claim for refund for any sales or use tax that is the subject of this assignment.

#### 29. CONTRACTS WITH SUBCONTRACTORS

The Contractor agrees to include the "Access to Accounting Records" and "Assignments of Refund Rights" paragraphs, in full, in any contracts with subcontractors.

#### 30. REQUIRED ATTACHMENTS TO BID

The following documents must be uploaded as attachments to the bid submitted via PennBID:

• Bid Bond (BB). Financial statement of the surety company, certified copy of Power of Attorney of person who signed the Bid Bond, and officer-signed certificate of surety company that they will provide the required bonds if bidder is awarded the Contract.

- Non-Collusion Affidavit (NCA)
- Signed Agreement

# **BID BOND**

KNOW	ALL MEN BY THESE PRESENTS, we,	the undersigned,	
			as Principal, and
		as Surety, are	hereby held and firmly
bound u	unto Bucks County as Owner, in the penal	sum of	
		<u>(\$</u>	)
for the p	payment of which, well and truly to be ma	de, we hereby jointly	y and severally bind
ourselve	res, our heirs, executors, administrators, su	ccessors, and assigns	S.
Signed	this day of		
The Cor	ondition of the above obligation is such tha	t whereas the Princip	oal has submitted to
		a certain Bid, attache	ed hereto and hereby made a
part her	reof, to enter into a contract in writing for:		
	BUCKS COUNTY FREE LIBR	ARY HVAC REP	LACEMENT
	]	BRANCH LIBRA	RY
		BRANCH LIBRA	RY
XX7°41 -41	1		
with th	his addition:		
Contra			Contract
NOW,	THEREFORE,		
A.)	If said Bid shall be rejected, or in the alte	ernate,	
B.)	If said Bid shall be accepted and the Prin	ncipal shall furnish a	bond for his faithful
	performance of said Contra ct, and for the	ne payment of all per	sons performing labor or
	furnishing materials in connection therev	with, and shall in all	respects perform the
	agreement created by the acceptance of s	said Bid,	

Then this obligation shall be void, otherwise the same shall remain in force effect; it being expressly understood and agreed that the liability of the Surety for any and all claims hereunder shall, in no event, exceed the penal amount of this obligation as herein stated.

The Surety, for value received, hereby stipulates and agrees the obligations of said Surety and its bond shall be in no way impaired or affected by any extension of the time within which the Owner may accept such Bid; and said Surety does hereby waive notice of any such extension.

IN WITNESS WHEREOF, the Principal and the Surety have hereunto set their hands and seals, and such of them as are corporations have caused their corporate seals to be hereto affixed and these presents to be signed by their proper officers, the day and year first set forth above.

	(Principal)
	(Surety)
BY:	

#### **IMPORTANT**:

Surety companies executing bonds must be authorized to do business in the Commonwealth of Pennsylvania.

BID BOND 04-2

# NON-COLLUSION AFFIDAVIT

## BUCKS COUNTY FREE LIBRARY HVAC REPLACEMENT

	BRANCH LIBRAI	RY
	BRANCH LIBRAI	RY
W	Vith this addition:	
Co	ontract #	Contract
Sta	tate of	
Cc	ounty of	
I s	state I amof(Nam	CD:
	(Title) (Nam	ne of Firm)
thi I s	nd officers. I am the person responsible in my firm for the price his bid.  state:  The price(s) and amount of this bid have been arrived at indep	``
	consultation, communication, or agreement with any other copotential bidder.	
2.	Neither the price(s) nor the amount of this bid, and neither the nor approximate amount of this bid have been disclosed to an who is a bidder or potential bidder, and they will not be disclosed.	y other firm or person
3.	No attempt has been made or will be made to induce any firm from bidding on this contract, or to submit a bid higher than t intentionally high or non-competitive bid or other form of contract.	his bid, or to submit any
4.	The bid of my firm is made in good faith and not pursuant to discussion with, or inducement from, any firm or person to su or other non-competitive bid.	, ,
5.	, its affiliates, sub	sidiaries, officers,
	(Name of My Firm) directors, and employees are not currently under investigation agency and have not in the last four years been convicted or f prohibited by state or federal law in any jurisdiction, involvin collusion with respect to bidding on any public contract, exce	n by any governmental Cound liable for ay act ag conspiracy or

1 state	_ understands and acknowledges the above
(Name of My Firm)	
representations are material and important, and	d will be relied on by the Bucks County
Board of Commissioners in awarding the contra	ract(s) for which this bid is submitted.
I understand and my firm understands any mis	sstatement in this affidavit is and shall be
treated as fraudulent concealment from Bucks	
submission of bids for this contract.	Ç
(Name and Comp	pany Position)
Sworn to and subscribed before me this	day of, 20
My commission Expires:	
My commission Expires.	
Notary Public:	

#### INSTRUCTIONS FOR NON-COLLUSION AFFIDAVIT

- 1. This Non-Collusion Affidavit is material to any contract awarded pursuant to this bid. According to the Pennsylvania Anti-bid-Rigging Act, 73 P.S. 1611 et seq., governmental agencies may require Non-Collusion Affidavits to be submitted together with bids.
- 2. This Non-Collusion Affidavit must be executed by the member, officer, or employee of the bidder, who makes the final decision on prices and the amount quoted in the bid.
- 3. Bid rigging and other efforts to restrain competition, and the making of false sworn statements in connection with the submission of bids are unlawful and may be subject to criminal prosecution. The person who signs the Affidavit should examine it carefully before signing and assure himself or herself each statement is true and accurate, making diligent inquiry, as necessary, of all other persons employed by or associated with the bidder with responsibilities for the preparation approval, or submission of the bid.
- 4. In the case of bid submitted by a joint venture, each party to the venture must identified in the bid documents, and an Affidavit must be submitted separately on behalf of each party.

- 5. The term "complementary bid", as used in the Affidavit, has the meaning commonly associated with that term in the bidding process, and includes the knowing submission of bids higher than the bid of another firm, any intentionally high or noncompetitive bid, and any other form of bid submitted for the purpose of giving false appearance of competition.
- 6. Failure to file an Affidavit in compliance with these instructions will result in disqualification of the bid.

#### AGREEMENT

#### BUCKS COUNTY FREE LIBRARY HVAC REPLACEMENT

	BRANCH LIBRARY				
		BRAI	NCH LIBRAR	RY	
With this addition:					
Contract #					_ Contract
THIS AGREEMENT n County Free Library, 1					
hereinafter "Contractor contained in this Agree					al promises
GENERAL PROVISION The Contractor shall:	NS:				
(a) have charge of	and be respon	nsible for the entire	e work for which	he has contrac	eted until its

- (a) have charge of and be responsible for the entire work for which he has contracted until its final completion and acceptance by the Library;
- (b) be held liable for any defects which may appear in the material he has furnished or in his work for a period of one (1) year after final acceptance by the Library;
- (c) be solely liable for any damage occasioned by his work to the property of the Library and others; and,
- (d) upon conclusion, clean up the ground worked over.

#### RESPONSIBILITIES OF THE CONTRACTOR:

The Contractor agrees to pay for all materials furnished and services rendered for the performance of the Contract and any person or corporation furnishing materials or rendering services to the Contractor as though such person or corporation were expressly named herein, provided the action is brought within one (1) year after the time and cause of the action accrued.

The Contractor shall defend, indemnify and save harmless the Library and Engineer, their officers, employees and agents from and against any and all claims, demands, suits, judgments, costs and expenses of any kind arising out of the work to be performed hereunder and resulting in any injury (including death) to any person or damage to any property (including loss of use) caused by any act or failure to act by the Contractor, its officers, employees, agents or guests.

06-1

It is also agreed and understood acceptance of final payment by the Contractor shall be considered as a release in full of any claim against the Library out of, or by reason of, the work done and materials furnished under this Contract.

The Contractor shall cooperate with the Library in carrying on the work, without interrupting any service to the public.

#### BONDS AND INSURANCE CERTIFICATES

The Contract documents are not complete until the Library has received satisfactory performance, material payment bonds executed by responsible surety companies listed to do business in the Commonwealth of Pennsylvania and acceptable to the Library; together with Certificates of Insurance in respect to the insurance required by these specifications under policies issued by companies authorized to do business in the Commonwealth of Pennsylvania and acceptable to the Library.

FAILURE TO SUPPLY PROOF OF INSURANCE SHALL CONSTITUTE MATERIAL BREACH OF THIS AGREEMENT. Remedies for such material breach include termination of agreement by Library and / or the withholding of payments by the Library until such time that material breach is cured.

#### STARTING AND PROSECUTION OF WORK

The Bidder agrees to begin the work within seven (7) consecutive calendar days after receipt of Notice to Proceed, and to prosecute it expeditiously to a conclusion, using an adequate number of competent men, suitable equipment and machinery at all times, and working each working day weather conditions permit.

#### **WORK INCLUDED IN THE CONTRACT:**

The Contract shall consist of furnishing all labor, superintendence, materials, equipment, tools and other facilities, and all things necessary and proper for performance of the work as shown on the Contract Drawings and as described in these Specifications (prepared by the Engineer) and the Advertisement for Bid

#### **CONTRACT DOCUMENTS:**

The Contract Documents consist of this Agreement, the General Terms of the Contract, the Contract Drawings, the Specifications, all Addenda issued prior to bidding and all modifications issued after execution of this Agreement. These form the Contract, and all are as fully a part of the Contract if attached to this Agreement or repeated herein. The Library shall furnish the Contractor up to three (3) copies of the Contract Documents for completion of the work.

#### MATERIALS TO BE FURNISHED BY THE LIBRARY:

No materials shall be furnished by the Library.

#### WORK DONE BY THE LIBRARY:

No work shall be done by the Library in connection with this Contract.

#### PAYMENTS:

In consideration of the Contractor faithfully complying with the terms and stipulations of the Contract, the Library covenants and agrees to pay said Contractor the sum set fourth in the bid of said Contractor, and also pay for extra work that may be agreed upon in writing, and said prices shall be full compensation under the terms of the Contract.

#### APPLICABLE LAW:

This Agreement shall be governed by and interpreted and enforced in accordance with the laws of the Commonwealth of Pennsylvania (without regard to any conflict of law's provisions) and the decisions of the Pennsylvania courts. The Supplier consents to the venue and jurisdiction of the Court of Common Pleas of Bucks County in Pennsylvania, waiving any claim or defense that such forum is not convenient or proper. The Supplier agrees that any such court shall have in personal jurisdiction over it, and consents to service of process in any manner authorized by Pennsylvania law.

#### <u>INTEGRATION:</u>

The Agreement, including all referenced documents and attachments, constitutes the entire agreement between the parties. No agent, representative, employee or officer of either the Library or Supplier has authority to make, or had made, any statement, agreement or representation, oral or written, in connection with the Agreement, which in any way can be deemed to modify, add to or detract from, or otherwise change or alter its terms and conditions unless otherwise explicitly stated within the agreement. No negotiations between the parties, nor any custom or usage, shall be permitted to modify or contradict any of the terms and conditions of the Agreement. No modifications, alterations, changes, or waiver to the Agreement or any of its terms shall be valid or binding unless accomplished by a written amendment signed by both parties. All such amendments will be made pursuant to the terms of the Agreement or using the appropriate Library form.

#### CONTROLLING TERMS AND CONDITIONS:

The terms and conditions of this Agreement shall be the exclusive terms of agreement between the Supplier and the Library. Other terms and conditions or additional terms and conditions included or referenced in the Supplier's invoices, business forms, or other documentation shall not become part of the parties' agreement and shall be disregarded by the parties, unenforceable by the Supplier and not binding on the Library.

#### **RIGHT TO KNOW LAW:**

- A. The Pennsylvania Right-to-Know Law, 65 P.S. §§ 67.101-3104, ("RTKL") applies to this Agreement.
- B. If the Library needs the Supplier's assistance in any matter arising out of the RTKL related to this Agreement, it shall notify the Supplier using the legal contact information provided in this Agreement. The Supplier, at any time, may designate a different contact for such purpose upon reasonable prior written notice to the Library.
- C. Upon written notification from the Library that it requires the Supplier's assistance in responding to a request under the RTKL for information related to this Agreement that may be in the Supplier's possession, constituting, or alleged to constitute, a public record in accordance with the RTKL ("Requested Information"), the Supplier shall:
  - 1) Provide the Library, within ten calendar days after receipt of written notification, access to, and copies of, any document or information in the Supplier's possession arising out of this Agreement that the Library reasonably believes is Requested Information and may be a public record under the RTKL; and
  - 2) Provide such other assistance as the Library may reasonably request, in order to comply with the RTKL with respect to this Agreement.
- D. If the Supplier considers the Requested Information to include a request for a Trade Secret or Confidential Proprietary Information, as those terms are defined by the RTKL, or other information that the Supplier considers exempt from production under the RTKL, the Supplier must notify the Library and provide, within seven calendar days of receiving the written notification, a redacted copy of such document along with a written statement signed by a representative of the supplier explaining why the requested material is exempt from public disclosure under the RTKL.
- E. The Library will rely upon the written statement from the Supplier in denying a RTKL request for the Requested Information unless the Library determines that the Requested Information is clearly not protected from disclosure under the RTKL. Should the Library determine that the Requested Information is clearly not exempt from disclosure, the Supplier shall provide the Requested Information within five business days of receipt of written notification of the Library's determination.
- F. If the Supplier fails to provide the Requested Information within the time period required by these provisions, the Supplier shall indemnify defend and hold the Library harmless for any damages, penalties, costs, detriment or harm that the Library may incur as a result of the Supplier's failure, including any statutory damages assessed against the Library.
- G. The Supplier shall have the obligation to request participation and defend the decision issued by the Bucks County Office of Open Records in any appeal to the Pennsylvania Office of Open Records and subsequent appeal regarding documents of Supplier.

expiration of this Agreement and shall continue as long as the Supplier has Requested Information in its possession. With this addition: Contract #\_\_\_\_\_\_ Contract BID PRICING BY LOCATION: BRANCH LIBRARY: \$ \_\_\_\_\_\_ (Written) \$\_\_\_\_\_(Numbers) BRANCH LIBRARY: \$ \_\_\_\_\_\_(Written) TOTAL AMOUNT OF BID FOR ALL LOCATIONS: \$\_\_\_\_\_(Numbers) IN WITNESS WHEREOF: The parties hereto have caused the signature of their proper officers and seals to be affixed thereto: ATTEST: BY:

H. The Supplier's duties relating to the RTKL are continuing duties that survive the

ATTEST:			
	BY:		
		Contractor	
	DATE:		

Note: An executed copy of this Agreement shall be provided with the Bid.

#### PUBLIC WORKS EMPLOYMENT VERIFICATION ACT

In accordance with Act of July 5, 2012 (P.L. 1086, No. 127), known as the "Public Works Employment Verification Act" (43 P.S. 167.1 et. seq.), CONTRACTOR and subcontractors (if any) shall verify employment eligibility. An employee is an individual hired by CONTRACTOR or a subcontractor for whom CONTRACTOR or subcontractor is required by law to file a Form W-2 with the Internal Revenue Service. The Act does not apply to material suppliers for projects.

CONTRACTOR and subcontractors shall participate in EVP and shall, subject to the requirements of Federal law governing the use of EVP, use EVP to verify employment eligibility of each new employee (EVP is the E-Verify Program operated by the Department of Homeland Security that electronically verifies employment eligibility for employees). The Department of General Services of the Commonwealth shall post on its publicly accessible Internet website information regarding the requirements of Federal law governing the use of EVP. In conducting the verification required, CONTRACTOR and subcontractors shall not discriminate against an employee on the basis of race, ethnicity, color or national origin.

As a precondition of being awarded a contract for a Public Work, <u>as defined in the Pennsylvania Prevailing Wage Act, 43 P.S. 165.1 et. seq.</u>; or with respect <u>such</u> a contract that was awarded prior to the effective date identified in Section 20 of the Act but has not yet been executed, prior to the execution of the contract, CONTRACTOR shall provide OWNER with a verification form described in Subsection (c) of Section 4, acknowledging its responsibilities under and its compliance with Section 3 of the Act. Contracts between CONTRACTOR and subcontractors shall contain information about the requirements of the Act.

Prior to commencing work on a public works project, subcontractor(s) shall provide the OWNER with a verification form described in Subsection (c) of Section 4 of the Act acknowledging subcontractor's responsibilities and compliance with Section 3 of the Act. Contracts between a subcontractor and its subcontractors shall contain information about the requirements of the Act.

The verification required by Section 4 of the Act shall be in a form prescribed by the Secretary of General Services of the Commonwealth <u>and shall be posted on the Internet</u>, and shall comply with the following additional requirements:

- (1) The statement shall include a certification that the information in the statement is true and correct and the individual signing the statement understands the submission of false or misleading information in connection with the verification shall subject the individual and the CONTRACTOR or subcontractor, as the case may be, to sanctions provided by law.
- (2) The statement shall be signed by a representative of the CONTRACTOR or subcontractor, as applicable, who has sufficient knowledge and authority to make the representations and certifications contained in the statement.

The Public Works Employment Verification Form is on the next page.



# **COMMONWEALTH OF PENNSYLVANIA**

# **PUBLIC WORKS EMPLOYMENT VERIFICATION FORM**

Date		
Business or Organization Name (Employe	er)	
Address		
City	State	Zip Code
Contractor Subcontractor (chec	ck one)	
Contracting Public Body		
Contract/Project No		
Project Description		
Project Location		
As a contractor/subcontractor for the above from the above date, our company is in constitute ('the Act') through utilization of the feet Department of Homeland Security. To January 1, 2013 are authorized to work in the second as a second to that all public work verify the employment eligibility of each date throughout the duration of the public defeated EVP upon each new hire shall be a second to the second the second that all public work verify the employment eligibility of each date throughout the duration of the public defeated EVP upon each new hire shall be a second to the second that all public work verify the employment eligibility of each date throughout the duration of the public defeated EVP upon each new hire shall be a second to the second that all public work verify the employment eligibility of each date throughout the duration of the public work in the second that all public work verify the employment eligibility of each date throughout the duration of the public work verify the employment eligibility of each date throughout the duration of the public work verify the employment eligibility of each date throughout the duration of the public work verify the employment eligibility of each date throughout the duration of the public work verify the employment eligibility of each date throughout the duration of the public work verify the employment eligibility of each date throughout the duration of the public work verify the employment eligibility of each date throughout the duration of the public work verify the employment eligibility of each date throughout the duration of the public work verify the employment eligibility of each date throughout the duration of the public work verify the employment eligibility of each date throughout the duration of the public work verify the employment eligibility of each date throughout the duration of the public work verify the employment eligibility of each date throughout the duration of the public work verify the employment eligibility of each date throughout	mpliance with the Pub deral E-Verify Program of the best of my/our of the United States. As contractors/subcontained hire within five ( lic works contract. Do maintained in the ever ized representative of of form is true and corre	lic Works Employment Verification Act (EVP) operated by the United States knowledge, all employees hired post tractors will utilize the federal EVP to (5) business days of the employee start ocumentation confirming the use of the nt of an investigation or audit.  If the company above, attest that the ect and understand that the submission
		Authorized Representative Signature

# PAYMENT BOND

KNOWN ALL MEN, we		, as
Principal, and		as
Surety, are held and firmly bound unto Buck		
Doylestown, PA 18901 and its successors and	l assigns (hereinafter called th	e Obligee), in
the just sum of:		
	<u>(</u> \$	)
Written	Figures	
Lawful money of the United States of Americ		um truly to be
made we bind ourselves and each of our	respective heirs, personal re	presentatives,
successors and assigns joints and severally by	these presents, this da	y of
, 20	ı , <u> </u>	J
WHEREAS, the Principal has entered into a	for performance of the Cont EE LIBRARY HVAC REPL	tract work in ACEMENT.
DD A NCH I IDD A DX		
BRANCH LIBRARY	<u>(</u>	
With this addition:		
Contract #		Contract
Contract in connection with Obligee (which	agreement together with the	specifications
therefore, including all related drawings and	documents) and such alteration	ons as may be
made in such specifications as therein provide	ed, are hereby made a part here	eof as fully as
if set out herein, and shall together be hereina	fter referred to as the "Contrac	et"; and it was
a condition of the award of said Contract that	this bond be furnished.	

# THEREFORE, THE CONDITIONS OF THE ABOVE OBLIGATIONS ARE:

That, if the Principal and all the Principal's subcontractors shall promptly make payment for all material furnished and labor supplied or performed in the prosecution of the work under the Contract, whether or not said material or labor enter into and become component parts of said work, then this obligation shall be void; but otherwise it shall remain in full force, "Labor" and "materials", as used in this Bond, shall include public utility services and reasonable rentals of equipment, but only for periods when the equipment is rented is actually used at the site of the work.

The Principal and Surety, for value received, hereby agree no change, extension of time, alterations or additions to the terms of any of the Contract Documents or to the items to be provided there under nor any forbearance by either the Obligee or the Principal to the other, shall in any way affect the obligation of either of them on this bond, and they hereby waives notice of any such change, extension of time, alteration or addition.

The Principal and Surety further acknowledge and agree this Bond is furnished pursuant to requirements of the Public Works Contractors' Bond Law of 1967, solely for the protection of claimants supplying labor or material to the Principal or any of the Principal's subcontractors in the prosecution of the work under the Contract, and this Bond is subject to all provisions of said Law as fully as though said provisions were set fourth herein at length. They also agree any claimant entitled under the said Law to sue on this Bond may use a copy of this obligation, certified by the Obligee, for the purpose of establishing his, or its or their claim without requiring production in court of an executed original, and that action by one or more claimants shall not bar any subsequent or concurrent action(s) by the same or other claimant(s). However, the Obligee shall in no event be liable for payment of any costs or expenses of any claimant's suit.

Both Principal and Surety acknowledge all references herein to the Principal, in singular form, shall include plural, as may be appropriate to the Principal.

IN WITNESS WHEREOF, The Principal and Surety, intending to be legally bound, have executed this bond the day and year aforementioned.

Principal	

D		
By:		
-	A 44 in E4 C4	
	Attorney-in-Fact, Surety	

# PERFORMANCE BOND

KNOWN ALL MEN, we	, as	
Principal, and	as	
Surety, are held and firmly bound unto Bucks Co		
Doylestown, PA 18901 and its successors and as	signs (hereinafter called the Obligee),	in
the just sum of:		
	(\$	)
Written	Figures	
for faithful performance of the Contract as specif	ried below, in lawful money of the	
United States of America, for the payment of wh	ich sum truly to be made, we bind	
ourselves and each of our respective heirs, person	nal representatives, successors and	
assigns, joints and severally, firmly by these pres	ents, this day of	
, 20		
WHEREAS, the Principal has entered into a writ	ten Agreement with the Obligee, dated	l
,, 20 for pe	rformance of the Contract work in	
connection with the "BUCKS COUNTY FREE	E LIBRARY HVAC REPLACEMEN	١T
	BRANCH AND	
BRANCH LIBR	ARY	
With this addition:		
Contract #	Contra	ct
Contract in connection with Obligee (which agree	eement together with the specifications	;
therefore, including all related drawings and docu	uments) and such alterations as may be	;
made in such specifications as therein provided,	are hereby made a part hereof as fully	as
if set out herein, and shall together be hereinafter	referred to as the "Contract"; and it w	as
a condition of the award of said Contract that this	s bond be furnished.	

THEREFORE, THE CONDITIONS OF THE ABOVE OBLIGATIONS ARE:

That, if the Principal shall faithfully perform the Contract (including any alterations for additions thereto) in accordance with the specifications and conditions of the Contract, and satisfy all claims and demands to persons or property, or for wrongful death in the performance thereof, and shall fully indemnify and save harmless the Obligee from any and all costs and damage which the Obligee may suffer, and fully reimburse and repay the Obligee any and all outlay and expense which it may incur, by reasons of any such default, then this part of the Obligation shall be void, but otherwise it shall remain in full

The Surety, for value received, hereby agrees no change, extension of time, alterations or additions to the terms of any of the Contract Documents or to the items to be provided thereunder nor any forbearance by either the Obligee or the Principal to the other, shall in any way affect its obligation on this bond, and it hereby waives notice of any such change, extension of time, alteration or addition.

Both Principal and Surety acknowledge all references herein to the Principal, in singular form, shall include plural, as may be appropriate to the Principal.

IN WITNESS WHEREOF, The Principal and Surety, intending to be legally bound, have executed this bond the day and year aforementioned.

	Principal	
By:		
<i>J</i> -	Attorney-in-Fact, Surety	

force.

# MAINTENANCE BOND

KNOWN ALL MEN, we	, as Principal
and	, as Surety, are
held and firmly bound unto Bucks County	y Free Library, 150 S Pine Street, Doylestown
PA 18901 and its successors and assigns (	hereinafter called the Obligee), in the just sums
of:	
	(\$)
Written	Figures
for maintenance as specified below:	
made, we bind ourselves and each of ourselves and assigns joints and severally	merica, for the payment of which sum truly to be our respective heirs, personal representatives, y, firmly by these presents, this day of a written Agreement with the Obligee, dated for performance of the Contract work in UCKS COUNTY FREE LIBRARY HVAC BRANCH AND
With this addition:	
Contract #	Contract
documents) and such alterations as may be therein provided, are hereby made a part h	hereof as fully as if set out herein, and shall Contract"; and it was a condition of the award

THEREFORE, THE CONDITIONS OF THE ABOVE OBLIGATIONS ARE:

That, if the Principal shall remedy without cost to the Obligee any defects which may develop during a period of one (1) year from the date of completion and acceptance of the

MAINTENANCE BOND 09-1

work performed under the Contract, provided that such defects in the judgment of the Obligee or its successor, are caused by defective or inferior materials or workmanship, then this part of the obligation shall be void, but otherwise it shall remain in full force. However, the Principal agrees the foregoing one-year limitation shall apply to the surety only and shall not relieve the Principal of any liability otherwise provided by law or by the Contract Documents.

The Principal and Surety, for value received, hereby agrees no change, extension of time, alterations or additions to the terms of any of the Contract Documents or to the items to be provided thereunder nor any forbearance by either the Obligee or the Principal to the other, shall in any way affect the obligation of either of them on this bond, and they hereby waives notice of any such change, extension of time, alteration or addition.

Both Principal and Surety acknowledge all references herein to the Principal, in singular form, shall include plural, as may be appropriate to the Principal.

IN WITNESS WHEREOF, The Principal and Surety, intending to be legally bound, have executed this bond the day and year aforementioned.

	Principal
By:	
-	Attorney-in-Fact, Surety

# CONTRACTOR'S AFFIDAVIT OF PAYMENTS OF DEBTS AND CLAIMS

STATE OF:
COUNTY OF:
CONTRACT: BUCKS COUNTY FREE LIBRARY HVAC REPLACEMENT
BRANCH LIBRARY
BRANCH LIBRARY
Before me, the undersigned, a(Notary Public, Justice o
the Peace, or Alderman), in and for said County and State, personally appeared
(Individual, Partner, or Duly Authorized
Representative of Corporate Contractor), who, being duly sworn according to law, deposes and
says all labor, material and outstanding claims and indebtedness of whatever nature arising out of the performance of the
Library, 150 S Pine Street, Doylestown, PA 18901 (Owner) with
(Contractor) have been paid in full.
(Individual, Partner, or Duly Authorized Representative of Corporate Contractor)
Subscribed and Sworn to me thisday of, 20
Notary Public:
My Commission Expires:

# CONSENT OF SURETY COMPANY TO FINAL PAYMENT

In accordance with the provisions	of the contract dated,
20 between	(Contractor), and Bucks
County Free Library, 150 S Pine Stre	eet, Doylestown, PA 18901 (Owner).
The	(Name of Surety),
Surety on the Bond of	(Contractor)
After careful examination of the book	ks and records of said Contractor, and after receipt of
Affidavit and Releases, satisfies this	s Company all claims for labor and materials have
been satisfactorily settled, hereby ap	proved of the final payment of said Contractor, and
by these presents witnesseth payme	nt to the Contractor of the final estimates shall not
	y of its obligations to the Bucks County Board of
	BUCKS COUNTY FREE LIBRARY HVAC
	BRANCH LIBRARY AND
	BRANCH LIBRARY
With this addition:	
Contract #	Contract
as set fourth in the said Surety Comp	any's Bond No
IN WITNESS WHEREOF, the said	Surety Company has hereunto set its hand and seal
thisday of	, 20
WITNESS:	
	(Name of Surety)
	BY:
	(Attorney-in-Fact)

#### CONTRACTOR'S AFFIDAVIT OF RELEASE OF LIENS

# PROJECT: BUCKS COUNTY FREE LIBRARY HVAC REPLACEMENT BRANCH LIBRARY BRANCH LIBRARY TO: Bucks County Free Library 150 S Pine Street Dovlestown, PA 18901 Contract For: Contract Date: The undersigned hereby certifies to the best of his knowledge, information and belief, except as listed below, the Releases or Waivers of Lien attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of work, labor or services who have or may have liens against any property of the Owner arising in any manner out of performance of the Contract referenced above. EXCEPTIONS (If none, write "None". If required by the Owner, the Contractor shall furnish bond satisfactory to the Owner for each exemption.) SUPPORTING DOCUMENTS ATTACHED HERETO: 1. Contractor's Release of or Waiver of Liens, conditional upon receipt of final payment. 2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof. Contractor: Subscribed and Sworn to me this day of , 20 .

CONTRACTORS AFFIDAVIT OF RELEASE OF LIENS Bucks County Free Library Bensalem and Levittown Branches

12-1

Notary Public:

My Commission Expires:	
------------------------	--

#### **CONTRACTOR'S RELEASE OF LIENS**

The undersigned,	, hereinafter known as
CONTRACTOR, for itself, its subcontractors, and a	
has furnished labor, equipment and materials, for th	
improvements consisting of the "BUCKS COUNT	
REPLACEMENT	
BRANCH LI	BRARY
With this addition:	
Contract #	Contract
for Bucks County Free Library, 150 S Pine Street, I known as OWNER, and has agreed to release all lie might have on the improvement and the property by work performed for erecting and constructing the in	ns which he or any of them have or reason of materials furnished or
NOW, contingent upon receipt of final payment	from the OWNER, the undersigned
CONTRACTOR, for itself, its subcontractors and	all parties acting through or under it
hereby remise, release and forever quit claim to O'	WNER, his heirs and assigns all liens
claims and demands which he or any of them no	w have or might or could have on or
against the interest of OWNER in the improve	ment and the property for labor or
materials previously or subsequently furnished	for erecting and constructing the
improvement; so OWNER, his heirs and assigns s	
and the property free and clear from all liens, clai	
furnished by the undersigned CONTRACTOR	
discharged.	
CONTRACTOR:	
ADDRESS:	
BY:	
TITLE:	
Subscribed and Sworn to me this	day of, 20
Notary Public:	

My Commission Expires:	
------------------------	--



#### CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY)

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

certificate holder in lie	u of such endorsement(s).					
PRODUCER			CONTACT NAME: PHONE (A/C, No, Ext): E-MAIL ADDRESS: PRODUCER CUSTOMER ID #:		FAX (A/C, No):	
INSURED	S A	M	INSURER	INSURER(S) AFFORD	ING COVERAGE	NAIC#
			INSURER B:			
			INSURER C:			
			INSURER D:			4-11
			INSURER E:			
			INSURER F:		***	

COVERAGES CERTIFICATE NUMBER:

REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

	XCL03IONS AND CONDITIONS OF SUCH						
INSR LTR	TYPE OF INSURANCE		SUBR	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMIT	S
1	GENERAL LIABILITY					EACH OCCURRENCE	s Gen.Cond.
	X COMMERCIAL GENERAL LIABILITY					DAMAGE TO RENTED PREMISES (Ea occurrence)	\$
	CLAIMS-MADE X OCCUR					MED EXP (Any one person)	\$
						PERSONAL & ADV INJURY	\$ Gen.Cond.
ŀ						GENERAL AGGREGATE	§ Gen.Cond.
	GEN'L AGGREGATE LIMIT APPLIES PER:					PRODUCTS - COMP/OP AGG	<pre>\$ Gen.Cond.</pre>
	POLICY PRO- JECT LOC			 			\$
	AUTOMOBILE LIABILITY  ANY AUTO	]				COMBINED SINGLE LIMIT (Ea accident)	\$ Gen.Cond.
				<u> </u>		BODILY INJURY (Per person)	\$ Gen.Cond.
ŀ	ALL OWNED AUTOS					BODILY INJURY (Per accident)	\$ Gen.Cond.
	SCHEDULED AUTOS HIRED AUTOS					PROPERTY DAMAGE (Per accident)	\$ Gen.Cond.
	NON-OWNED AUTOS				·		\$
							\$
	X UMBRELLA LIAB OCCUR			,		EACH OCCURRENCE	s Gen.Cond.
	EXCESS LIAB CLAIMS-MADE					AGGREGATE	<pre>\$ Gen.Cond.</pre>
Ì	DEDUCTIBLE						\$
	RETENTION \$						\$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y/N					X WC STATU- OTH- TORY LIMITS ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED?	N/A				E.L. EACH ACCIDENT	§ Gen.Cond.
	(Mandatory in NH)					E.L. DISEASE - EA EMPLOYEE	\$ Gen.Cond.
	If yes, describe under DESCRIPTION OF OPERATIONS below					E.L. DISEASE - POLICY LIMIT	
			L				

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (Attach ACORD 101, Additional Remarks Schedule, if more space is required)

When it applies, Addition Insured shall read exactly as follows- The County of Bucks, its Board of Commissioners, employees, directors, officers, departments and divisions; and Holstein White, it's employees, directors and officers shall be included as additional insured with respect to the work performed for thir Agreement: HVAC Replacement Bensalem, Doylestown and Perkasie Branch Libraries, Spec #44-10/17.

CERTIFICATE HOLDER	CANCELLATION
County of Bucks Board of Commissioners Attn: Office of the Controller 55 East Court Street	SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.
Doylestown, PA 18901	AUTHORIZED REPRESENTATIVE

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#### WEEKLY PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS

Contractor or	Subco	ontracto	r (Please che	ck one)	)	AL	L IN	FOR	MAT	ION	MU	STB	E COMPLI	ETED				
CONTRACTOR							SUE	CON'	TRAC	CTOR								
ADDRESS							ADI	ORES:	S									
PAYROLL NUMBER	WEEK :	ENDIN	G DATE	PROJ PROJ				ATION	J Bu	icks C oylesto	ounty own a	y HVA	C Replacemen rkasie Branch PROJECT #	Libraries		PI	LABOR & INDUSTRY U OF LABOR LAW COMI REVAILING WAGE DIVISI 7TH & FORSTER STREET HARRISBURG PA 17121 1-800-932-0665	PLIANCE ON S
EMPLOYEE NAM	ME	APPR. RATE (%)				HOU		AND I		DAY		S- TIME 0- TIME	BASE HOURLY RATE	TOTAL FRINGE BENEFITS (C=Cash) (FB=Contributions)*	DED	OTAL UCTIONS	GROSS PAY FOR PREVAILING RATE JOB(S)	СНЕСК
														C: FB:				
														C: FB:				
												:		C: FB:				
														C: FB:				
			·											C: FB:				
											*SEE	REVE	RSE SIDE	DAGE NUMBER		0.5	<del>.</del>	

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PAGE NUMBER \_\_\_\_\_ OF \_\_\_\_

#### **RULES AND REGULATIONS FOR OUTSIDE CONTRACTORS**

#### **PRACTICE**

It is the practice of Bucks County to require outside contractors to abide by established safety rules and regulations designed to protect our personnel and facilities. The intent of this procedure is to provide sufficient information to allow our contractors to conduct business in all County facilities in a safe and professional manner.

#### **PROCEDURE**

- A. The General Services Department shall communicate the safety rules and regulations for outside contractors to the contractor or his representative prior to the beginning of work, and inform the contractor that violation of these rules and regulations by the contractor may be **grounds for cancellation of the Agreement** by the County Commissioners or the Chief Operating Officer.
- B. All threats to safety involving outside contractors must be reported to the General Services Department.
- C. Bucks County Purchasing Department or requesting department, shall send a copy of this procedure to all contractors as part of any bid or quote package issued.
- D. The contractor must notify the General Services Department by phone at 215-345-3950 before starting work at any County facility.

#### **RULES**

- A. The contractor is responsible for adherence to existing local, state and federal codes and regulations.
- B. Personal vehicles may be parked in designated areas; all parking regulations as posted must be observed.
- C. The possession of any type of weapon on county property is prohibited. The contractor shall not allow his employees to work under the influence of narcotics or intoxicating beverages.
- D. Fighting, horse-play and running are prohibited within the entire facility.
- E. Smoking is not permitted.
- F. Before starting any excavation the contractor must consult with the General Services department for all known underground utilities. The contractor is also responsible to schedule a PA one Call before starting any work. All open pits and excavated areas must be properly protected at all times. Barricades, identification signs or other warning devices must be used at these hazardous locations when no work is being performed.
- G. The treatment of injuries sustained by the contractor's employees shall be the responsibility of the contractor.
- H. Regardless of the type of fuel used, all fuel-driven machines must be shut down for refueling.
- I. Gasoline powered trucks must be equipped with a spark-arrester on tail pipe. No riders, other than the driver, are permitted on either empty or loaded trucks. Refueling must be done outside the building.

- J. Adequate and proper eye protection such as safety glasses, face shields or goggles must be properly worn at all times when work offers an eye injury exposure. Safety glasses must also be worn in any posted area requiring their use.
- K. Oily or otherwise dirty disposable wiping cloths must be deposited in closed covered containers.
- L. Housekeeping is the contractor's responsibility. Clean-up of the respective working areas must be accomplished at the end of the day or shift or more often if an unusual hazard is created.
- M. Bulk storage of flammable liquids must be kept outside of buildings. No more than one day's working supply should be inside the building at any time and they must be kept in properly labeled self-closing covered safety containers.
- N. Dunnage, binding wire, metal strapping and other types of debris must be cleaned up immediately after use and taken to designated collection areas. At no time shall scrap be permitted to remain in <u>aisles</u> and areas where it could become a "tripping" or a "slip and fall" hazard.
- O. Aisles, exits, walkways and fire protection equipment must be maintained free from obstruction at all times. Fire doors must not be blocked or fastened open. Wires, cables or hoses, etc. shall not pass through a doorway and prevent the fire door from closing completely.
- P. Adequate fire protection must be provided at every job site where flame and spark producing equipment is used. This equipment must be inspected by the contractor before it is used to ensure that it is in good working order. A Cutting and Welding Permit must be secured from the General Service Department before starting such work.
- Q. General Services, in conjunction with the Fire Marshal's Office shall show the contractor the various methods of transmitting fire alarms within the facility. It is the responsibility of the contractor to familiarize his employees with these methods.
- R. When welding and/or cutting are done in storage rooms, flammable liquid area and vapor degreaser areas, the flammable material must be adequately covered with flame retardant tarpaulins. While the cutting and/or welding is being done, at least one person must be stationed in the immediate area with a suitable fire extinguisher.
- S. When cutting, welding or grinding work is to be done in the immediate vicinity of county employees, adequate screen protection from flying objects must be provided.
- T. If and when it becomes necessary to use a fire extinguisher, it must be reported immediately to the General Services Department.
- U. All ladders must be substantially built, free of defects and provided with the necessary safety equipment. Extension ladders, while in use, must be securely fastened to prevent them from falling or skidding. Aluminum ladders are not permitted.
- V. Acetylene, oxygen, nitrogen and other compressed gas cylinders must be securely fastened in an upright position.
- W. Contractors must store gas cylinders in a specified location. After completion of the work, the contractor is responsible for the removal of all his gas cylinders.

- X. Any spillage, regardless of its nature, must be cleaned up immediately.
- Y. Safety guards or other devices shall not be removed from tools or equipment except for repairs and must be replaced upon completion of repair.
- Z. Scaffolds planks, ladders, ropes, ground wires, etc., shall be inspected by the contractor and replaced if they prove to be defective.
- AA. Hard hats should be worn when overhead work is being performed.
- BB. Temporary wiring must be properly insulated and substantially supported.
- CC. If work necessitates the turning off of any portion of the sprinkler systems or power, <u>General Services</u>

  <u>Department</u> in conjunction with the Fire marshal's Office, must be notified 24 hours prior to these systems being turned off or on.
- DD. It is the responsibility of the contractor to see that only authorized, qualified (licensed if required) personnel use power actuated (stud) tools. Adequate shields to lessen the danger of flying materials must be erected if work is done in close proximity to county employees.
- EE. It is the responsibility of the contractor's representative to familiarize himself with the building or work area layout and to instruct employees in the location of emergency exits and evacuation routes.
- FF. The contractor's employees will be permitted access only to those areas necessary for the performance of contractual work. Under no circumstances are the contractor's employees allowed to tour or roam around the facility or enter areas not necessary for the performance of their work.
- GG. "Strike anywhere" matches are not permitted.
- HH. All personnel must wear shirts with sleeves that cover the shoulders and pants that cover the entire leg to the ankle.
- II. At no time is work permitted with materials that the employee does not understand or are not aware of the hazard. The contractor is required to have Material Safety Data Sheets for all materials.

Project Name:	Bensalem Library HVAC Replacements
Awarding Agency:	Bucks County Free Library
Contract Award Date:	12/7/2021
Serial Number:	21-07165
Project Classification:	Building
Determination Date:	10/12/2021
Assigned Field Office:	Philadelphia
Field Office Phone Number:	(215)560-1858
Toll Free Phone Number:	
Project County:	Bucks County

Project: 21-07165 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Asbestos & Insulation Workers	5/29/2017		\$47.30	\$34.85	\$82.15
Asbestos & Insulation Workers	5/1/2018		\$49.30	\$35.85	\$85.15
Asbestos & Insulation Workers	5/1/2019		\$51.20	\$36.95	\$88.15
Asbestos & Insulation Workers	6/1/2020		\$54.20	\$36.95	\$91.15
Asbestos & Insulation Workers	5/1/2021		\$54.35	\$39.95	\$94.30
Boilermaker (Commercial, Institutional, and Minor Repair Work)	3/1/2017		\$28.52	\$18.22	\$46.74
Boilermaker (Commercial, Institutional, and Minor Repair Work)	3/1/2018	100	\$29.52	\$18.22	\$47.74
Boilermaker (Commercial, Institutional, and Minor Repair Work)	1/1/2019		\$29.26	\$18.48	\$47.74
Boilermakers	1/1/2017		\$44.26	\$33.36	\$77.62
Boilermakers	1/1/2018		\$46.26	\$33.36	\$79.62
Boilermakers	3/1/2018		\$45.89	\$33.73	\$79.62
Boilermakers	1/1/2019		\$45.51	\$34.11	\$79.62
Boilermakers	8/1/2019		\$47.21	\$34.11	\$81.32
Boilermakers	1/1/2021		\$49.32	\$34.90	\$84.22
Bricklayer	5/1/2017		\$40.98	\$26.78	\$67.76
Bricklayer	5/1/2018		\$43.73	\$26.78	\$70.51
Bricklayer	5/1/2019		\$46.48	\$26.78	\$73.26
Bricklayer	5/1/2020		\$44.45	\$30.31	\$74.76
Bricklayer	5/1/2021		\$45.45	\$30.61	\$76.06
Carpenter - Chief of Party (Surveying & Layout)	5/1/2017		\$45.25	\$27.59	\$72.84
Carpenter - Chief of Party (Surveying & Layout)	5/1/2018	4/30/2019	\$45.83	\$27.59	\$73.42
Carpenter - Chief of Party (Surveying & Layout)	5/1/2019	4/30/2020	\$46.54	\$27.59	\$74.13
Carpenter - Chief of Party (Surveying & Layout)	5/1/2020		\$47.73	\$27.59	\$75.32
Carpenter - Chief of Party (Surveying & Layout)	5/1/2021		\$47.47	\$28.71	\$76.18
Carpenter - Instrument Person (Surveying & Layout)	5/1/2017		\$39.35	\$27.59	\$66.94
Carpenter - Instrument Person (Surveying & Layout)	5/1/2018	4/30/2019	\$39.85	\$27.59	\$67.44
Carpenter - Instrument Person (Surveying & Layout)	5/1/2019	4/30/2020	\$40.47	\$27.59	\$68.06
Carpenter - Instrument Person (Surveying & Layout)	5/1/2020		\$41.50	\$27.59	\$69.09
Carpenter - Instrument Person (Surveying & Layout)	5/1/2021		\$41.28	\$28.71	\$69.99
Carpenter - Rodman (Surveying & Layout)	5/1/2017		\$19.68	\$19.64	\$39.32
Carpenter - Rodman (Surveying & Layout)	5/1/2018	4/30/2019	\$19.93	\$19.49	\$39.42
Carpenter - Rodman (Surveying & Layout)	5/1/2019	4/30/2020	\$20.24	\$19.69	\$39.93
Carpenter - Rodman (Surveying & Layout)	5/1/2020		\$20.75	\$19.49	\$40.24
Carpenter - Rodman (Surveying & Layout)	5/1/2021		\$20.64	\$20.31	\$40.95
Carpenters	5/1/2017		\$39.35	\$27.59	\$66.94
Carpenters	5/1/2018	4/30/2019	\$39.85	\$27.59	\$67.44
Carpenters	5/1/2019	4/30/2020	\$40.87	\$27.59	\$68.46
Carpenters	5/1/2020		\$41.90	\$27.59	\$69.49
Carpenters	5/1/2021		\$41.28	\$28.71	\$69.99
Carpenters	5/1/2022		\$42.53	\$28.71	\$71.24
Cement Masons	5/1/2017		\$36.45	\$31.76	\$68.21
Cement Masons	5/1/2018		\$37.50	\$32.26	\$69.76

Project: 21-07165 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Cement Masons	5/1/2019		\$38.50	\$32.81	\$71.31
Cement Masons	5/1/2020		\$39.45	\$33.46	\$72.91
DockBuilder/ Divers (Building Heavy & Highway)	5/1/2020		\$52.44	\$37.27	\$89.71
DockBuilder/Pile Drivers (Building, Heavy & Highway)	5/1/2018		\$43.45	\$34.47	\$77.92
DockBuilder/Pile Drivers (Building, Heavy & Highway)	5/1/2020		\$43.70	\$37.27	\$80.97
DockBuilder/Pile Drivers/ Diver Tender(Building Heavy & Highway)	5/1/2020		\$43.70	\$37.27	\$80.97
Dockbuilder/Piledriver (Building, Heavy, Highway)	11/1/2017		\$43.45	\$33.22	\$76.6
Dockbuilder/Piledriver (Building, Heavy, Highway)	5/1/2018		\$44.70	\$33.22	\$77.9
Drapery Installers	5/1/2009		\$31.09	\$21.34	\$52.4
Drywall Finisher	5/1/2017		\$37.11	\$26.75	\$63.8
Drywall Finisher	5/1/2018		\$39.27	\$27.49	\$66.7
Drywall Finisher	5/1/2019		\$37.75	\$28.11	\$65.8
Drywall Finisher	5/1/2020		\$38.27	\$28.59	\$66.8
Electricians	4/30/2017		\$56.50	\$36.24	\$92.7
Electricians	4/29/2018		\$58.33	\$37.41	\$95.7
Electricians	4/29/2019		\$59.79	\$38.95	\$98.7
Electricians	8/2/2020		\$61.93	\$40.31	\$102.2
Elevator Constructor	1/1/2016		\$52.79	\$30.29	\$83.0
Elevator Constructor	1/1/2018		\$55.76	\$33.05	\$88.8
Elevator Constructor	1/1/2020		\$59.44	\$35.25	\$94.6
Elevator Constructor	1/1/2021		\$61.43	\$36.36	\$97.7
Floor Coverer	5/1/2019		\$44.37	\$28.44	\$72.8
Floor Coverer	5/1/2020		\$46.01	\$28.44	\$74.4
Floor Coverer	5/1/2021		\$45.74	\$29.21	\$74.9
Floor Layer	5/1/2017		\$42.51	\$27.91	\$70.4
Floor Layer	5/1/2018		\$43.11	\$28.09	\$71.2
Glazier	5/1/2017		\$41.30	\$30.80	\$72.
Glazier	5/1/2018		\$43.32	\$32.33	\$75.6
Glazier	5/1/2019	1	\$43.87	\$33.38	\$77.2
Glazier	5/1/2020	1	\$44.92	\$33.63	\$78.5
Glazier	5/1/2021		\$45.67	\$34.38	\$80.0
Interior Finish	5/1/2019		\$30.20	\$25.80	\$56.0
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	7/1/2017		\$47.30	\$32.91	\$80.2
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	7/1/2018		\$51.46	\$30.60	\$82.0
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	7/1/2019		\$49.30	\$34.41	\$83.
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	1/1/2020		\$49.80	\$34.41	\$84.2
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	7/1/2020		\$50.80	\$34.91	\$85.
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	7/1/2021		\$47.70	\$39.51	\$87.2
Iron Workers (Riggers)	7/1/2017		\$39.83		\$67.
Ironworker (Rodman)	1/1/2017		\$46.20	\$31.26	\$77.

Commonwealth of Pennsylvania Report Date: 10/18/2021

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Project: 21-07165 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Ironworker (Rodman)	7/1/2017		\$42.56	\$29.30	\$71.8€
Ironworker (Rodman)	7/1/2018		\$42.88	\$30.60	\$73.48
Ironworker (Rodman)	7/1/2019	15	\$43.88	\$30.85	\$74.73
Ironworker (Rodman)	7/1/2020		\$44.82	\$31.60	\$76.42
Laborers (Class 01 - General)	5/1/2020		\$32.05	\$25.25	\$57.30
Laborers (Class 01 - See notes)	5/1/2017		\$28.65	\$24.95	\$53.60
Laborers (Class 01 - See notes)	5/1/2019		\$30.20	\$25.80	\$56.00
Laborers (Class 02 - See notes)	5/1/2017		\$30.85	\$25.65	\$56.50
Laborers (Class 02 - See notes)	5/1/2019		\$33.15	\$26.50	\$59.65
Laborers (Class 02 - see notes)	5/1/2020		\$35.15	\$26.15	\$61.30
Laborers (Class 03 - See notes)	5/1/2017		\$28.92	\$25.18	\$54.10
Laborers (Class 03 - See notes)	5/1/2019		\$30.52	\$25.98	\$56.50
Laborers (Class 03 - See notes)	5/1/2020		\$32.47	\$25.43	\$57.90
Laborers (Class 04 - See notes)	5/1/2017		\$28.95	\$24.95	\$53.90
Laborers (Class 04 - See notes)	5/1/2019		\$30.52	\$25.98	\$56.50
Laborers (Class 04 - See notes)	5/1/2020		\$32.47	\$25.43	\$57.90
Laborers (Class 05 - See notes)	5/1/2017		\$28.65	\$24.95	\$53.60
Laborers (Class 05 - See notes)	5/1/2019		\$30.20	\$25.80	\$56.00
Laborers (Class 05 - See notes)	5/1/2020		\$32.05	\$25.25	\$57.30
Landscape Laborer	5/1/2017		\$22.71	\$23.08	\$45.79
Landscape Laborer	5/1/2019		\$24.64	\$23.68	\$48.32
Landscape Laborer	5/1/2020		\$26.55	\$23.13	\$49.68
Marble Finisher	5/1/2017		\$35.55	\$24.17	\$59.72
Marble Finisher	5/1/2018		\$37.55	\$24.17	\$61.72
Marble Finisher	5/1/2019		\$39.75	\$24.17	\$63.92
Marble Finisher	5/1/2020		\$37.57	\$27.65	\$65.22
Marble Mason	5/1/2017		\$40.36	\$26.99	\$67.35
Marble Mason	5/1/2018		\$43.11	\$26.99	\$70.10
Marble Mason	5/1/2019		\$45.86	\$26.99	\$72.85
Marble Mason	5/1/2020		\$44.25	\$30.10	\$74.35
Mason Tender, Cement	5/1/2019		\$30.52	\$25.98	\$56.50
Millwright	7/1/2017		\$41.35	\$32.24	\$73.59
Millwright	5/1/2018		\$43.33	\$32.96	\$76.29
Millwright	5/1/2019		\$45.50	\$33.29	\$78.79
Millwright	6/8/2020		\$46.80	\$33.19	\$79.99
Millwright	5/1/2021		\$48.60	\$33.19	\$81.79
Millwright	5/1/2022		\$50.60	\$33.19	\$83.79
Operators (Building, Class 01 - See Notes)	5/1/2017		\$44.87	\$28.14	\$73.01
Operators (Building, Class 01 - See Notes)	5/1/2018		\$46.41	\$28.60	\$75.01
Operators (Building, Class 01 - See Notes)	5/1/2019		\$46.41	\$30.60	\$77.01
Operators (Building, Class 01 - See Notes)	5/1/2020		\$47.96	\$31.05	\$79.01
Operators (Building, Class 01 - See Notes)	5/1/2021		\$49.50	\$31.51	\$81.01
Operators (Building, Class 01A - See Notes)	5/1/2017		\$47.86	\$29.03	\$76.89
Operators (Building, Class 01A - See Notes)	5/1/2018		\$49,41	\$29.49	\$78.90

Project: 21-07165 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Operators (Building, Class 01A - See Notes)	5/1/2019		\$49.41	\$31.49	\$80.90
Operators (Building, Class 01A - See Notes)	5/1/2020		\$50.96	\$31.94	\$82.90
Operators (Building, Class 01A - See Notes)	5/1/2021		\$52.51	\$32.39	\$84.90
Operators (Building, Class 02 - See Notes)	5/1/2017		\$44.62	\$28.07	\$72.69
Operators (Building, Class 02 - See Notes)	5/1/2018		\$46.16	\$28.53	\$74.69
Operators (Building, Class 02 - See Notes)	5/1/2019		\$46.16	\$30.53	\$76.69
Operators (Building, Class 02 - See Notes)	5/1/2020		\$47.71	\$30.98	\$78.69
Operators (Building, Class 02 - See Notes)	5/1/2021		\$49.25	\$31.44	\$80.69
Operators (Building, Class 02A - See Notes)	5/1/2017		\$47.61	\$28.97	\$76.58
Operators (Building, Class 02A - See Notes)	5/1/2018		\$49.16	\$29.42	\$78.58
Operators (Building, Class 02A - See Notes)	5/1/2019		\$49.17	\$31.41	\$80.58
Operators (Building, Class 02A - See Notes)	5/1/2020		\$50.71	\$31.87	\$82.58
Operators (Building, Class 02A - See Notes)	5/1/2021		\$52.26	\$32.32	\$84.58
Operators (Building, Class 03 - See Notes)	5/1/2017		\$40.53	\$26.87	\$67.40
Operators (Building, Class 03 - See Notes)	5/1/2018		\$42.07	\$27.33	\$69.40
Operators (Building, Class 03 - See Notes)	5/1/2019		\$42.08	\$29.32	\$71.40
Operators (Building, Class 03 - See Notes)	5/1/2020		\$43.62	\$29.78	\$73.40
Operators (Building, Class 03 - See Notes)	5/1/2021		\$45.16	\$30.24	\$75.40
Operators (Building, Class 04 - See Notes)	5/1/2017		\$40.24	\$26.78	\$67.02
Operators (Building, Class 04 - See Notes)	5/1/2018		\$41.78	\$27.22	\$69.00
Operators (Building, Class 04 - See Notes)	5/1/2019		\$41.78	\$29.23	\$71.01
Operators (Building, Class 04 - See Notes)	5/1/2020		\$43.32	\$29.69	\$73.01
Operators (Building, Class 04 - See Notes)	5/1/2021		\$44.87	\$30.14	\$75.01
Operators (Building, Class 05 - See Notes)	5/1/2017		\$38.51	\$26.27	\$64.78
Operators (Building, Class 05 - See Notes)	5/1/2018		\$40.05	\$26.73	\$66.78
Operators (Building, Class 05 - See Notes)	5/1/2019		\$40.06	\$28.72	\$68.78
Operators (Building, Class 05 - See Notes)	5/1/2020		\$41.60	\$29.18	\$70.78
Operators (Building, Class 05 - See Notes)	5/1/2021		\$43.14	\$29.64	\$72.78
Operators (Building, Class 06 - See Notes)	5/1/2017		\$37.52	\$25.98	\$63.50
Operators (Building, Class 06 - See Notes)	5/1/2018		\$39.07	\$26.43	\$65.50
Operators (Building, Class 06 - See Notes)	5/1/2019		\$39.07	\$28.43	\$67.50
Operators (Building, Class 06 - See Notes)	5/1/2020		\$40.61	\$28.89	\$69.50
Operators (Building, Class 06 - See Notes)	5/1/2021		\$42.16	\$29.34	\$71.50
Operators (Building, Class 07A- See Notes)	5/1/2017		\$54.14	\$32.47	\$86.6
Operators (Building, Class 07A- See Notes)	5/1/2018		\$55.99	\$33.02	\$89.0
Operators (Building, Class 07A- See Notes)	5/1/2019		\$56.30	\$35.11	\$91.4
Operators (Building, Class 07A- See Notes)	5/1/2020		\$58.16	\$35.65	\$93.8
Operators (Building, Class 07A- See Notes)	5/1/2021		\$60.00	\$36.21	\$96.2
Operators (Building, Class 07B- See Notes)	5/1/2017		\$53.84	\$32.40	\$86.2
Operators (Building, Class 07B- See Notes)	5/1/2018		\$55.70	\$32.92	\$88.6
Operators (Building, Class 07B- See Notes)	5/1/2019		\$56.00	\$35.03	\$91.0
Operators (Building, Class 07B- See Notes)	5/1/2020		\$57.86	\$35.57	\$93.4
Operators (Building, Class 07B- See Notes)	5/1/2021		\$59.72	\$36.11	\$95.8
Painters Class 1 (see notes)	5/1/2021		\$41.24	\$30.29	\$71.5

Project: 21-07165 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Painters Class 2 (see notes)	2/1/2021		\$47.56	\$29.35	\$76.9
Painters Class 4 (see notes)	5/1/2021		\$41.62	\$30.29	\$71.9
Piledrivers	5/1/2021		\$43.73	\$37.99	\$81.72
Plasterers	5/1/2017		\$37.42	\$28.83	\$66.25
Plasterers	5/1/2018		\$37.42	\$30.04	\$67.46
Plasterers	5/1/2019		\$37.72	\$30.74	\$68.46
Plasterers	5/1/2020		\$38.12	\$31.34	\$69.46
plumber	5/1/2018		\$53.45	\$33.54	\$86.99
plumber	5/1/2019		\$55.45	\$34.54	\$89.99
plumber	8/1/2020		\$57.33	\$35.66	\$92.99
plumber	5/1/2021		\$59.83	\$36.16	\$95.99
Plumbers	5/1/2017		\$51.42	\$32.57	\$83.99
Pointers, Caulkers, Cleaners	5/1/2017		\$42.26	\$25.69	\$67.95
Pointers, Caulkers, Cleaners	5/1/2018		\$45.01	\$25.69	\$70.70
Pointers, Caulkers, Cleaners	5/1/2019		\$47.76	\$25.69	\$73.45
Pointers, Caulkers, Cleaners	5/1/2020		\$45.75	\$29.20	\$74.95
Pointers, Caulkers, Cleaners	5/1/2021		\$46.75	\$29,50	\$76.25
Roofers (Composition)	5/1/2017		\$36.15	\$30.22	\$66.37
Roofers (Composition)	5/1/2018		\$37.15	\$31.27	\$68.42
Roofers (Composition)	5/1/2019		\$38.35	\$31.80	\$70.15
Roofers (Composition)	5/1/2020		\$39.50	\$32.30	\$71.80
Roofers (Composition)	5/1/2021		\$40.33	\$33.12	\$73.45
Roofers (Shingle)	5/1/2016		\$25.70	\$19.17	\$44.87
Roofers (Shingle)	5/1/2019		\$28.50	\$20.87	\$49.37
Roofers (Shingle)	5/1/2020		\$29.50	\$21.25	\$50.75
Roofers (Shingle)	5/1/2021		\$30.50	\$21.55	\$52.05
Roofers (Slate & Tile)	5/1/2016		\$28.70	\$19.17	\$47.87
Roofers (Slate & Tile)	5/1/2018	3	\$30.50	\$20.37	\$50.87
Roofers (Slate & Tile)	5/1/2019		\$31.50	\$20.87	\$52.37
Roofers (Slate & Tile)	5/1/2020		\$32.50	\$21.25	\$53.75
Roofers (Slate & Tile)	5/1/2021		\$33.50	\$21.55	\$55.05
Sheet Metal Workers	5/1/2017		\$46.42	\$39.51	\$85.93
Sheet Metal Workers	5/1/2018		\$47.58	\$41.60	\$89.18
Sheet Metal Workers	5/1/2019		\$49.79	\$42.89	\$92.68
Sheet Metal Workers	5/1/2020		\$52.04	\$44.19	\$96.23
Sheet Metal Workers	5/1/2021		\$53.84	\$45.94	\$99.78
Sign Makers and Hangars	7/17/2021		\$29.49	\$23.90	\$53.39
Sprinklerfitters	4/1/2017		\$37.40	\$21.74	\$59.14
Sprinklerfitters	4/1/2018		\$38.80	\$22.74	\$61.54
Sprinklerfitters	5/1/2019		\$57.20	\$28.32	\$85.52
Sprinklerfitters	5/1/2020		\$59.10	\$29.22	\$88.32
Sprinklerfitters	5/1/2021		\$60.83	\$30.34	\$91.17
Steamfitters	5/1/2017		\$54.64	\$32.53	\$87.17
Steamfitters	5/1/2018		\$56.37	\$34.39	\$90.76

Project: 21-07165 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Steamfitters	5/1/2019		\$58.17	\$35.99	\$94.16
Steamfitters	5/1/2020		\$60.47	\$37.24	\$97.71
Steamfitters	5/1/2021		\$60.47	\$40.89	\$101.36
Steamfitters	5/1/2022		\$60.47	\$44.63	\$105.10
Stone Masons	5/1/2017		\$40.36	\$26.99	\$67.35
Stone Masons	5/1/2018		\$43.11	\$26.99	\$70.10
Stone Masons	5/1/2019		\$45.86	\$26.99	\$72.85
Stone Masons	5/1/2020		\$44.25	\$30.10	\$74.35
Stone Masons	5/1/2021		\$44.90	\$30.75	\$75.65
Terrazzo Finisher	5/1/2017		\$39.06	\$22.73	\$61.79
Terrazzo Finisher	5/1/2018		\$41.31	\$22.73	\$64.04
Terrazzo Finisher	5/1/2019		\$43.61	\$22.73	\$66.34
Terrazzo Finisher	5/1/2020		\$41.46	\$26.37	\$67.83
Terrazzo Grinder	5/1/2017		\$39.33	\$22.73	\$62.00
Terrazzo Grinder	5/1/2018		\$41.58	\$22.73	\$64.3
Terrazzo Grinder	5/1/2019		\$43.98	\$22.73	\$66.7
Terrazzo Grinder	5/1/2020		\$41.73	\$26.37	\$68.1
Terrazzo Mechanics	5/1/2017		\$43.71	\$24.81	\$68.5
Terrazzo Mechanics	5/1/2018		\$46.46	\$24.81	\$71.2
Terrazzo Mechanics	5/1/2019		\$49.21	\$24.81	\$74.0
Terrazzo Mechanics	5/1/2020		\$47.51	\$28.01	\$75.5
Terrazzo Mechanics	5/1/2021		\$48.01	\$28.81	\$76.8
Tile Finisher	5/1/2017		\$35.55	\$24.17	\$59.7
Tile Finisher	5/1/2018		\$37.55	\$24.17	\$61.7
Tile Finisher	5/1/2019	-	\$39.75	\$24.17	\$63.9
Tile Finisher	5/1/2020		\$37.57	\$27.65	\$65.2
Tile Setter	5/1/2017		\$43.71	\$24.81	\$68.5
Tile Setter	5/1/2018		\$46.46	\$24.81	\$71.2
	5/1/2019	-	\$49.21	\$24.81	\$74.0
Tile Setter	5/1/2020		\$47.51	\$28.01	\$75.5
Tile Setter  Truckdriver class 1(see notes)	5/1/2017	<del></del>	\$30.46		\$48.4
	5/1/2018		\$31.93	\$17.96	\$49.8
Truckdriver class 1(see notes)	5/1/2019		\$32.21	\$19.19	\$51.4
Truckdriver class 1(see notes)	5/1/2020		\$34.93	\$17.96	\$52.8
Truckdriver class 1(see notes)	5/1/2021		\$36.48		\$54.4
Truckdriver class 1(see notes)	5/1/2017		\$30.56		\$48.5
Truckdriver class 2 (see notes)			\$32.03		\$49.9
Truckdriver class 2 (see notes)	5/1/2018		\$32.03	\$19.19	\$51.5
Truckdriver class 2 (see notes)	5/1/2019	-	\$35.03		\$52.9
Truckdriver class 2 (see notes)	5/1/2020	-	\$36.58		\$54.5
Truckdriver class 2 (see notes)	5/1/2021	ļ		\$17.96 \$17.96	\$48.7
Truckdriver class 3 (see notes)	5/1/2017	-	\$30.81		\$50.2
Truckdriver class 3 (see notes)	5/1/2018		\$32.28		\$50.2 \$51.7
Truckdriver class 3 (see notes)	5/1/2019		\$32.56		
Truckdriver class 3 (see notes)	5/1/2020		\$35.28	\$17.96	\$53.2

Project: 21-07165 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Truckdriver class 3 (see notes)	5/1/2021		\$36.83	\$17.96	\$54.79
Window Film / Tint Installer	6/1/2019		\$24.52	\$12.08	\$36.60

Project: 21-07165 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Carpenter - Chief of Party (Surveying & Layout)	5/1/2017		\$51.42	\$27.39	\$78.81
Carpenter - Chief of Party (Surveying & Layout)	5/1/2018	4/30/2019	\$53.20	\$27.69	\$80.89
Carpenter - Chief of Party (Surveying & Layout)	5/1/2019	4/30/2020	\$55.38	\$27.69	\$83.07
Carpenter - Chief of Party (Surveying & Layout)	5/1/2020	4/30/2021	\$57.63	\$27.69	\$85.32
Carpenter - Chief of Party (Surveying & Layout)	5/1/2021		\$59.93	\$27.69	\$87.62
Carpenter - Instrument Person (Surveying & Layout)	5/1/2017		\$44.71	\$27.39	\$72.10
Carpenter - Instrument Person (Surveying & Layout)	5/1/2018	4/30/2019	\$46.26	\$27.69	\$73.95
Carpenter - Instrument Person (Surveying & Layout)	5/1/2019	4/30/2020	\$48.16	\$27.69	\$75.8
Carpenter - Instrument Person (Surveying & Layout)	5/1/2020	4/30/2021	\$50.11	\$27.69	\$77.80
Carpenter - Instrument Person (Surveying & Layout)	5/1/2021		\$52.11	\$27.69	\$79.80
Carpenter - Rodman (Surveying & Layout)	5/1/2017		\$35.77	\$21.19	\$56.96
Carpenter - Rodman (Surveying & Layout)	5/1/2018	4/30/2019	\$37.01	\$21.34	\$58.3
Carpenter - Rodman (Surveying & Layout)	5/1/2019	4/30/2020	\$38.53	\$21.34	\$59.8
Carpenter - Rodman (Surveying & Layout)	5/1/2020	4/30/2021	\$40.09	\$21.34	\$61.4
Carpenter - Rodman (Surveying & Layout)	5/1/2021	14	\$41.69	\$21.34	\$63.0
Carpenter	5/1/2018	4/30/2019	\$46.26	\$27.69	\$73.9
Carpenter	5/1/2019	4/30/2020	\$47.81	\$28.04	\$75.8
	5/1/2020		\$49.46	\$28.34	\$77.80
Carpenter Carpenter	5/1/2021		\$51.76	\$28.04	\$79.8
Cement Masons	5/1/2017		\$34.45	\$31.51	\$65.9
	5/1/2018		\$35.65	\$32.01	\$67.6
Cement Masons	5/1/2019		\$37.90	\$31.51	\$69.4
Cement Masons	5/1/2020		\$37.95	\$33.26	\$71.2
Cement Masons	5/1/2021		\$39.65	\$33.41	\$73.0
Cement Masons	5/1/2020	<del>- ,</del>	\$52.44	\$37.27	\$89.7
DockBuilder/ Divers (Building Heavy & Highway)  DockBuilder/Pile Drivers/ Diver Tender(Building Heavy & Highway)	5/1/2020		\$43.70	\$37.27	\$80.9
Electric Lineman	5/29/2017		\$52.60	\$26.37	\$78.9
Electric Lineman	5/28/2018		\$53.64	\$27.45	\$81.0
Electric Lineman	5/27/2019		\$54.66	\$28.56	\$83.2
Electric Lineman	6/1/2020		\$55.96	\$29.76	\$85.7
	5/31/2021	<del> </del>	\$57.93	\$30.22	\$88.1
Electric Lineman	5/30/2022	-	\$59.17	\$31.48	\$90.6
Electric Lineman	5/29/2023	-	\$60.48	\$32.77	\$93.2
Electric Lineman	6/3/2024		\$62.07	\$33.96	\$96.0
Electric Lineman	6/1/2022		\$44.46	\$23.06	\$67.5
Electricians	6/1/2023		\$46.49	\$23.06	\$69.5
Electricians Iron Workers (Bridge, Structural Steel, Ornamental,	7/1/2016		\$46.20	\$31.26	\$77.4
Precast, Reinforcing)  Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	1/1/2017		\$46.20	\$31.26	\$77.4
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	7/1/2020		\$50.80	\$34.91	\$85.7
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	7/1/2021		\$47.70	\$39.51	\$87.2
Iron Workers	7/1/2017	1	\$47.30	\$32.91	\$80.2

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Project: 21-07165 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Iron Workers	7/1/2019		\$49.30	\$34.41	\$83.7
Iron Workers	1/1/2020		\$49.80	\$34.41	\$84.2
Ironworker (Rodman)	7/1/2020		\$44.82	\$31.60	\$76.42
Laborers (Class 01 - See notes)	5/1/2017		\$29.75	\$25.65	\$55.40
Laborers (Class 01 - See notes)	5/1/2018		\$31.25	\$25.65	\$56.90
Laborers (Class 01 - See notes)	5/1/2019		\$31.95	\$26.50	\$58.4
Laborers (Class 01 - See notes)	5/1/2020		\$33.95	\$26.15	\$60.10
Laborers (Class 01 - See notes)	5/1/2021		\$36.20	\$25.65	\$61.8
Laborers (Class 02 - See notes)	5/1/2017		\$29.95	\$25.65	\$55.60
Laborers (Class 02 - See notes)	5/1/2018		\$31.45	\$25.65	\$57.1
Laborers (Class 02 - See notes)	5/1/2019		\$32.15	\$26.50	\$58.6
Laborers (Class 02 - See notes)	5/1/2020		\$34.15	\$26.15	\$60.30
Laborers (Class 02 - See notes)	5/1/2021		\$36.40	\$25.65	\$62.0
Laborers (Class 03 - See notes)	5/1/2017		\$29.95	\$25.65	\$55.60
Laborers (Class 03 - See notes)	5/1/2018		\$31.45	\$25.65	\$57.10
Laborers (Class 03 - See notes)	5/1/2019		\$32.15	\$26.50	\$58.6
Laborers (Class 03 - See notes)	5/1/2020		\$34.15	\$26.15	\$60.30
_aborers (Class 03 - See notes)	5/1/2021		\$36.40	\$25.65	\$62.0
_aborers (Class 04 - See notes)	5/1/2017		\$24.55	\$25.65	\$50.20
_aborers (Class 04 - See notes)	5/1/2018		\$26.05	\$25.65	\$51,70
_aborers (Class 04 - See notes)	5/1/2019		\$26.75	\$26.50	\$53.2
Laborers (Class 04 - See notes)	5/1/2020		\$28.75	\$26.15	\$54.90
_aborers (Class 04 - See notes)	5/1/2021		\$31.00	\$25.65	\$56.65
_aborers (Class 05 - See notes)	5/1/2017		\$30.60	\$25.65	\$56.25
aborers (Class 05 - See notes)	5/1/2018		\$32.10	\$25.65	\$57.75
aborers (Class 05 - See notes)	5/1/2019	-	\$32.80	\$26.50	\$59.30
aborers (Class 05 - See notes)	5/1/2020		\$34.80	\$26.15	\$60.95
_aborers (Class 05 - See notes)	5/1/2021		\$37.05	\$25.65	\$62.70
aborers (Class 06 - See notes)	5/1/2017		\$30.65	\$25.65	\$56.30
aborers (Class 06 - See notes)	5/1/2018		\$32.15	\$25.65	\$57.80
_aborers (Class 06 - See notes)	5/1/2019		\$32.85	\$26.50	\$59.35
aborers (Class 06 - See notes)	5/1/2020		\$34.85	\$26.15	\$61.00
aborers (Class 06 - See notes)	5/1/2021		\$37.10	\$25.65	\$62.75
aborers (Class 07 - See notes)	5/1/2017		\$30.50	\$25.65	\$56.15
aborers (Class 07 - See notes)	5/1/2018		\$32.00	\$25.65	\$57.65
aborers (Class 07 - See notes)	5/1/2019		\$32.70	\$26.50	\$59.20
aborers (Class 07 - See notes)	5/1/2020		\$34.70	\$26.15	\$60.85
aborers (Class 07 - See notes)	5/1/2021		\$36.95	\$25.65	\$62.60
aborers (Class 08 - See notes)	5/1/2017		\$30.25	\$25.65	\$55.90
aborers (Class 08 - See notes)	5/1/2018		\$31.75	\$25.65	\$57.40
aborers (Class 08 - See notes)	5/1/2019		\$32.45	\$26.50	\$58.95
aborers (Class 08 - See notes)	5/1/2020		\$34.45	\$26.15	\$60.60
aborers (Class 08 - See notes)	5/1/2021		\$36.70	\$25.65	\$62.35
aborers (Class 09 - See notes)	5/1/2017		\$30.10	\$25.65	\$55.75

Project: 21-07165 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Laborers (Class 09 - See notes)	5/1/2018		\$31.60	\$25.65	\$57.25
Laborers (Class 09 - See notes)	5/1/2019		\$32.30	\$26.50	\$58.80
Laborers (Class 09 - See notes)	5/1/2020		\$34.30	\$26.15	\$60.45
Laborers (Class 09 - See notes)	5/1/2021		\$36.55	\$25.65	\$62.20
Laborers (Class 10- See notes)	5/1/2017		\$30.25	\$25.65	\$55.90
Laborers (Class 10- See notes)	5/1/2018		\$33.30	\$25.65	\$58.95
Laborers (Class 10- See notes)	5/1/2019		\$32.45	\$26.50	\$58.95
Laborers (Class 10- See notes)	5/1/2020		\$34.45	\$26.15	\$60.60
Laborers (Class 10- See notes)	5/1/2021		\$36.70	\$25.65	\$62.35
Laborers (Class 11 -See Notes)	5/1/2017		\$30.15	\$25.65	\$55.80
Laborers (Class 11 -See Notes)	5/1/2018		\$31.55	\$25.65	\$57.20
Laborers (Class 11 -See Notes)	5/1/2019		\$32.35	\$26.50	\$58.85
Laborers (Class 11 -See Notes)	5/1/2020		\$34.35	\$26.15	\$60.50
Laborers (Class 11 -See Notes)	5/1/2021		\$36.50	\$25.65	\$62.15
Laborers (Class 12 -See Notes)	5/1/2017		\$31.85	\$25.65	\$57.50
Laborers (Class 12 -See Notes)	5/1/2018		\$32.45	\$25.65	\$58.1
Laborers (Class 12 -See Notes)	5/1/2019		\$34.05	\$26.50	\$60.5
Laborers (Class 12 -See Notes)	5/1/2020		\$36.05	\$26.15	\$62.2
Laborers (Class 12 -See Notes)	5/1/2021		\$37.40	\$25.65	\$63.0
Laborers (Class 13 -See Notes)	5/1/2017		\$33.88	\$25.65	\$59.5
Laborers (Class 13 -See Notes)	5/1/2018		\$35.38	\$25.65	\$61.0
Laborers (Class 13 -See Notes)	5/1/2019		\$36.08	\$26.50	\$62.5
	5/1/2020		\$38.08	\$26.15	\$64.2
Laborers (Class 13 -See Notes)	5/1/2021	<b>-</b>	\$40.33	\$25.65	\$65.9
Laborers (Class 13 -See Notes)	5/1/2017	2	\$30.00		\$55.6
Laborers (Class 14 -See Notes)	5/1/2017		\$31.50		\$57.1
Laborers (Class 14 -See Notes)	5/1/2019		\$32.20		\$58.7
Laborers (Class 14 -See Notes)	5/1/2019		\$34.20		\$60.3
Laborers (Class 14 -See Notes)	5/1/2021		\$36.45		\$62.1
Laborers (Class 14 -See Notes)	5/1/2021		\$23.52		\$41.1
Laborers Utility (PGW ONLY) (Flagperson)	5/1/2017		\$30.55		\$48.1
Laborers Utility (PGW ONLY)	5/1/2017		\$21.19		\$43.8
Landscape Laborer			\$24.22	<u> </u>	\$47.7
Landscape Laborer	5/1/2019		\$26.13		\$49.0
Landscape Laborer	5/1/2020	ļ	\$44.87		\$73.0
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2017				\$75.0
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2018		\$46.41		
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2019		\$46.41		\$77.0
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2020		\$47.96		\$79.1
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2021		\$49.50		\$81.0
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2017		\$47.86	\$29.03	\$76.8

Project: 21-07165 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2018		\$49.41	\$29,49	\$78.90
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2019		\$49.41	\$31.49	\$80.90
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2020		\$50.96	\$32.09	\$83.05
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2021		\$52.51	\$32.39	\$84.90
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2017		\$44.62	\$28.07	\$72.69
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2018		\$46.16	\$28.53	\$74.69
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2019		\$46.16	\$30.53	\$76.69
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2020		\$47.71	\$31.13	\$78.84
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2021		\$49.25	\$31.44	\$80.69
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2017		\$47.61	\$28.97	\$76.58
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2018		\$49.16	\$29.42	\$78.58
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2019		\$49.17	\$31.41	\$80.58
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2020		\$50.71	\$32.02	\$82.73
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2021		\$52.27	\$32.31	\$84.58
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2017		\$40.53	\$26.87	\$67.40
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2018		\$42.07	\$27.33	\$69.40
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2019		\$42.08	\$29.32	\$71.40
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2020		\$43.62	\$29.93	\$73.55
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2021		\$45.16	\$30.24	\$75.40
Operators Class 04 - See Notes (Building, Heavy, Highway)	5/1/2017		\$40.24	\$26.78	\$67.02
Operators Class 04 - See Notes (Building, Heavy, Highway)	5/1/2018		\$41.78	\$27.22	\$69.00
Operators Class 04 - See Notes (Building, Heavy, Highway)	5/1/2019		\$41.78	\$29.23	\$71.01
Operators Class 04 - See Notes (Building, Heavy, fighway)	5/1/2020	-	\$43.32	\$29.84	\$73.16
Operators Class 04 - See Notes (Building, Heavy, dighway)	5/1/2021		\$44.86	\$30.15	\$75.01
Operators Class 05 - See Notes (Building, Heavy, lighway)	5/1/2017		\$38.51	\$26.27	\$64.78
Operators Class 05 - See Notes (Building, Heavy, lighway)	5/1/2018		\$40.05	\$26.73	\$66.78
Operators Class 05 - See Notes (Building, Heavy, dighway)	5/1/2019		\$40.06	\$28.72	\$68.78

Project: 21-07165 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Operators Class 05 - See Notes (Building, Heavy, Highway)	5/1/2020		\$41.60	\$29.33	\$70.93
Operators Class 05 - See Notes (Building, Heavy, Highway)	5/1/2021		\$43.14	\$29.64	\$72.78
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2017		\$37.52	\$25.98	\$63.50
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2018		\$39.07	\$26.43	\$65.50
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2019		\$39.07	\$28.43	\$67.50
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2020		\$40.61	\$29.04	\$69.65
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2021		\$42.16	\$29.34	\$71.50
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2017		\$54.14	\$32.47	\$86.61
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2018		\$55.99	\$33.02	\$89.01
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2019		\$56.30	\$35.11	\$91.41
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2020		\$58.16	\$35.80	\$93.96
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2021	=	\$60.00	\$36.21	\$96.2
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2017		\$53.84	\$32.40	\$86.24
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2018		\$55.70	\$32.92	\$88.62
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2019		\$56.00	\$35.03	\$91.03
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2020		\$57.86	\$35.72	\$93.5
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2021		\$59.72	\$36.11	\$95.8
Painters Class 2 (see notes)	2/1/2021		\$47.56	\$29.35	\$76.9
Painters Class 3 (see notes)	2/1/2021		\$58.52	\$29.39	\$87.9
Piledrivers	5/1/2021		\$43.73	\$37.99	\$81.7
Steamfitters (Heavy and Highway - Gas Distribution)	5/1/2017		\$51.91	\$32.53	\$84.4
Steamfitters (Heavy and Highway - Gas Distribution)	5/1/2020		\$60.47	\$36.93	\$97.4
Steamfitters	5/1/2018		\$56.37	\$34.39	\$90.7
Truckdriver class 1(see notes)	5/1/2017		\$30.31	\$17.96	\$48.2
Truckdriver class 1(see notes)	5/1/2018		\$31.78	\$17.96	\$49.7
Truckdriver class 1(see notes)	5/1/2019		\$32.06	\$19.19	\$51.2
Truckdriver class 1(see notes)	5/1/2020		\$34.78	\$17.96	\$52.7
Truckdriver class 1(see notes)	5/1/2021		\$36.33	\$17.96	\$54.2
Truckdriver class 2 (see notes)	5/1/2017		\$30.41	\$17.96	\$48.3
Truckdriver class 2 (see notes)	5/1/2018		\$31.88	\$17.96	\$49.8
Truckdriver class 2 (see notes)	5/1/2019		\$32.16	\$19.19	\$51.3
Truckdriver class 2 (see notes)	5/1/2020		\$34.88	\$17.96	\$52.8
Truckdriver class 2 (see notes)	5/1/2021		\$36.43	\$17.96	\$54.3

Project: 21-07165 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Truckdriver class 3 (see notes)	5/1/2017		\$30.66	\$17.96	\$48.62
Truckdriver class 3 (see notes)	5/1/2018		\$32.13	\$17.96	\$50.09
Truckdriver class 3 (see notes)	5/1/2019		\$32.41	\$19.19	\$51.60
Truckdriver class 3 (see notes)	5/1/2020		\$35.13	\$17.96	\$53.09
Truckdriver class 3 (see notes)	5/1/2021		\$36.68	\$17.96	\$54.64

#### DOCUMENT 00413 - BID FORM

1.1	BID INFORMATION
A.	Bidder:
B.	Project Name: Bucks County Free Library HVAC Replacement Bensalem and Levittown Branch Libraries
C.	Project Locations: Bensalem Branch – 3700 Humeville Road, Bensalem, PA 19020
	Levittown Branch – 7311 New Falls Road, Levittown, PA 19055
D.	Owner: Bucks County Free Library
E.	Library Spec #10-28/21
F.	A mandatory Pre-Bid Meeting will be at 9:00 AM on November 16, 2021. Meet at the Levittown Branch located at 7311 New Falls Road, Levittown, PA 19055.
1.2	CERTIFICATIONS AND BASE BID
A.	Lump Sum Base Bid (Single Prime Contract):
	1. The undersigned Bidder, having carefully examined the Procurement and Contracting Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, as prepared by Holstein White, Inc. and Engineer's consultants, having visited the site, and being familiar with all conditions and requirements of the Work, hereby agrees to furnish all material, labor, equipment and services, including all scheduled allowances, necessary to complete the construction of the above-named project according to the requirements of the Procurement and Contracting Documents, for the stipulated sum of:
	Base Bid
	Dollars (\$)
	Written Figures

Project Name:	Levittown Library HVAC Replacements
Awarding Agency:	Bucks County Free Library
Contract Award Date:	12/7/2021
Serial Number:	21-07247
Project Classification:	Building
Determination Date:	10/18/2021
Assigned Field Office:	Philadelphia
Field Office Phone Number:	(215)560-1858
Toll Free Phone Number:	
Project County:	Bucks County

Project: 21-07247 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Asbestos & Insulation Workers	5/29/2017		\$47.30	\$34.85	\$82.1
Asbestos & Insulation Workers	5/1/2018		\$49.30	\$35.85	\$85.15
Asbestos & Insulation Workers	5/1/2019		\$51.20	\$36.95	\$88,15
Asbestos & Insulation Workers	6/1/2020		\$54.20	\$36.95	\$91.15
Asbestos & Insulation Workers	5/1/2021		\$54.35	\$39.95	\$94.30
Boilermaker (Commercial, Institutional, and Minor Repair Work)	3/1/2017	,	\$28.52	\$18.22	\$46.74
Boilermaker (Commercial, Institutional, and Minor Repair Work)	3/1/2018		\$29.52	\$18.22	\$47.74
Boilermaker (Commercial, Institutional, and Minor Repair Work)	1/1/2019		\$29.26	\$18.48	\$47.74
Boilermakers	1/1/2017		\$44.26	\$33.36	\$77.62
Boilermakers	1/1/2018		\$46.26	\$33.36	\$79.62
Boilermakers	3/1/2018		\$45.89	\$33.73	\$79.62
Boilermakers	1/1/2019		\$45.51	\$34.11	\$79.62
Boilermakers	8/1/2019		\$47.21	\$34.11	\$81.32
Boilermakers	1/1/2021		\$49.32	\$34.90	\$84.22
Bricklayer	5/1/2017		\$40.98	\$26.78	\$67.76
Bricklayer	5/1/2018		\$43.73	\$26.78	\$70.51
Bricklayer	5/1/2019		\$46.48	\$26.78	\$73.26
Bricklayer	5/1/2020		\$44.45	\$30.31	\$74.76
Bricklayer	5/1/2021		\$45.45	\$30.61	\$76.06
Carpenter - Chief of Party (Surveying & Layout)	5/1/2017		\$45.25	\$27.59	\$72.84
Carpenter - Chief of Party (Surveying & Layout)	5/1/2018	4/30/2019	\$45.83	\$27.59	\$73.42
Carpenter - Chief of Party (Surveying & Layout)	5/1/2019	4/30/2020	\$46.54	\$27.59	\$74.13
Carpenter - Chief of Party (Surveying & Layout)	5/1/2020		\$47.73	\$27.59	\$75.32
Carpenter - Chief of Party (Surveying & Layout)	5/1/2021		\$47.47	\$28.71	\$76.18
Carpenter - Instrument Person (Surveying & Layout)	5/1/2017		\$39.35	\$27.59	\$66.94
Carpenter - Instrument Person (Surveying & Layout)	5/1/2018	4/30/2019	\$39.85	\$27.59	\$67.44
Carpenter - Instrument Person (Surveying & Layout)	5/1/2019	4/30/2020	\$40.47	\$27.59	\$68.06
Carpenter - Instrument Person (Surveying & Layout)	5/1/2020		\$41.50	\$27.59	\$69.09
Carpenter - Instrument Person (Surveying & Layout)	5/1/2021		\$41.28	\$28.71	\$69.99
Carpenter - Rodman (Surveying & Layout)	5/1/2017		\$19.68	\$19.64	\$39.32
Carpenter - Rodman (Surveying & Layout)	5/1/2018	4/30/2019	\$19.93	\$19.49	\$39.42
Carpenter - Rodman (Surveying & Layout)	5/1/2019	4/30/2020	\$20.24	\$19.69	\$39.42
Carpenter - Rodman (Surveying & Layout)	5/1/2020		\$20.75	\$19.49	\$40.24
Carpenter - Rodman (Surveying & Layout)	5/1/2021		\$20.64	\$20.31	\$40.95
Carpenters	5/1/2017		\$39.35	\$27.59	\$66.94
Carpenters	5/1/2018	4/30/2019	\$39.85	\$27.59	\$67.44
Carpenters	5/1/2019	4/30/2020	\$40.87	\$27.59	\$68.46
Carpenters	5/1/2020		\$41.90	\$27.59	\$69.49
Carpenters	5/1/2021		\$41.28	\$28.71	\$69.49
Carpenters	5/1/2022		\$42.53	\$28.71	\$71.24
Cement Masons	5/1/2017		\$36.45	\$31.76	\$68.21
Cement Masons	5/1/2018		\$37.50	\$31.76	\$69.76

Project: 21-07247 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Cement Masons	5/1/2019		\$38.50	\$32.81	\$71.31
Cement Masons	5/1/2020		\$39.45	\$33.46	\$72.91
DockBuilder/ Divers (Building Heavy & Highway)	5/1/2020		\$52.44	\$37.27	\$89.71
DockBuilder/Pile Drivers (Building, Heavy & Highway)	5/1/2018		\$43.45	\$34.47	\$77.92
DockBuilder/Pile Drivers (Building, Heavy & Highway)	5/1/2020		\$43.70	\$37.27	\$80.97
DockBuilder/Pile Drivers/ Diver Tender(Building Heavy & Highway)	5/1/2020		\$43.70	\$37.27	\$80.97
Dockbuilder/Piledriver (Building, Heavy, Highway)	11/1/2017		\$43.45	\$33.22	\$76.67
Dockbuilder/Piledriver (Building, Heavy, Highway)	5/1/2018		\$44.70	\$33.22	\$77.92
Drapery Installers	5/1/2009		\$31.09	\$21.34	\$52.43
Drywall Finisher	5/1/2017		\$37.11	\$26.75	\$63.86
Drywall Finisher	5/1/2018		\$39.27	\$27.49	\$66.76
Drywall Finisher	5/1/2019		\$37.75	\$28.11	\$65.86
Drywall Finisher	5/1/2020		\$38.27	\$28.59	\$66.86
Electricians	5/1/2016		\$49.18	\$31.57	\$80.75
Electricians	10/1/2017	9/2/2018	\$49.79	\$32.08	\$81.87
Electricians	9/3/2018		\$50.14	\$31.73	\$81.87
Electricians	1/1/2019	3/31/2019	\$50.20	\$31.67	\$81.87
Electricians	4/1/2019	7/5/2020	\$51.27	\$32.59	\$83.86
Electricians	7/6/2020		\$51.71	\$34.16	\$85.87
Electricians	10/4/2021		\$53.73	\$34.13	\$87.86
Elevator Constructor	1/1/2016		\$52.79	\$30.29	\$83.08
Elevator Constructor	1/1/2018		\$55.76	\$33.05	\$88.81
Elevator Constructor	1/1/2020		\$59.44	\$35.25	\$94.69
Elevator Constructor	1/1/2021		\$61.43	\$36.36	\$97.79
Floor Coverer	5/1/2019		\$44.37	\$28.44	\$72.8
Floor Coverer	5/1/2020		\$46.01	\$28.44	\$74.45
Floor Coverer	5/1/2021		\$45.74	\$29.21	\$74.95
Floor Layer	5/1/2017		\$42.51	\$27.91	\$70.42
Floor Layer	5/1/2018		\$43.11	\$28.09	\$71.20
Glazier	5/1/2017		\$41.30	\$30.80	\$72.1
Glazier	5/1/2018		\$43.32	\$32.33	\$75.6
Glazier	5/1/2019	1	\$43.87	\$33.38	\$77.2
Glazier	5/1/2020		\$44.92	\$33.63	\$78.5
Glazier	5/1/2021		\$45.67	\$34.38	\$80.0
Interior Finish	5/1/2019		\$30.20	\$25.80	\$56.0
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	7/1/2017		\$47.30	\$32.91	\$80.2
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	7/1/2018		\$51.46	\$30.60	\$82.0
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	7/1/2019		\$49.30	\$34.41	\$83.7
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	1/1/2020		\$49.80		\$84.2
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	7/1/2020		\$50.80	\$34.91	\$85.7

Project: 21-07247 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Iron Workers (Bridge, Structural Steel, Ornamental, Precast, Reinforcing)	7/1/2021		\$47.70	\$39.51	\$87.2
Iron Workers (Riggers)	7/1/2017		\$39.83	\$27.92	\$67.75
Ironworker (Rodman)	1/1/2017		\$46.20	\$31.26	\$77.46
Ironworker (Rodman)	7/1/2017		\$42.56	\$29.30	\$71.86
Ironworker (Rodman)	7/1/2018		\$42.88	\$30.60	\$73.48
Ironworker (Rodman)	7/1/2019		\$43.88	\$30.85	\$74.73
Ironworker (Rodman)	7/1/2020		\$44.82	\$31.60	\$76.42
Laborers (Class 01 - General)	5/1/2020		\$32.05	\$25.25	\$57.30
Laborers (Class 01 - See notes)	5/1/2017		\$28.65	\$24.95	\$53.60
Laborers (Class 01 - See notes)	5/1/2019		\$30.20	\$25.80	\$56.00
Laborers (Class 02 - See notes)	5/1/2017		\$30.85	\$25.65	\$56.50
Laborers (Class 02 - See notes)	5/1/2019		\$33.15	\$26.50	\$59.65
Laborers (Class 02 - see notes)	5/1/2020		\$35.15	\$26.15	\$61.30
Laborers (Class 03 - See notes)	5/1/2017		\$28.92	\$25.18	\$54.10
Laborers (Class 03 - See notes)	5/1/2019		\$30.52	\$25.98	\$56.50
Laborers (Class 03 - See notes)	5/1/2020		\$32.47	\$25.43	\$57.90
Laborers (Class 04 - See notes)	5/1/2017		\$28.95	\$24.95	\$53.90
Laborers (Class 04 - See notes)	5/1/2019		\$30.52	\$25.98	\$56.50
Laborers (Class 04 - See notes)	5/1/2020		\$32.47	\$25.43	\$57.90
Laborers (Class 05 - See notes)	5/1/2017		\$28.65	\$24.95	\$53.60
Laborers (Class 05 - See notes)	5/1/2019	3.	\$30.20	\$25.80	\$56.00
Laborers (Class 05 - See notes)	5/1/2020		\$32.05	\$25.25	\$57.30
Landscape Laborer	5/1/2017		\$22.71	\$23.08	\$45.79
Landscape Laborer	5/1/2019		\$24.64	\$23.68	\$48.32
Landscape Laborer	5/1/2020		\$26.55	\$23.13	\$49.68
Marble Finisher	5/1/2017		\$35.55	\$24.17	\$59.72
Marble Finisher	5/1/2018		\$37.55	\$24.17	\$61.72
Marble Finisher	5/1/2019		\$39.75	\$24.17	\$63.92
Marble Finisher	5/1/2020		\$37.57	\$27.65	\$65.22
Marble Mason	5/1/2017		\$40.36	\$26.99	\$67.35
Marble Mason	5/1/2018		\$43.11	\$26.99	\$70.10
Marble Mason	5/1/2019		\$45.86	\$26.99	\$72.85
Marble Mason	5/1/2020		\$44.25	\$30.10	\$74.35
Mason Tender, Cement	5/1/2019		\$30.52	\$25.98	\$56.50
Millwright	7/1/2017		\$41.35	\$32.24	\$73.59
Millwright	5/1/2018		\$43.33	\$32.96	\$76.29
Millwright	5/1/2019		\$45.50	\$33.29	\$78.79
<b>Millwright</b>	6/8/2020		\$46.80	\$33.19	\$79.99
Millwright	5/1/2021		\$48.60	\$33.19	\$81.79
Aillwright	5/1/2022		\$50.60	\$33.19	\$83.79
Operators (Building, Class 01 - See Notes)	5/1/2017		\$44.87	\$28.14	\$73.01
Operators (Building, Class 01 - See Notes)	5/1/2018		\$46.41	\$28.60	\$75.01
Operators (Building, Class 01 - See Notes)	5/1/2019		\$46.41	\$30.60	\$75.01
Operators (Building, Class 01 - See Notes)	5/1/2020		\$47.96	\$30.60	\$77.01
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Report Date: 10/27/2021

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Project: 21-07247 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Operators (Building, Class 01 - See Notes)	5/1/2021		\$49.50	\$31.51	\$81.01
Operators (Building, Class 01A - See Notes)	5/1/2017		\$47.86	\$29.03	\$76.89
Operators (Building, Class 01A - See Notes)	5/1/2018		\$49.41	\$29.49	\$78.90
Operators (Building, Class 01A - See Notes)	5/1/2019		\$49.41	\$31.49	\$80.90
Operators (Building, Class 01A - See Notes)	5/1/2020		\$50.96	\$31.94	\$82.9
Operators (Building, Class 01A - See Notes)	5/1/2021		\$52.51	\$32.39	\$84.9
Operators (Building, Class 02 - See Notes)	5/1/2017		\$44.62	\$28.07	\$72.6
Operators (Building, Class 02 - See Notes)	5/1/2018		\$46.16	\$28.53	\$74.6
Operators (Building, Class 02 - See Notes)	5/1/2019		\$46.16	\$30.53	\$76.6
Operators (Building, Class 02 - See Notes)	5/1/2020		\$47.71	\$30.98	\$78.6
Operators (Building, Class 02 - See Notes)	5/1/2021		\$49.25	\$31.44	\$80.6
Operators (Building, Class 02A - See Notes)	5/1/2017		\$47.61	\$28.97	\$76.5
Operators (Building, Class 02A - See Notes)	5/1/2018		\$49.16	\$29.42	\$78.5
Operators (Building, Class 02A - See Notes)	5/1/2019		\$49.17	\$31.41	\$80.5
Operators (Building, Class 02A - See Notes)	5/1/2020		\$50.71	\$31.87	\$82.5
Operators (Building, Class 02A - See Notes)	5/1/2021		\$52.26	\$32.32	\$84.5
Operators (Building, Class 03 - See Notes)	5/1/2017		\$40.53	\$26.87	\$67.4
Operators (Building, Class 03 - See Notes)	5/1/2018		\$42.07	\$27.33	\$69.4
Operators (Building, Class 03 - See Notes)	5/1/2019		\$42.08	\$29.32	\$71.4
Operators (Building, Class 03 - See Notes)	5/1/2020		\$43.62	\$29.78	\$73.4
Operators (Building, Class 03 - See Notes)	5/1/2021		\$45.16	\$30.24	\$75.4
	5/1/2017	<b></b>	\$40.24	\$26.78	\$67.0
Operators (Building, Class 04 - See Notes)	5/1/2018		\$41.78	\$27.22	\$69.0
Operators (Building, Class 04 - See Notes)	5/1/2019	-	\$41.78	\$29.23	\$71.0
Operators (Building, Class 04 - See Notes)	5/1/2020		\$43.32	\$29.69	\$73.
Operators (Building, Class 04 - See Notes)	5/1/2021		\$44.87	\$30.14	\$75.
Operators (Building, Class 04 - See Notes)	5/1/2021		\$38.51	\$26.27	\$64.
Operators (Building, Class 05 - See Notes)	5/1/2018	-	\$40.05	\$26.73	\$66.
Operators (Building, Class 05 - See Notes)	5/1/2019		\$40.06	\$28.72	\$68.
Operators (Building, Class 05 - See Notes)			\$41.60	\$29.18	\$70.
Operators (Building, Class 05 - See Notes)	5/1/2020		\$43.14	\$29.64	\$72.
Operators (Building, Class 05 - See Notes)	5/1/2021	-	\$37.52	\$25.98	\$63.
Operators (Building, Class 06 - See Notes)	5/1/2017		\$39.07	\$26.43	\$65.
Operators (Building, Class 06 - See Notes)	5/1/2018	-	\$39.07	\$28.43	\$67.
Operators (Building, Class 06 - See Notes)	5/1/2019		\$40.61	\$28.89	\$69.
Operators (Building, Class 06 - See Notes)	5/1/2020		\$40.61		\$71.
Operators (Building, Class 06 - See Notes)	5/1/2021				\$86.
Operators (Building, Class 07A- See Notes)	5/1/2017		\$54.14		\$89.
Operators (Building, Class 07A- See Notes)	5/1/2018		\$55.99		\$91.
Operators (Building, Class 07A- See Notes)	5/1/2019		\$56.30		
Operators (Building, Class 07A- See Notes)	5/1/2020		\$58.16		\$93.
Operators (Building, Class 07A- See Notes)	5/1/2021		\$60.00		\$96
Operators (Building, Class 07B- See Notes)	5/1/2017		\$53.84		\$86.
Operators (Building, Class 07B- See Notes)	5/1/2018		\$55.70		\$88.
Operators (Building, Class 07B- See Notes)	5/1/2019		\$56.00	\$35.03	\$91.

Project: 21-07247 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Operators (Building, Class 07B- See Notes)	5/1/2020		\$57.86	\$35.57	\$93,4
Operators (Building, Class 07B- See Notes)	5/1/2021		\$59.72	\$36.11	\$95.8
Painters Class 1 (see notes)	5/1/2021		\$41.24	\$30.29	\$71.5
Painters Class 2 (see notes)	2/1/2021		\$47.56	\$29.35	\$76.9
Pairiters Class 4 (see notes)	5/1/2021		\$41.62	\$30.29	\$71.9
Piledrivers	5/1/2021		\$43.73	\$37.99	\$81.72
Plasterers	5/1/2017		\$37.42	\$28.83	\$66.2
Plasterers	5/1/2018	1 31	\$37.42	\$30.04	\$67.4
Plasterers	5/1/2019		\$37.72	\$30.74	\$68.40
Plasterers	5/1/2020		\$38.12	\$31.34	\$69.46
plumber	5/1/2018		\$53.45	\$33.54	\$86.99
plumber	5/1/2019		\$55.45	\$34.54	\$89.99
plumber	8/1/2020		\$57.33	\$35.66	\$92.99
plumber	5/1/2021		\$59.83	\$36.16	\$95.99
Plumbers	5/1/2017		\$51.42	\$32.57	\$83.99
Pointers, Caulkers, Cleaners	5/1/2017		\$42.26	\$25.69	\$67.95
Pointers, Caulkers, Cleaners	5/1/2018		\$45.01	\$25.69	\$70.70
Pointers, Caulkers, Cleaners	5/1/2019		\$47.76	\$25.69	\$73.45
Pointers, Caulkers, Cleaners	5/1/2020		\$45.75	\$29.20	\$74.95
Pointers, Caulkers, Cleaners	5/1/2021		\$46.75	\$29,50	\$76.25
Roofers (Composition)	5/1/2017	-	\$36.15	\$30.22	\$66.37
Roofers (Composition)	5/1/2018		\$37.15	\$31.27	\$68.42
Roofers (Composition)	5/1/2019		\$38.35	\$31.80	\$70.15
Roofers (Composition)	5/1/2020		\$39.50	\$32.30	\$71.80
Roofers (Composition)	5/1/2021		\$40.33	\$33.12	\$73.45
Roofers (Shingle)	5/1/2016		\$25.70	\$19.17	\$44.87
Roofers (Shingle)	5/1/2019		\$28.50	\$20.87	\$49.37
Roofers (Shingle)	5/1/2020		\$29.50	\$21.25	\$50.75
Roofers (Shingle)	5/1/2021		\$30.50	\$21.55	\$52.05
Roofers (Slate & Tile)	5/1/2016		\$28.70	\$19.17	\$47.87
Roofers (Slate & Tile)	5/1/2018		\$30.50	\$20.37	\$50.87
Roofers (Slate & Tile)	5/1/2019		\$31.50	\$20.87	\$52.37
Roofers (Slate & Tile)	5/1/2020		\$32.50	\$21.25	\$53.75
Roofers (Slate & Tile)	5/1/2021		\$33.50	\$21.55	\$55.05
Sheet Metal Workers	5/1/2017		\$46.42	\$39.51	\$85.93
Sheet Metal Workers	5/1/2018		\$47.58	\$41.60	\$89.18
Sheet Metal Workers	5/1/2019		\$49.79	\$42.89	\$92.68
Sheet Metal Workers	5/1/2020		\$52.04	\$44.19	\$96.23
Sheet Metal Workers	5/1/2021		\$53.84	\$45.94	\$90.23
Sign Makers and Hangars	7/17/2021		\$29.49	\$23.90	\$53.39
Sprinklerfitters	4/1/2017		\$37.40	\$23.90	
Sprinklerfitters	4/1/2018		\$37.40	\$21.74	\$59.14
Sprinklerfitters	5/1/2019		\$57.20	\$28.32	\$61.54
Sprinklerfitters	5/1/2020		\$57.20	\$28.32	\$85.52 \$88.32

Project: 21-07247 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Sprinklerfitters	5/1/2021		\$60.83	\$30.34	\$91.1
Steamfitters	5/1/2017		\$54.64	\$32.53	\$87.1
Steamfitters	5/1/2018		\$56.37	\$34.39	\$90.7
Steamfitters	5/1/2019		\$58.17	\$35.99	\$94.1
Steamfitters	5/1/2020		\$60.47	\$37.24	\$97.7
Steamfitters	5/1/2021	t e	\$60.47	\$40.89	\$101.3
Steamfitters	5/1/2022		\$60.47	\$44.63	\$105.1
Stone Masons	5/1/2017		\$40.36	\$26.99	\$67.3
Stone Masons	5/1/2018		\$43.11	\$26.99	\$70.1
Stone Masons	5/1/2019		\$45.86	\$26.99	\$72.8
Stone Masons	5/1/2020		\$44.25	\$30.10	\$74.3
Stone Masons	5/1/2021		\$44.90	\$30.75	\$75.6
Terrazzo Finisher	5/1/2017		\$39.06	\$22.73	\$61.7
Terrazzo Finisher	5/1/2018		\$41.31	\$22.73	\$64.0
Terrazzo Finisher	5/1/2019		\$43.61	\$22.73	\$66.3
Terrazzo Finisher	5/1/2020		\$41.46	\$26.37	\$67.8
Terrazzo Grinder	5/1/2017		\$39.33	\$22.73	\$62.0
Terrazzo Grinder	5/1/2018		\$41.58	\$22.73	\$64.3
	5/1/2019	<b>-</b>	\$43.98	\$22.73	\$66.
Terrazzo Grinder	5/1/2020		\$41.73	\$26.37	\$68.
Terrazzo Grinder	5/1/2017		\$43.71	\$24.81	\$68.
Terrazzo Mechanics	5/1/2018	-	\$46.46	\$24.81	\$71.:
Terrazzo Mechanics	5/1/2019		\$49.21	\$24.81	\$74.0
Terrazzo Mechanics	5/1/2019		\$47.51	\$28.01	\$75.
Terrazzo Mechanics		-	\$48.01	\$28.81	\$76.
Terrazzo Mechanics	5/1/2021		\$35.55	\$24.17	\$59.
Tile Finisher	5/1/2017		\$37.55	\$24.17	\$61.
Tile Finisher	5/1/2018		\$37.55	\$24.17	\$63.
Tile Finisher	5/1/2019		\$39.75	\$27.65	\$65.
Tile Finisher	5/1/2020				\$68.
Tile Setter	5/1/2017		\$43.71		\$71.
Tile Setter	5/1/2018		\$46.46		\$74.
Tile Setter	5/1/2019		\$49.21	\$24.81	\$75.
Tile Setter	5/1/2020		\$47.51		\$48.
Truckdriver class 1(see notes)	5/1/2017		\$30.46		
Truckdriver class 1(see notes)	5/1/2018		\$31.93		\$49.
Truckdriver class 1(see notes)	5/1/2019		\$32.21		\$51.
Truckdriver class 1(see notes)	5/1/2020		\$34.93		\$52
Truckdriver class 1(see notes)	5/1/2021		\$36.48		\$54
Truckdriver class 2 (see notes)	5/1/2017		\$30.56		\$48
Truckdriver class 2 (see notes)	5/1/2018		\$32.03		\$49
Truckdriver class 2 (see notes)	5/1/2019		\$32.31		\$51
Truckdriver class 2 (see notes)	5/1/2020		\$35.03	\$17.96	\$52
Truckdriver class 2 (see notes)	5/1/2021		\$36.58	\$17.96	\$54
Truckdriver class 3 (see notes)	5/1/2017		\$30.81	\$17.96	\$48

Project: 21-07247 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Truckdriver class 3 (see notes)	5/1/2018		\$32.28	\$17.96	\$50.24
Truckdriver class 3 (see notes)	5/1/2019		\$32.56	\$19.19	\$51.75
Truckdriver class 3 (see notes)	5/1/2020		\$35.28	\$17.96	\$53.24
Trückdriver class 3 (see notes)	5/1/2021		\$36.83	\$17.96	\$54.79
Window Film / Tint Installer	6/1/2019		\$24.52	\$12.08	\$36.60

Project: 21-07247 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Carpenter - Chief of Party (Surveying & Layout)	5/1/2017		\$51.42	\$27.39	\$78.81
Carpenter - Chief of Party (Surveying & Layout)	5/1/2018	4/30/2019	\$53.20	\$27.69	\$80.89
Carpenter - Chief of Party (Surveying & Layout)	5/1/2019	4/30/2020	\$55.38	\$27.69	\$83.07
Carpenter - Chief of Party (Surveying & Layout)	5/1/2020	4/30/2021	\$57.63	\$27.69	\$85.32
Carpenter - Chief of Party (Surveying & Layout)	5/1/2021		\$59.93	\$27.69	\$87.62
Carpenter - Instrument Person (Surveying & Layout)	5/1/2017		\$44.71	\$27.39	\$72.10
Carpenter - Instrument Person (Surveying & Layout)	5/1/2018	4/30/2019	\$46.26	\$27.69	\$73.95
Carpenter - Instrument Person (Surveying & Layout)	5/1/2019	4/30/2020	\$48.16	\$27.69	\$75.8
Carpenter - Instrument Person (Surveying & Layout)	5/1/2020	4/30/2021	\$50.11	\$27.69	\$77.80
Carpenter - Instrument Person (Surveying & Layout)	5/1/2021		\$52.11	\$27.69	\$79.8
Carpenter - Rodman (Surveying & Layout)	5/1/2017		\$35.77	\$21.19	\$56.90
Carpenter - Rodman (Surveying & Layout)	5/1/2018	4/30/2019	\$37.01	\$21.34	\$58.3
Carpenter - Rodman (Surveying & Layout)	5/1/2019	4/30/2020	\$38.53	\$21.34	\$59.8
Carpenter - Rodman (Surveying & Layout)	5/1/2020	4/30/2021	\$40.09	\$21.34	\$61.4
Carpenter - Rodman (Surveying & Layout)  Carpenter - Rodman (Surveying & Layout)	5/1/2021		\$41.69	\$21.34	\$63.0
Carpenter - Rouman (Surveying & Eayout)	5/1/2018	4/30/2019	\$46.26	\$27.69	\$73.9
	5/1/2019	4/30/2020	\$47.81	\$28.04	\$75.8
Corporter	5/1/2020		\$49.46	\$28.34	\$77.8
Carpenter	5/1/2021		\$51.76	\$28.04	\$79.8
Carpenter Cement Masons	5/1/2017		\$34.45	\$31.51	\$65.9
	5/1/2018		\$35.65	\$32.01	\$67.6
Cement Masons	5/1/2019		\$37.90	\$31.51	\$69.4
Cement Masons	5/1/2020		\$37.95	\$33.26	\$71.2
Cement Masons	-5/1/2021	-	\$39.65	\$33.41	\$73.0
Cement Masons	5/1/2020		\$52.44	\$37.27	\$89.7
DockBuilder/ Divers (Building Heavy & Highway)  DockBuilder/Pile Drivers/ Diver Tender(Building Heavy & Highway)	5/1/2020		\$43.70	\$37.27	\$80.9
Electric Lineman	5/29/2017		\$52.60	\$26.37	\$78.9
Electric Lineman	5/28/2018		\$53.64	\$27.45	\$81.0
Electric Lineman	5/27/2019		\$54.66	\$28.56	\$83.2
	6/1/2020		\$55.96	\$29.76	\$85.7
Electric Lineman	5/31/2021		\$57.93	\$30.22	\$88.
Electric Lineman	5/30/2022		\$59.17	\$31.48	\$90.6
Electric Lineman	5/29/2023		\$60.48	\$32.77	\$93.2
Electric Lineman	6/3/2024		\$62.07	\$33.96	\$96.0
Electric Lineman	6/1/2022		\$44.46	\$23.06	\$67.
Electricians	6/1/2023		\$46.49		\$69.
Electricians Iron Workers (Bridge, Structural Steel, Ornamental,	7/1/2016		\$46.20		\$77.
Precast, Reinforcing)  Iron Workers (Bridge, Structural Steel, Ornamental,	1/1/2017		\$46.20	\$31.26	\$77.
Precast, Reinforcing) Iron Workers (Bridge, Structural Steel, Ornamental,	7/1/2020		\$50.80	\$34.91	\$85.
Precast, Reinforcing)  Iron Workers (Bridge, Structural Steel, Ornamental,	7/1/2021		\$47.70	\$39.51	\$87.
Precast, Reinforcing)			\$47.30	\$32.91	\$80.

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Project: 21-07247 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Iron Workers	7/1/2019		\$49.30	\$34.41	\$83.7
Iron Workers	1/1/2020		\$49.80	\$34.41	\$84.2
Ironworker (Rodman)	7/1/2020		\$44.82	\$31.60	\$76.42
Laborers (Class 01 - See notes)	5/1/2017		\$29.75	\$25.65	\$55.40
Laborers (Class 01 - See notes)	5/1/2018		\$31.25	\$25.65	\$56.90
Laborers (Class 01 - See notes)	5/1/2019		\$31.95	\$26.50	\$58.4
Laborers (Class 01 - See notes)	5/1/2020		\$33.95	\$26.15	\$60.10
Laborers (Class 01 - See notes)	5/1/2021		\$36.20	\$25.65	\$61.8
Laborers (Class 02 - See notes)	5/1/2017		\$29.95	\$25.65	\$55.60
Laborers (Class 02 - See notes)	5/1/2018		\$31.45	\$25.65	\$57.10
Laborers (Class 02 - See notes)	5/1/2019	1115	\$32.15	\$26.50	\$58.6
Laborers (Class 02 - See notes)	5/1/2020		\$34.15	\$26.15	\$60.30
Laborers (Class 02 - See notes)	5/1/2021		\$36.40	\$25.65	\$62.0
_aborers (Class 03 - See notes)	5/1/2017		\$29.95	\$25.65	\$55.60
_aborers (Class 03 - See notes)	5/1/2018		\$31.45	\$25.65	\$57.10
_aborers (Class 03 - See notes)	5/1/2019		\$32.15	\$26.50	\$58.65
_aborers (Class 03 - See notes)	5/1/2020		\$34.15	\$26.15	\$60.30
_aborers (Class 03 - See notes)	5/1/2021		\$36.40	\$25.65	\$62.05
_aborers (Class 04 - See notes)	5/1/2017		\$24.55	\$25.65	\$50.20
aborers (Class 04 - See notes)	5/1/2018		\$26.05	\$25.65	\$51,70
aborers (Class 04 - See notes)	5/1/2019		\$26.75	\$26.50	\$53.25
aborers (Class 04 - See notes)	5/1/2020		\$28.75	\$26.15	\$54.90
aborers (Class 04 - See notes)	5/1/2021		\$31.00	\$25.65	\$56.6
aborers (Class 05 - See notes)	5/1/2017		\$30.60	\$25.65	\$56.25
aborers (Class 05 - See notes)	5/1/2018		\$32.10	\$25.65	\$57.75
aborers (Class 05 - See notes)	5/1/2019		\$32.80	\$26.50	\$59.30
aborers (Class 05 - See notes)	5/1/2020		\$34.80	\$26.15	\$60.95
aborers (Class 05 - See notes)	5/1/2021		\$37.05	\$25.65	\$62.70
aborers (Class 06 - See notes)	5/1/2017		\$30.65	\$25.65	\$56.30
aborers (Class 06 - See notes)	5/1/2018		\$32.15	\$25.65	\$57.80
aborers (Class 06 - See notes)	5/1/2019		\$32.85	\$26.50	\$59.35
aborers (Class 06 - See notes)	5/1/2020		\$34.85	\$26.15	\$61.00
aborers (Class 06 - See notes)	5/1/2021		\$37.10	\$25.65	\$62.75
aborers (Class 07 - See notes)	5/1/2017		\$30.50	\$25.65	\$56.15
aborers (Class 07 - See notes)	5/1/2018		\$32.00	\$25.65	\$57.65
aborers (Class 07 - See notes)	5/1/2019		\$32.70	\$26.50	\$59.20
aborers (Class 07 - See notes)	5/1/2020		\$34.70	\$26.15	\$60.85
aborers (Class 07 - See notes)	5/1/2021		\$36.95	\$25.65	\$62.60
aborers (Class 08 - See notes)	5/1/2017		\$30.25	\$25.65	\$55.90
aborers (Class 08 - See notes)	5/1/2018	-	\$31.75	\$25.65	\$57.40
aborers (Class 08 - See notes)	5/1/2019		\$32.45	\$26.50	\$58.95
aborers (Class 08 - See notes)	5/1/2020		\$34.45	\$26.15	\$60.60
aborers (Class 08 - See notes)	5/1/2021		\$36.70	\$25.65	\$62.35
aborers (Class 09 - See notes)	5/1/2017		\$30.70	\$25.65	\$55.75

Project: 21-07247 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Laborers (Class 09 - See notes)	5/1/2018		\$31.60	\$25.65	\$57.25
Laborers (Class 09 - See notes)	5/1/2019		\$32.30	\$26.50	\$58.80
_aborers (Class 09 - See notes)	5/1/2020		\$34.30	\$26.15	\$60.45
_aborers (Class 09 - See notes)	5/1/2021		\$36.55	\$25.65	\$62.20
_aborers (Class 10- See notes)	5/1/2017		\$30.25	\$25.65	\$55.90
Laborers (Class 10- See notes)	5/1/2018		\$33.30	\$25.65	\$58.9
_aborers (Class 10- See notes)	5/1/2019		\$32.45	\$26.50	\$58.9
Laborers (Class 10- See notes)	5/1/2020		\$34.45	\$26.15	\$60.6
Laborers (Class 10- See notes)	5/1/2021		\$36.70	\$25.65	\$62.3
Laborers (Class 11 -See Notes)	5/1/2017		\$30.15	\$25.65	\$55.8
Laborers (Class 11 -See Notes)	5/1/2018		\$31.55	\$25.65	\$57.2
Laborers (Class 11 -See Notes)	5/1/2019		\$32.35	\$26.50	\$58.8
Laborers (Class 11 -See Notes)	5/1/2020		\$34.35	\$26.15	\$60.5
Laborers (Class 11 -See Notes)	5/1/2021		\$36.50	\$25.65	\$62.1
	5/1/2017		\$31.85	\$25.65	\$57.5
Laborers (Class 12 -See Notes)	5/1/2018		\$32.45	\$25.65	\$58.1
Laborers (Class 12 -See Notes)	5/1/2019		\$34.05	\$26.50	\$60.5
Laborers (Class 12 -See Notes)	5/1/2020		\$36.05	\$26.15	\$62.2
Laborers (Class 12 -See Notes)	5/1/2021		\$37.40	\$25.65	\$63.0
Laborers (Class 12 -See Notes)	5/1/2021		\$33.88	\$25.65	\$59.5
Laborers (Class 13 -See Notes)	5/1/2018		\$35.38	\$25.65	\$61.0
Laborers (Class 13 -See Notes)	5/1/2019		\$36.08	\$26.50	\$62.5
Laborers (Class 13 -See Notes)		-	\$38.08		\$64.2
Laborers (Class 13 -See Notes)	5/1/2020		\$40.33		\$65.9
Laborers (Class 13 -See Notes)	5/1/2021	<u> </u>	\$30.00		\$55.6
Laborers (Class 14 -See Notes)	5/1/2017		\$30.00		\$57.1
Laborers (Class 14 -See Notes)	5/1/2018		\$32.20		\$58.7
Laborers (Class 14 -See Notes)	5/1/2019		\$34.20		\$60.3
Laborers (Class 14 -See Notes)	5/1/2020		\$34.20		\$62.1
Laborers (Class 14 -See Notes)	5/1/2021		\$23.52		\$41.
Laborers Utility (PGW ONLY) (Flagperson)	5/1/2017				\$48.
Laborers Utility (PGW ONLY)	5/1/2017		\$30.55 \$21.19		\$43.8
Landscape Laborer	5/1/2016				\$47.7
Landscape Laborer	5/1/2019		\$24.22		\$49.0
Landscape Laborer	5/1/2020		\$26.13		
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2017		\$44.87		\$73.
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2018		\$46.41		\$75.
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2019		\$46.41		\$77.
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2020		\$47.96	\$31.20	\$79.
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2021		\$49.50		\$81.
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2017		\$47.86	\$29.03	\$76.

Project: 21-07247 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2018		\$49.41	\$29.49	\$78.90
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2019		\$49.41	\$31.49	\$80.90
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2020		\$50.96	\$32.09	\$83.05
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2021		\$52.51	\$32.39	\$84.90
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2017		\$44.62	\$28.07	\$72.69
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2018		\$46.16	\$28.53	\$74.69
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2019		\$46.16	\$30.53	\$76.69
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2020		\$47.71	\$31.13	\$78.84
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2021		\$49.25	\$31.44	\$80.69
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2017		\$47.61	\$28.97	\$76.58
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2018		\$49.16	\$29.42	\$78.58
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2019		\$49.17	\$31.41	\$80.58
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2020		\$50.71	\$32.02	\$82.73
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2021		\$52.27	\$32.31	\$84.58
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2017		\$40.53	\$26.87	\$67.40
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2018		\$42.07	\$27.33	\$69.40
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2019		\$42.08	\$29.32	\$71.40
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2020		\$43.62	\$29.93	\$73.55
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2021.		\$45.16	\$30.24	\$75.40
Operators Class 04 - See Notes (Building, Heavy, Highway)	5/1/2017		\$40.24	\$26.78	\$67.02
Operators Class 04 - See Notes (Building, Heavy, Highway)	5/1/2018		\$41.78	\$27.22	\$69.00
Operators Class 04 - See Notes (Building, Heavy, Highway)	5/1/2019		\$41.78	\$29.23	\$71.01
Operators Class 04 - See Notes (Building, Heavy, Highway)	5/1/2020		\$43.32	\$29.84	\$73.16
Operators Class 04 - See Notes (Building, Heavy, Highway)	5/1/2021		\$44.86	\$30.15	\$75.01
Operators Class 05 - See Notes (Building, Heavy, Highway)	5/1/2017		\$38.51	\$26.27	\$64.78
Operators Class 05 - See Notes (Building, Heavy, Highway)	5/1/2018		\$40.05	\$26.73	\$66.78
Operators Class 05 - See Notes (Building, Heavy,	5/1/2019		\$40.06	\$28.72	\$68.78

Project: 21-07247 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Operators Class 05 - See Notes (Building, Heavy, Highway)	5/1/2020		\$41.60	\$29.33	\$70.93
Operators Class 05 - See Notes (Building, Heavy, Highway)	5/1/2021		\$43.14	\$29.64	\$72.78
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2017		\$37.52	\$25.98	\$63.50
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2018		\$39.07	\$26.43	\$65.50
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2019		\$39.07	\$28.43	\$67.50
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2020		\$40.61	\$29.04	\$69.65
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2021		\$42.16	\$29.34	\$71.50
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2017		\$54.14	\$32.47	\$86.61
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2018		\$55.99	\$33.02	\$89.01
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2019		\$56.30	\$35.11	\$91.4
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	-5/1/2020		\$58.16	\$35.80	\$93.96
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2021		\$60.00	\$36.21	\$96.2
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2017		\$53.84	\$32.40	\$86.2
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2018		\$55.70	\$32.92	\$88.62
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2019		\$56.00	\$35.03	\$91.0
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2020		\$57.86	\$35.72	\$93.5
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2021	-	\$59.72	\$36.11	\$95.8
Painters Class 2 (see notes)	2/1/2021		\$47.56	\$29.35	\$76.9
Painters Class 3 (see notes)	2/1/2021		\$58.52	\$29.39	\$87.9
Piledrivers	5/1/2021		\$43.73	\$37.99	\$81.7
Steamfitters (Heavy and Highway - Gas Distribution)	5/1/2017		\$51.91	\$32.53	\$84.4
Steamfitters (Heavy and Highway - Gas Distribution)	5/1/2020		\$60.47	\$36.93	\$97.4
Steamfitters	5/1/2018		\$56.37	\$34.39	\$90.7
Truckdriver class 1(see notes)	5/1/2017		\$30.31	\$17.96	\$48.2
Truckdriver class 1(see notes)	5/1/2018		\$31.78	\$17.96	\$49.7
Truckdriver class 1(see notes)	5/1/2019		\$32.06	\$19.19	\$51.2
Truckdriver class 1(see notes)	5/1/2020		\$34.78	\$17.96	\$52.7
Truckdriver class 1(see notes)	5/1/2021		\$36.33	\$17.96	\$54.2
Truckdriver class 2 (see notes)	5/1/2017		\$30.41	\$17.96	\$48.3
Truckdriver class 2 (see notes)	5/1/2018		\$31.88	\$17.96	\$49.8
Truckdriver class 2 (see notes)	5/1/2019		\$32.16	\$19.19	\$51.3
Truckdriver class 2 (see notes)	5/1/2020		\$34.88	\$17.96	\$52.8
Truckdriver class 2 (see notes)	5/1/2021		\$36.43	\$17.96	\$54.3

# BUREAU OF LABOR LAW COMPLIANCE PREVAILING WAGES PROJECT RATES

Project: 21-07247 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Truckdriver class 3 (see notes)	5/1/2017		\$30.66	\$17.96	\$48.62
Truckdriver class 3 (see notes)	5/1/2018		\$32.13	\$17.96	\$50.09
Truckdriver class 3 (see notes)	5/1/2019		\$32.41	\$19.19	\$51.60
Truckdriver class 3 (see notes)	5/1/2020		\$35.13	\$17.96	\$53.09
Truckdriver class 3 (see notes)	5/1/2021		\$36.68	\$17.96	\$54.64

# DOCUMENT 00413 - BID FORM

1.1	BID INFORMATION
A.	Bidder:
B.	Project Name: Bucks County Free Library HVAC Replacement Bensalem and Levittown Branch Libraries
C.	Project Locations: Bensalem Branch – 3700 Humeville Road, Bensalem, PA 19020
	Levittown Branch – 7311 New Falls Road, Levittown, PA 19055
D.	Owner: Bucks County Free Library
E.	Library Spec #10-28/21
F.	A mandatory Pre-Bid Meeting will be at 9:00 AM on November 16, 2021. Meet at the Levittown Branch located at 7311 New Falls Road, Levittown, PA 19055.
1.2	CERTIFICATIONS AND BASE BID
A.	Lump Sum Base Bid (Single Prime Contract):
	1. The undersigned Bidder, having carefully examined the Procurement and Contracting Requirements, Conditions of the Contract, Drawings, Specifications, and all subsequent Addenda, as prepared by Holstein White, Inc. and Engineer's consultants, having visited the site, and being familiar with all conditions and requirements of the Work, hereby agrees to furnish all material, labor, equipment and services, including all scheduled allowances, necessary to complete the construction of the above-named project according to the requirements of the Procurement and Contracting Documents, for the stipulated sum of:
	Base Bid
	Dollars (\$)
	Written Figures

	Alternate #1 Bid		
		Dollars (\$Figures	)
	Written	Figures	
1.3 B	BID GUARANTEE		
A.	Award, if offered within 60 days after Library the attached cash, cashier's c	n surety as specified within 10 days after a writteer receipt of bids, and on failure to do so agrees sheck, certified check, U.S. money order, or bid lercent (5%) of the Base Bid amount above:	to forfeit to
		Dollars (\$(Numbers)	).
	(Written amount)	(Numbers)	
B. 1.4		Notice of Award within the time limits stated aboash, cashier's check, certified check, U.S. mone	
Α.	List all subcontractors expected to po		
	•	Trade:	
	2. Company:	Trade:	
	3. Company:	Trade:	
	4. Company:	Trade:	
	5. Company:	Trade:	
	6. Company:	Trade:	
1.5	TIME OF COMPLETION		
A.		and agrees hereby to commence the Work of the written Notice to Proceed to be issued by En 120 calendar days.	

BID FORM

# 1.6 ACKNOWLEDGEMENT OF ADDENDA The undersigned Bidder acknowledges receipt of and use of the following Addenda in the A. preparation of this Bid: Addendum No. \_\_\_\_\_ Dated \_\_\_\_\_. 1. Addendum No. Dated . 2. 1.7 **BID SUPPLEMENTS** A. The following supplements are a part of this Bid Form and are attached hereto. Bid Bond Form 1. 2. Non-Collusion Affidavit Contractor's Qualification Statement 3. 4 Proposed Schedule of Values Form Verification of Performance Bond and Labor and Material Bond 5. Verification of Certificates of Insurance 6. Public Works Employment Verification Form. 7. 1.8 CONTRACTOR'S LICENSE The undersigned further states that it is a duly licensed contractor, for the type of work A. proposed, in the Jurisdiction of the Project, and that all fees, permits, etc., pursuant to submitting this proposal have been paid in full. 1.9 SUBMISSION OF BID Respectfully submitted this day of , 20 . Submitted By: (Name of bidding firm or corporation) Authorized Signature: (Handwritten signature) Signed By: (Type or print name) Title: (Owner/Partner/President/Vice President)

BID FORM

Witness By:

Attest:  (Handwritten signature)  By:  (Type or print name)  Title:  (Corporate Secretary or Assistant Secretary)  Street Address: City, State, Zip Phone: License No.: Federal ID No.:  Affix Corporate Seal Here)		(Handwritten signature)	
By:  (Type or print name)  Title:  (Corporate Secretary or Assistant Secretary)  Street Address:  City, State, Zip Phone:  License No.:  Federal ID No.:	Attest:	(Handwritten cignature)	
Title:  (Corporate Secretary or Assistant Secretary)  Street Address: City, State, Zip Phone: License No.: Federal ID No.:		(Handwitten signature)	
Title:  (Corporate Secretary or Assistant Secretary)  Street Address: City, State, Zip Phone: License No.: Federal ID No.:			
City, State, Zip Phone: License No.: Federal ID No.:	By:	(Type or print name)	
City, State, Zip Phone: License No.: Federal ID No.:			
City, State, Zip  Phone:  License No.:  Federal ID No.:	Title:	(Corporate Secretary or Assistant Secretary)	
Phone: License No.: Federal ID No.:	Street Address:		-
License No.:  Federal ID No.:	City, State, Zip		-
Federal ID No.:	Phone:		-
	License No.:		-
	Federal ID No.:		-

Bid responses that do not include pages 00413-1 thru 00413-4 and other items indicated above may not be considered for evaluation and award.

Note: Bids submitted with a bid bond that is not properly signed and sealed by the

Bids submitted with a bid bond that is not properly signed and sealed by the bidder and Surety Company may not be considered for evaluation and award.

BID FORM

bidder and surety company will be rejected.

# END OF DOCUMENT 00413

#### SECTION 01100 - SUMMARY

## PART 1 - GENERAL

## 1.1 SUMMARY

## A. Section Includes:

- 1. Project information.
- 2. Work covered by Contract Documents.
- 3. Access to site.
- 4. Coordination with occupants.
- 5. Work restrictions.
- 6. Specification and drawing conventions.
- 7. New work and Existing Building Systems.

## 1.2 GENERAL CONDITIONS

- A. The Contractor shall visit the site before he submits his proposal. He shall examine all existing conditions which affect the work. Submission of the proposal shall be considered evidence that this requirement has been fulfilled. No extra payment will be allowed for additional work made necessary by the failure to visit the site.
- B. In preparing his estimate, the Contractor shall review all of the contract documents and visit the site in order to acquaint himself with the existing and related conditions that may, will or could affect his work. He shall be experienced, skilled and knowledgeable with this type of construction and shall be expert and proficient in the preparation of estimates and the comprehension, implementation, and interpretation of contract documents such as those prepared for this project.
- C. The Contractor by his acceptance of the contract guarantees that all work installed shall be free from all defects in workmanship and materials and that all apparatus furnished by him shall develop the capacities and characteristics specified. He further guarantees that if, during a period of one (1) year from the date of the certificate of completion and acceptance of the work, any such defects in workmanship, material or performance appear, such defects shall be remedied by him without cost to the Bucks County Free Library.
- D. The Bid Plans issued for procurement of contract are diagrammatic and indicate the general arrangement of systems. The Contractor shall provide all work required for a complete installation. The Bid Plans are not to be scaled. The contractor is solely responsible to field verify all dimensional information.
- E. The Contractor shall give all necessary notices, obtain all permits, pay all governmental taxes, fees and other costs in connection with his work. He shall file all necessary plans, and prepare all other documents including additional detailed plans that are required for compliance with all applicable laws, ordinances, rules and regulations.

**SUMMARY** 

F. The Contractor shall be responsible for all working conditions and shall maintain a safe working environment at the job site for all employees, and building occupants.

## 1.3 PROJECT INFORMATION

- A. Project Identification:
  - 1. Bucks County Free Library HVAC Replacement Bensalem and Levittown Branch Libraries.
- B. Project Address:
  - 1. Bensalem 3700 Hulmeville Road, Bensalem, PA 19020
  - 2. Levittown 7311 New Falls Road, Levittown, PA 19055
- C. Owner: Bucks County Free Library.
- D. Owner's Representative: Joe Thompson Administrative Services Director
- E. Project Engineer:
  - 1. Holstein White, Inc.
    - a. Jamie Boles, P.E.

Office: (215)322-7711 Fax: (215)322-7709.

## 1.4 DEFINITIONS

- A. "Owner" Defined:
  - 1. Wherever the word "Owner" is used in these specifications, it shall be understood to mean:

Bucks County Free Library Doylestown Branch – 150 S Pine Street Doylestown, PA 18901

- B. "Engineer" Defined:
  - 1. Wherever the word "Engineer" is used in these Specifications, it shall be understood to mean:

Holstein White, Inc. 210 E. Street Road, Suite 2D Feasterville, PA 18901

- C. "Contractor" Defined:
  - 1. Wherever the word "Contractor" is used in these Specifications, it shall be understood to mean the person, firm, or corporation to whom the execution of any part of the work herein contemplated shall be awarded by the Bucks County Free Library.
- D. "He" or "Him" as used in the Specifications is intended to identify the responsible party implied in each section of this Specification.

**SUMMARY** 

# 1.5 WORK COVERED BY CONTRACT DOCUMENTS

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

# **Bensalem Branch Library**

- 1. Demolish and removal of two (2) existing gas-fired packaged rooftop units. One (1) of the two units documented will be priced as an add alternate #1.
- 2. Installation of two (2) new gas-fired packaged rooftop units. One (1) of the two units documented will be priced as an add alternate #1.
- 3. Modification of the existing rooftop units existing ductwork connections and roof curbs.
- 4. Install new main distribution panel (OFF HOURS) in place of the existing distribution panel.
- 5. All new systems shall be testing and certified per these specifications and manufacturers requirements. Reports shall be provided indicating the results of all testing and certification.
- 6. Provide equipment and installation warranty for a period of one (1) year, or as indicated in these specifications, from receipt of substantial completion documentation from Library.
- 7. Provide new RTU-1 branch circuit with disconnect switches as indicated on plans.

## **Levittown Branch Library**

- 1. Demolish and removal of two (2) existing gas-fired packaged rooftop units.
- 2. Installation of two (2) new gas-fired packaged rooftop units.
- 3. Modification of the existing rooftop unit existing ductwork connections and roof curbs.
- 4. Removal of the building's existing HVAC rooftop unit controls that are no longer in use.
- 5. Testing and inspection of existing duct mounted heater and controls associated with this rooftop unit to ensure it is suitable for reuse.
- 6. All new systems shall be testing and certified per these specifications and manufacturers requirements. Reports shall be provided indicating the results of all testing and certification.
- 7. Provide equipment and installation warranty for a period of one (1) year, or as indicated in these specifications, from receipt of substantial completion documentation from Library.
- B. Type of Contract.

The work will be performed under separate prime contracts as follows:

## 1. Mechanical Contract:

- a. The Mechanical Contract shall include all labor, materials, equipment, and services necessary to furnish and install all rooftop units, mechanical ductwork modifications, controls as shown on Drawings and as described in Specification Divisions 00, 01, 23. Contract may also include work of other specification sections and other drawings where noted.
- b. Project Coordinator: The Mechanical contractor shall be the "project coordinator" for the project. Responsibilities are described in subpart 1.8 of this specification section.

## 2. Electrical Contractor:

- a. The Electrical Contract shall include all labor, materials, equipment, and services necessary to furnish and install all electrical distribution modifications, wiring, and temporary power as shown on Drawings and as described in Specification Divisions 00, 01, 26 and 27 of the specifications.
- b. Cooperate and coordinate with the "Project Coordinator".

#### 3. GENERAL NOTES REGARDING THE PRIME CONTRACTS.

- a. All contractors are responsible for their respective sections of work, which may include work in other sections or shown on drawings other than their respective format. All contractors must make themselves familiar with the total project and all the project documents. No additions to Contract sums will be approved for any contract where work may be shown or included as part of the Contract Documents including Drawings AND/OR the Project Specifications.
- b. There shall be no political signs or activities permissible on this project. The Owner (BUCKS COUNTY FREE LIBRARY) will hold the contractor responsible for any non-compliance acts and may be subject to back charges for each occurrence.
- 4. The Bucks County Free Library reserves the right to award locations individually or combined locations as determined to be in our best interest.

## 1.6 PROJECT COMPLETION DATE

A. Project Completion Date: Project must be complete and fully operational with-in 120 days of notice to proceed.

## 1.7 ACCESS TO SITE

- A. General: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

**SUMMARY** 

- 1. Limits: Confine construction operations to the areas of work indicated on the plans and as defined by the Owner's representative.
- 2. Driveways, Walkways and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to Bucks County Free Library, Library's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.
  - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
  - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
- D. Building Security: Contractor shall be responsible for checking in with building security each day to obtain an ID badge for each employee performing work at the facility.
- E. Contractor shall obtain clearance from Bucks County Free Library prior to commencing work in any areas of building.

#### 1.8 COORDINATION WITH OCCUPANTS

- A. Full Bucks County Free Library Occupancy: Bucks County Free Library will occupy site, existing and adjacent building(s) during entire construction period. Cooperate with Bucks County Free Library during construction operations to minimize conflicts and facilitate County usage. Perform the Work so as not to interfere with Library's day-to-day operations. Maintain existing exits unless otherwise indicated.
  - Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Bucks County Free Library and approval of authorities having jurisdiction.
  - 2. Notify Bucks County Free Library not less than (2) weeks prior to planned activity and confirm work 72 hours in advance of activities that will affect Library's operations.

    Coordinate with, and receive written permission and sign-off from Owner.
- B. Contractor shall not proceed with any work in any area of building unless they have obtained clearance to work in that area by the Library's Representative.
- C. All Hazardous material remediation in occupied areas of the building shall occur on the weekends and be coordinated with Library's Representative.

## 1.9 WORK RESTRICTIONS

A. Refer to Appendix for General Services Contractor Rules and Regulations. These rules and regulations supersede the specifications and shall be referred to in the event of conflicting information.

SUMMARY

- B. General: Comply with restrictions on construction operations.
  - 1. Comply with limitations on use of public streets and with other requirements of authorities having jurisdiction.
- C. On-Site Work Hours: Limit work in the existing building to normal business working hours of 7 a.m. to 5 p.m., Monday through Friday, and Weekends as coordinated with Bucks County Free Library, unless otherwise indicated.
- D. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Bucks County Free Library or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:
  - 1. Notify Bucks County Free Library not less than two (2) weeks in advance of proposed utility interruptions, and provide a detailed schedule indicating exact systems to be interrupted and expected completion time.
  - 2. Obtain Library's written permission before proceeding with utility interruptions.
- E. Noise, Vibration, and Odors: Coordinate operations that may result in high levels of noise and vibration, odors, or other disruption to Bucks County Free Library occupancy with Library.
  - 1. Notify Bucks County Free Library not less than two (2) days in advance of proposed disruptive operations.
  - 2. Obtain Library's written permission before proceeding with disruptive operations.
- F. Nonsmoking Building: Smoking is not permitted within the building or within 25 feet (8 m) of entrances, operable windows, or outdoor-air intakes.
- G. Controlled Substances: Use of tobacco products and other controlled substances on Project site is not permitted.

## 1.10 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
  - 1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
  - 2. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 1 General Requirements: Requirements of Sections in Division 1 apply to the Work of all Sections in the Specifications.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:

- 1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
- 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
- 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Specification.

## 1.11 NEW WORK AND EXISTING BUILDING SYSTEMS

- A. Retain this article or portions of it if an explanation of conventions used in the Specifications and Drawings is necessary. Revise to suit Project. See Evaluations.
- B. Where existing facilities are being altered, disconnect and remove or relocate all existing electrical work that interferes with or is necessary because of new construction as specified, shown or required.
- C. Perform alterations and additions to present electrical systems with a minimum interruption in the operation of these systems. Obtain written clearance from Owner for such interruptions and schedule same at whatever time specified in writing by Owner.
- D. Circuit breakers made spare due to demolition shall be set in off position and labeled 'SPARE'.
- E. Where specified or required, extend existing systems or tie into same to provide a complete coordinated electrical system to satisfaction of Owner and Engineer.
- F. All existing work to remain, but disturbed or disconnected because of alterations and new construction shall be replaced and put in operating condition unless instructed otherwise in writing by Owner.
- G. Perform all work necessary to permit operation of all existing systems during the construction period. Provide and maintain applicable approved temporary wiring to meet this requirement.
- H. Existing branch circuits not shown shall remain intact to extent practicable, and shall be extended as required.
- I. Demolish and remove existing electrical equipment, feeders and conduit no longer required by new construction.

END OF SECTION 01100

#### SECTION 01250 - CONTRACT MODIFICATION PROCEDURES

## PART 1 - GENERAL

#### 1.1 SUMMARY

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

## 1.2 MINOR CHANGES IN THE WORK

1. Engineer will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Engineer's Supplemental Instructions." (Refer to Appendix for sample form).

## 1.3 PROPOSAL REQUESTS

- A. Bucks County Free Library-Initiated Proposal Requests: Engineer will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
  - 1. Work Change Proposal Requests issued by Engineer are not instructions either to stop work in progress or to execute the proposed change.
  - 2. Within 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
    - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
    - c. Include costs of labor and supervision directly attributable to the change.
    - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
    - e. Quotation Form: Use CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail" or forms acceptable to Engineer (Refer to Appendix for sample forms).
- B. Contractor-Initiated Work Change Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Construction Manager.

## CONTRACT MODIFICATION PROCEDURES

- 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
- 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
- 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts
- 4. Include costs of labor and supervision directly attributable to the change.
- 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
- 6. Comply with requirements in Division 1 Section "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
- 7. Work Change Proposal Request Form: Use CSI Form 13.6A, "Change Order Request (Proposal)," with attachments CSI Form 13.6D, "Proposal Worksheet Summary," and Form 13.6C, "Proposal Worksheet Detail" or form acceptable to Engineer (Refer to Appendix for sample forms).

## 1.4 CHANGE ORDER PROCEDURES

1. On Library's approval of a Work Changes Proposal Request, Engineer will issue a Change Order for signatures of Bucks County Free Library and Contractor on AIA Document G701 (Refer to Appendix for sample form), or other forms acceptable to the County.

## 1.5 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Engineer may issue a Construction Change Directive on AIA Document G714 (Refer to Appendix for sample form), or other forms acceptable to the Bucks County Free Library. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
  - 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
  - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

END OF SECTION 01250

#### SECTION 01290 - PAYMENT PROCEDURES

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
  - 1. Division 1 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.

#### 1.2 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
  - 1. Coordinate line items in the schedule of values with other required administrative forms and schedules, including the following:
    - a. Application for Payment forms with continuation sheets.
    - b. Submittal schedule.
    - c. Items required to be indicated as separate activities in Contractor's construction schedule.
  - 2. Submit the schedule of values to Engineer at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
  - 3. Sub-schedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide sub-schedules showing values coordinated with each phase of payment.
- B. Format and Content: Use Specification table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
  - 1. Identification: Include the following Project identification on the schedule of values:
    - a. Project name and location.
    - b. Bucks County Free Library.
    - c. Library's project number.
    - d. Contractor's name and address.
    - e. Date of submittal.
  - 2. Arrange schedule of values consistent with format of AIA Document G703 (Refer to Appendix for sample form).
  - 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with

# PAYMENT PROCEDURES

Specification table of contents. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.

- a. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
- 4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
- 5. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
- 6. Provide separate line items in the schedule of values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
- 7. Allowances: Provide a separate line item in the schedule of values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
- 8. Each item in the schedule of values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
  - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the schedule of values or distributed as general overhead expense, at Contractor's option.
- 9. Schedule Updating: Update and resubmit the schedule of values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

## 1.3 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Engineer and paid for by Bucks County Free Library.
  - 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: Submit Application for Payment to Engineer by the 15 of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment (Refer to Appendix for sample forms).
- D. Certified Payroll: Submit certified payroll in accordance with the Pennsylvania Prevailing Wage Act. Certification shall be submitted for the work period applied. Documents shall consist of Certified Payroll Report and a Statement of Compliance. Forms can be downloaded and/or obtained from the Pennsylvania Department of Labor and Industry.

- E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Engineer will return incomplete applications without action.
  - 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
  - 2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
  - 3. Retainage in the amount of 10% of the work completed shall be held back from each application for payment. At the discretion of the Bucks County Free Library and the Engineer, the retainage amount may be reduced to 5% when the project has reached 80% completion.
- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Engineer by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
  - 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from entities lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
  - 1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
  - 2. When an application shows completion of an item, submit conditional final or full waivers.
  - 3. County reserves the right to designate which entities involved in the Work must submit waivers.
  - 4. Waiver Forms: Submit executed waivers of lien on forms acceptable to County.
- H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
  - 1. List of subcontractors.
  - 2. Schedule of values.
  - 3. Contractor's construction schedule (preliminary if not final).
  - 4. Schedule of unit prices.
  - 5. Submittal schedule (preliminary if not final).
  - 6. List of Contractor's staff assignments.
  - 7. List of Contractor's principal consultants.
  - 8. Copies of building permits.
  - 9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
  - 10. Initial progress report.
  - 11. Report of preconstruction conference.
  - 12. Certificates of insurance and insurance policies.
  - 13. Certified Payroll documents.

- I. Application for Payment at Substantial Completion: After Engineer issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
  - 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
  - 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Library occupancy of designated portions of the Work.
  - 3. Certified Payroll documents
- J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
  - 1. Evidence of completion of Project closeout requirements.
  - 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
  - 3. Updated final statement, accounting for final changes to the Contract Sum.
  - 4. Contractor's Affidavit of Payment of Debts and Claims.
  - 5. Contractor's Affidavit of Release of Liens.
  - 6. Consent of Surety Company to Final Payment."
  - 7. Evidence that claims have been settled.
  - 8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Library took possession of and assumed responsibility for corresponding elements of the Work.
  - 9. Final liquidated damages settlement statement.
  - 10. Final Certified Payroll reports.
  - 11. Maintenance Bond.
- K. Payment from the Bucks County Free Library will be made in 45 days after all of the appropriate documents have been approved.

**END OF SECTION 01290** 

#### SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. Coordination drawings.
  - 2. Requests for Information (RFIs).
  - 3. Project meetings.

#### 1.2 DEFINITIONS

A. RFI: Request from Bucks County Free Library, Engineer, or Contractor seeking information required by or clarifications of the Contract Documents.

#### 1.3 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use CSI Form 1.5A (Refer to Appendix for sample form). Include the following information in tabular form:
  - 1. Name, address, and telephone number of entity performing subcontract or supplying products.
  - 2. Number and title of related Specification Section(s) covered by subcontract.
  - 3. Drawing number and detail references, as appropriate, covered by subcontract.

## 1.4 GENERAL COORDINATION PROCEDURES

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

- B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  - 1. Prepare similar memoranda for County and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - 1. Preparation of Contractor's construction schedule.
  - 2. Preparation of the schedule of values.
  - 3. Installation and removal of temporary facilities and controls.
  - 4. Delivery and processing of submittals.
  - 5. Progress meetings.
  - 6. Preinstallation conferences.
  - 7. Project closeout activities.
  - 8. Startup and adjustment of systems.

## 1.5 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
  - 1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
    - a. Indicate functional and spatial relationships of components of engineering, structural, civil, mechanical, and electrical systems.
    - b. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Engineer indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- B. Coordination Drawing Organization: Organize coordination drawings as follows:
  - 1. Floor Plans and Reflected Ceiling Plans: Show engineering and structural elements, and mechanical, plumbing, fire-protection, fire alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid.
  - 2. Plenum Space: Indicate sub-framing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings.

- 3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire alarm, and electrical equipment.
- 4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
- 5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items
- 6. Review: Engineer will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility.

# 1.6 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
  - 1. Engineer will return RFIs submitted to Engineer by other entities controlled by Contractor with no response.
  - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.
- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:
  - 1. Project name.
  - 2. Project number.
  - 3. Date.
  - 4. Name of Contractor.
  - 5. Name of Engineer.
  - 6. RFI number, numbered sequentially.
  - 7. RFI subject.
  - 8. Specification Section number and title and related paragraphs, as appropriate.
  - 9. Drawing number and detail references, as appropriate.
  - 10. Field dimensions and conditions, as appropriate.
  - 11. Contractor's suggested resolution. If Contractor's solution(s) impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
  - 12. Contractor's signature.
  - 13. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
- C. RFI Forms: AIA Document G716 Software-generated form with substantially the same content as indicated above, acceptable to Engineer (Refer to Appendix for sample form).
- D. Engineer's Action: Engineer will review each RFI, determine action required, and respond. Allow seven (7) working days for Engineer's response for each RFI. RFIs received by Engineer after 1:00 p.m. will be considered as received the following working day.

- 1. The following RFIs will be returned without action:
  - a. Requests for approval of submittals.
  - b. Requests for approval of substitutions.
  - c. Requests for coordination information already indicated in the Contract Documents.
  - d. Requests for adjustments in the Contract Time or the Contract Sum.
  - e. Requests for interpretation of Engineer's actions on submittals.
  - f. Incomplete RFIs or inaccurately prepared RFIs.
- 2. Engineer's action may include a request for additional information, in which case Engineer's time for response will date from time of receipt of additional information.
- 3. Engineer's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Division 1 Section "Contract Modification Procedures."
  - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Engineer in writing within 10 days of receipt of the RFI response.
- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Use CSI Log Form 13.2B (Refer to Appendix for sample form).
  - 1. Project name.
  - 2. Name and address of Contractor.
  - 3. Name and address of Engineer.
  - 4. RFI number including RFIs that were dropped and not submitted.
  - 5. RFI description.
  - 6. Date the RFI was submitted.
  - 7. Date Engineer's response was received.
- F. On receipt of Engineer's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Engineer within seven days if Contractor disagrees with response.
  - 1. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
  - 2. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

## 1.7 PROJECT MEETINGS

- A. General: Schedule and conduct meetings and conferences at Project site unless otherwise indicated.
  - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Bucks County Free Library and Engineer of scheduled meeting dates and times.
  - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.

- 3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Bucks County Free Library and Engineer, within three days of the meeting.
- B. Preconstruction Conference: Engineer will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Bucks County Free Library and Engineer, but no later than 15 days after Notice to Proceed.
  - 1. Attendees: Authorized representatives of Bucks County Free Library Engineer, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 2. Agenda: Discuss items of significance that could affect progress, including the following:
    - Tentative construction schedule.
    - b. Phasing.
    - c. Critical work sequencing and long-lead items.
    - d. Designation of key personnel and their duties.
    - e. Procedures for processing field decisions and Change Orders.
    - f. Procedures for RFIs.
    - g. Procedures for testing and inspecting.
    - h. Procedures for processing Applications for Payment.
    - i. Distribution of the Contract Documents.
    - j. Submittal procedures.
    - k. Preparation of record documents.
    - 1. Use of the premises and existing building.
    - m. Work restrictions.
    - n. Working hours.
    - o. Library's occupancy requirements.
    - p. Responsibility for temporary facilities and controls.
    - q. Procedures for moisture and mold control.
    - r. Procedures for disruptions and shutdowns.
    - s. Construction waste management and recycling.
    - t. Parking availability.
    - u. Office, work, and storage areas.
    - v. Equipment deliveries and priorities.
    - w. First aid.
    - x. Security.
    - y. Progress cleaning.
  - 3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Pre-installation Conferences: Conduct a pre-installation conference at Project site before each construction activity that requires coordination with other construction.
  - 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and

- installations that have preceded or will follow, shall attend the meeting. Advise Engineer of scheduled meeting dates.
- 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
  - a. Contract Documents.
  - b. Options.
  - c. Related RFIs.
  - d. Related Change Orders.
  - e. Purchases.
  - f. Deliveries.
  - g. Submittals.
  - h. Review of mockups.
  - i. Possible conflicts.
  - j. Compatibility problems.
  - k. Time schedules.
  - l. Weather limitations.
  - m. Manufacturer's written instructions.
  - n. Warranty requirements.
  - o. Compatibility of materials.
  - p. Acceptability of substrates.
  - q. Temporary facilities and controls.
  - r. Space and access limitations.
  - s. Regulations of authorities having jurisdiction.
  - t. Testing and inspecting requirements.
  - u. Installation procedures.
  - v. Coordination with other work.
  - w. Required performance results.
  - x. Protection of adjacent work.
  - y. Protection of construction and personnel.
- 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
- 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
- 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Progress Meetings: Conduct progress meetings at weekly intervals.
  - 1. Attendees: In addition to representatives of Bucks County Free Library and Engineer, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
  - 2. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

- a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
  - 1) Review schedule for next period.
- b. Review present and future needs of each entity present, including the following:
  - 1) Interface requirements.
  - 2) Sequence of operations.
  - 3) Status of submittals.
  - 4) Status of documentation.
  - 5) Deliveries.
  - 6) Off-site fabrication.
  - 7) Access.
  - 8) Site utilization.
  - 9) Temporary facilities and controls.
  - 10) Progress cleaning.
  - 11) Quality and work standards.
  - 12) Status of correction of deficient items.
  - 13) Field observations.
  - 14) Status of RFIs.
  - 15) Status of proposal requests.
  - 16) Pending changes.
  - 17) Status of Change Orders.
  - 18) Pending claims and disputes.
  - 19) Documentation of information for payment requests.
- 3. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.
  - a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

**END OF SECTION 01310** 

## SECTION 01320 - CONSTRUCTION PROGRESS DOCUMENTATION

## PART 1 - GENERAL

## 1.1 SUMMARY

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

## 1.2 DEFINITIONS

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

## 1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
  - 1. Five paper copies.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
  - 1. Submit a working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.

C. Construction Schedule Updating Reports: Submit with Applications for Payment.

## 1.4 COORDINATION

A. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.

## PART 2 - PRODUCTS

## 2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice to Proceed to date of final completion.
  - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each library branch as a separate numbered activity for each main element of the Work. Comply with the following:
  - 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Engineer.
  - 2. Procurement Activities: Include procurement process activities for the following long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
  - 3. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's construction schedule with submittal schedule.
  - 4. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
  - 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Engineer's administrative procedures necessary for certification of Substantial Completion.
  - 6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
  - 1. Phasing: Arrange list of activities on schedule by phase.
  - 2. Work Restrictions: Show the effect of the following items on the schedule:
    - a. Coordination with existing construction.
    - b. Limitations of continued occupancies.
    - c. Uninterruptible services.
    - d. Partial occupancy before Substantial Completion.
    - e. Use of premises restrictions.

- f. Provisions for future construction.
- g. Seasonal variations.
- h. Environmental control.
- 3. Work Stages: Indicate important stages of construction for each major portion of the Work.
- D. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion.
- E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
  - 1. Unresolved issues.
  - 2. Unanswered Requests for Information.
  - 3. Rejected or unreturned submittals.
  - 4. Notations on returned submittals.
  - 5. Pending modifications affecting the Work and Contract Time.
- F. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule.
- G. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
  - 1. Use Microsoft Project, for Windows XP, Macintosh OS X operating system, or other industry accepted scheduling software capable of exporting a pdf of each schedule.

# 2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (GANTT CHART)

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's construction schedule within 30 days of date established from the contract award.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
  - 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

## 2.3 REPORTS

- A. Bi Weekly Construction Reports: Prepare bi-weekly construction report recording the following information concerning events at Project site:
  - 1. List of subcontractors at Project site.
  - 2. Approximate count of personnel at Project site.
  - 3. Equipment at Project site.
  - 4 Material deliveries

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- 5. Accidents.
- 6. Meetings and significant decisions.
- 7. Unusual events.
- 8. Stoppages, delays, shortages, and losses.
- 9. Orders and requests of authorities having jurisdiction.
- 10. Change Orders received and implemented.
- 11. Construction Change Directives received and implemented.
- 12. Equipment or system tests and startups.
- B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

## PART 3 - EXECUTION

## 3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
  - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
  - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  - 3. As the Work progresses, indicate final completion percentage for each activity.
- B. Distribution: Distribute copies of approved schedule to Engineer, Library, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
  - 1. Post copies in Project meeting rooms and temporary field offices.
  - 2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

**END OF SECTION 01320** 

## SECTION 01330 - SUBMITTAL PROCEDURES

## PART 1 - GENERAL

## 1.1 SUMMARY

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

## 1.2 DEFINITIONS

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

#### 1.3 ACTION SUBMITTALS

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

# 1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Engineer's Digital Data Files: Electronic copies of digital data files of the Contract Drawings will be provided by Engineer for Contractor's use in preparing submittals.
  - 1. Engineer will furnish Contractor one set of digital data drawing files of the Contract Drawings for use in preparing Shop Drawings and Project record drawings.
    - a. Engineer makes no representations as to the accuracy or completeness of digital data drawing files as they relate to the Contract Drawings.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
  - 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
  - 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

#### SUBMITTAL PROCEDURES

- a. Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Engineer's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
  - 1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Engineer will advise Contractor when a submittal being processed must be delayed for coordination.
  - 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
  - 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
- D. Paper Submittals: Place a permanent label or title block on each submittal item for identification.
  - 1. Indicate name of firm or entity that prepared each submittal on label or title block.
  - 2. Provide a space approximately 6 by 8 inches (150 by 200 mm) on label or beside title block to record Contractor's review and approval markings and action taken by Engineer and Construction Manager.
  - 3. Include the following information for processing and recording action taken:
    - a. Project name.
    - b. Date.
    - c. Name of Engineer.
    - d. Name of Construction Manager.
    - e. Name of Contractor.
    - f. Name of subcontractor.
    - g. Name of supplier.
    - h. Name of manufacturer.
    - i. Submittal number or other unique identifier, including revision identifier.
      - 1) Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.01). Resubmittals shall include an alphabetic suffix after another decimal point (e.g., 06100.01.A).
    - j. Number and title of appropriate Specification Section.
    - k. Drawing number and detail references, as appropriate.
    - 1. Location(s) where product is to be installed, as appropriate.
    - m. Other necessary identification.
  - 4. Additional Paper Copies: Unless additional copies are required for final submittal, and unless Engineer observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.
    - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Engineer.

- 5. Transmittal for Paper Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Engineer will return without review or discard submittals received from sources other than Contractor.
  - a. Transmittal Form for Paper Submittals: Provide locations on form for the following information:
    - 1) Project name.
    - 2) Date.
    - 3) Destination (To:).
    - 4) Source (From:).
    - 5) Name and address of Engineer.
    - 6) Name of Construction Manager.
    - 7) Name of Contractor.
    - 8) Name of firm or entity that prepared submittal.
    - 9) Names of subcontractor, manufacturer, and supplier.
    - 10) Category and type of submittal.
    - 11) Submittal purpose and description.
    - 12) Specification Section number and title.
    - 13) Specification paragraph number or drawing designation and generic name for each of multiple items.
    - 14) Drawing number and detail references, as appropriate.
    - 15) Indication of full or partial submittal.
    - 16) Transmittal number, numbered consecutively.
    - 17) Submittal and transmittal distribution record.
    - 18) Remarks.
    - 19) Signature of transmitter.
- E. Options: Identify options requiring selection by Engineer.
- F. Deviations: Identify deviations from the Contract Documents on submittals.
- G. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
  - 1. Note date and content of previous submittal.
  - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
  - 3. Resubmit submittals until they are marked with approval notation from Engineer's action stamp.
- H. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- I. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Engineer's action stamp.

## 2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements:
  - 1. Submit electronic submittals via email as PDF electronic files.
    - a. Engineer will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
  - 2. Action Submittals: Submit five paper copies of each submittal unless otherwise indicated. Engineer will return two copies.
  - 3. Informational Submittals: Submit five paper copies of each submittal unless otherwise indicated. Engineer will not return copies.
  - 4. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
    - a. Provide a digital signature with digital certificate on electronically-submitted certificates and certifications where indicated.
    - b. Provide a notarized statement on original paper copy certificates and certifications where indicated.
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
  - 1. If information must be specially prepared for submittal because standard published data are not suitable for use, submit as Shop Drawings, not as Product Data.
  - 2. Mark each copy of each submittal to show which products and options are applicable.
  - 3. Include the following information, as applicable:
    - a. Manufacturer's catalog cuts.
    - b. Manufacturer's product specifications.
    - c. Standard color charts.
    - d. Statement of compliance with specified referenced standards.
    - e. Testing by recognized testing agency.
    - f. Application of testing agency labels and seals.
    - g. Notation of coordination requirements.
    - h. Availability and delivery time information.
  - 4. For equipment, include the following in addition to the above, as applicable:
    - a. Wiring diagrams showing factory-installed wiring.
    - b. Printed performance curves.
    - c. Operational range diagrams.
    - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

- 5. Submit Product Data before or concurrent with Samples.
- 6. Submit Product Data in the following format:
  - a. PDF electronic file.
  - b. Five paper copies of Product Data unless otherwise indicated. Engineer will return two copies.
- C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
  - 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
    - a. Identification of products.
    - b. Schedules.
    - c. Compliance with specified standards.
    - d. Notation of coordination requirements.
    - e. Notation of dimensions established by field measurement.
    - f. Relationship and attachment to adjoining construction clearly indicated.
    - g. Seal and signature of professional engineer if specified.
  - 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (215 by 280 mm), but no larger than 30 by 42 inches (750 by 1067 mm).
  - 3. Submit Shop Drawings in the following format:
    - a. Five opaque (bond) copies of each submittal. Engineer will return two copy(ies).
- D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
  - 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
  - 2. Identification: Attach label on unexposed side of Samples that includes the following:
    - a. Generic description of Sample.
    - b. Product name and name of manufacturer.
    - c. Sample source.
    - d. Number and title of applicable Specification Section.
  - 3. For projects where electronic submittals are required, provide corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record.
  - 4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
    - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.

- b. Samples not incorporated into the Work, or otherwise designated as County's property, are the property of Contractor.
- 5. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
  - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Engineer will return submittal with options selected.
- 6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
  - a. Number of Samples: Submit three sets of Samples. Engineer will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record sample.
    - 1) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- E. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
  - 1. Submit product schedule in the following format:
    - a. Three paper copies of product schedule or list unless otherwise indicated. Engineer will return two copies.
- F. Coordination Drawings Submittals: Comply with requirements specified in Division 1 Section "Project Management and Coordination."
- G. Contractor's Construction Schedule: Comply with requirements specified in Division 1 Section "Construction Progress Documentation."
- H. Application for Payment and Schedule of Values: Comply with requirements specified in Division 1 Section "Payment Procedures."
- I. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Division 1 Section "Closeout Procedures."
- J. Maintenance Data: Comply with requirements specified in Division 1 Section "Operation and Maintenance Data."

- K. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of Engineers and Bucks County Free Library, and other information specified.
- L. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.
- M. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- N. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- O. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- P. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
- Q. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- R. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- S. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project.
- T. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- U. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- V. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- W. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads.

Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

## 2.2 DELEGATED-DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
  - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Engineer.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit three paper copies of certificate, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
  - 1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services

## PART 3 - EXECUTION

### 3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Engineer.
- B. Project Closeout and Maintenance Material Submittals: See requirements in Division 1 Section "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

## 3.2 ENGINEER'S ACTION

- A. General: Engineer will not review submittals that do not bear Contractor's approval stamp and will return them without action.
- B. Action Submittals: Engineer will review each submittal, make marks to indicate corrections or revisions required, and return it. Engineer will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action.

#### SUBMITTAL PROCEDURES

- C. Informational Submittals: Engineer will review each submittal and will not return it, or will return it if it does not comply with requirements. Engineer will forward each submittal to appropriate party.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

**END OF SECTION 01330** 

### SECTION 01420 - REFERENCES

### PART 1 - GENERAL

#### 1.1 DEFINITIONS

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

#### 1.2 INDUSTRY STANDARDS

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

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

### 1.3 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Thomson Gale's "Encyclopedia of Associations" or in Columbia Books' "National Trade & Professional Associations of the U.S."
- B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list.

AA Aluminum Association, Inc. (The)

AAADM American Association of Automatic Door Manufacturers

AABC Associated Air Balance Council

AAMA American Architectural Manufacturers Association

AASHTO American Association of State Highway and Transportation Officials

AATCC American Association of Textile Chemists and Colorists

ABAA Air Barrier Association of America

ABMA American Bearing Manufacturers Association

ACI American Concrete Institute

ACPA American Concrete Pipe Association

AEIC Association of Edison Illuminating Companies, Inc. (The)

AF&PA American Forest & Paper Association

AGA American Gas Association

AGC Associated General Contractors of America (The)

AHA American Hardboard Association

(Now part of CPA)

AHAM Association of Home Appliance Manufacturers

AI Asphalt Institute

AIA American Institute of Architects (The)

AISC American Institute of Steel Construction

AISI American Iron and Steel Institute

AITC American Institute of Timber Construction

ALCA Associated Landscape Contractors of America

(Now PLANET - Professional Landcare Network)

ALSC American Lumber Standard Committee, Incorporated

AMCA Air Movement and Control Association International, Inc.

ANSI American National Standards Institute

AOSA Association of Official Seed Analysts, Inc.

APA Architectural Precast Association

APA APA - The Engineered Wood Association

APA EWS APA - The Engineered Wood Association; Engineered Wood Systems

(See APA - The Engineered Wood Association)

API American Petroleum Institute

ARI Air-Conditioning & Refrigeration Institute

ARMA Asphalt Roofing Manufacturers Association

ASCE American Society of Civil Engineers

ASCE/SEI American Society of Civil Engineers/Structural Engineering Institute

(See ASCE)

ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers

ASME ASME International

(American Society of Mechanical Engineers International)

ASSE American Society of Sanitary Engineering

ASTM ASTM International

(American Society for Testing and Materials International)

AWCI Association of the Wall and Ceiling Industry

AWCMA American Window Covering Manufacturers Association

(Now WCMA)

AWI Architectural Woodwork Institute

AWPA American Wood Protection Association

(Formerly: American Wood Preservers' Association)

AWS American Welding Society

AWWA American Water Works Association

BHMA Builders Hardware Manufacturers Association

BIA Brick Industry Association (The)

BICSI BICSI, Inc.

BIFMA BIFMA International

(Business and Institutional Furniture Manufacturer's Association International)

BISSC Baking Industry Sanitation Standards Committee

BWF Badminton World Federation

(Formerly: IBF - International Badminton Federation)

CCC Carpet Cushion Council

CDA Copper Development Association

CEA Canadian Electricity Association

CEA Consumer Electronics Association

CFFA Chemical Fabrics & Film Association, Inc.

CGA Compressed Gas Association

CIMA Cellulose Insulation Manufacturers Association

CISCA Ceilings & Interior Systems Construction Association

CISPI Cast Iron Soil Pipe Institute

CLFMI Chain Link Fence Manufacturers Institute

CRRC Cool Roof Rating Council

CPA Composite Panel Association

CPPA Corrugated Polyethylene Pipe Association

CRI Carpet and Rug Institute (The)

CRSI Concrete Reinforcing Steel Institute

CSA Canadian Standards Association

CSA CSA International

(Formerly: IAS - International Approval Services)

CSI Cast Stone Institute

CSI Construction Specifications Institute (The)

CSSB Cedar Shake & Shingle Bureau

CTI Cooling Technology Institute

(Formerly: Cooling Tower Institute)

DHI Door and Hardware Institute

EIA Electronic Industries Alliance

EIMA EIFS Industry Members Association

EJCDC Engineers Joint Contract Documents Committee

EJMA Expansion Joint Manufacturers Association, Inc.

ESD ESD Association

(Electrostatic Discharge Association)

ETL SEMCO Intertek ETL SEMCO

(Formerly: ITS - Intertek Testing Service NA)

FIBA Federation Internationale de Basketball

(The International Basketball Federation)

FIVB Federation Internationale de Volleyball

(The International Volleyball Federation)

FM Approvals LLC

FM Global FM Global

(Formerly: FMG - FM Global)

FMRC Factory Mutual Research

(Now FM Global)

FRSA Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.

FSA Fluid Sealing Association

FSC Forest Stewardship Council

GA Gypsum Association

GANA Glass Association of North America

GRI (Part of GSI)

GS Green Seal

GSI Geosynthetic Institute

HI Hydraulic Institute

HI Hydronics Institute

HMMA Hollow Metal Manufacturers Association

(Part of NAAMM)

HPVA Hardwood Plywood & Veneer Association

HPW H. P. White Laboratory, Inc.

IAS International Approval Services

(Now CSA International)

IBF International Badminton Federation

(Now BWF)

ICEA Insulated Cable Engineers Association, Inc.

ICRI International Concrete Repair Institute, Inc.

IEC International Electrotechnical Commission

IEEE Institute of Electrical and Electronics Engineers, Inc. (The)

IESNA Illuminating Engineering Society of North America

IEST Institute of Environmental Sciences and Technology

IGCC Insulating Glass Certification Council

IGMA Insulating Glass Manufacturers Alliance

ILI Indiana Limestone Institute of America, Inc.

ISO International Organization for Standardization

Available from ANSI

ISSFA International Solid Surface Fabricators Association

ITS Intertek Testing Service NA

(Now ETL SEMCO)

ITU International Telecommunication Union

KCMA Kitchen Cabinet Manufacturers Association

LMA Laminating Materials Association

(Now part of CPA)

LPI Lightning Protection Institute

MBMA Metal Building Manufacturers Association

MFMA Maple Flooring Manufacturers Association, Inc.

MFMA Metal Framing Manufacturers Association, Inc.

MH Material Handling

(Now MHIA)

MHIA Material Handling Industry of America

MIA Marble Institute of America

MPI Master Painters Institute

MSS Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

NAAMM National Association of Architectural Metal Manufacturers

NACE International

(National Association of Corrosion Engineers International)

NADCA National Air Duct Cleaners Association

NAGWS National Association for Girls and Women in Sport

NAIMA North American Insulation Manufacturers Association

NBGQA National Building Granite Quarries Association, Inc.

NCAA National Collegiate Athletic Association (The)

NCMA National Concrete Masonry Association

NCPI National Clay Pipe Institute

NCTA National Cable & Telecommunications Association

NEBB National Environmental Balancing Bureau

NECA National Electrical Contractors Association

NeLMA Northeastern Lumber Manufacturers' Association

NEMA National Electrical Manufacturers Association

NETA InterNational Electrical Testing Association

NFHS National Federation of State High School Associations

NFPA NFPA

(National Fire Protection Association)

NFRC National Fenestration Rating Council

NGA National Glass Association

NHLA National Hardwood Lumber Association

NLGA National Lumber Grades Authority

NOFMA: The Wood Flooring Manufacturers Association

(Formerly: National Oak Flooring Manufacturers Association)

NOMMA National Ornamental & Miscellaneous Metals Association

NRCA National Roofing Contractors Association

NRMCA National Ready Mixed Concrete Association

NSF NSF International

(National Sanitation Foundation International)

NSSGA National Stone, Sand & Gravel Association

NTMA National Terrazzo & Mosaic Association, Inc. (The)

NTRMA National Tile Roofing Manufacturers Association

(Now TRI)

NWWDA National Wood Window and Door Association

(Now WDMA)

OPL Omega Point Laboratories, Inc.

(Now ITS)

PCI Precast/Prestressed Concrete Institute

PDCA Painting & Decorating Contractors of America

PDI Plumbing & Drainage Institute

PGI PVC Geomembrane Institute

PLANET Professional Landcare Network

(Formerly: ACLA - Associated Landscape Contractors of America)

PTI Post-Tensioning Institute

RCSC Research Council on Structural Connections

RFCI Resilient Floor Covering Institute

RIS Redwood Inspection Service

SAE SAE International

SDI Steel Deck Institute

SDI Steel Door Institute

SEFA Scientific Equipment and Furniture Association

SEI/ASCE Structural Engineering Institute/American Society of Civil Engineers

(See ASCE)

SGCC Safety Glazing Certification Council

SIA Security Industry Association

SIGMA Sealed Insulating Glass Manufacturers Association

(Now IGMA)

SJI Steel Joist Institute

SMA Screen Manufacturers Association

SMACNA Sheet Metal and Air Conditioning Contractors'

National Association

SMPTE Society of Motion Picture and Television Engineers

SPFA Spray Polyurethane Foam Alliance

(Formerly: SPI/SPFD - The Society of the Plastics Industry, Inc.; Spray

Polyurethane Foam Division)

SPIB Southern Pine Inspection Bureau (The)

SPRI Single Ply Roofing Industry

SSINA Specialty Steel Industry of North America

SSPC SSPC: The Society for Protective Coatings

STI Steel Tank Institute

SWI Steel Window Institute

SWRI Sealant, Waterproofing, & Restoration Institute

TCA Tile Council of America, Inc.

(Now TCNA)

TCNA Tile Council of North America, Inc.

TIA/EIA Telecommunications Industry Association/Electronic Industries Alliance

TMS The Masonry Society

TPI Truss Plate Institute, Inc.

TPI Turfgrass Producers International

TRI Tile Roofing Institute

UL Underwriters Laboratories Inc.

UNI Uni-Bell PVC Pipe Association

USAV USA Volleyball

USGBC U.S. Green Building Council

USITT United States Institute for Theatre Technology, Inc.

WASTEC Waste Equipment Technology Association

WCLIB West Coast Lumber Inspection Bureau

WCMA Window Covering Manufacturers Association

WCSC Window Covering Safety Council

(Formerly: WCMA - Window Covering Manufacturers Association)

WDMA Window & Door Manufacturers Association

(Formerly: NWWDA - National Wood Window and Door Association)

WI Woodwork Institute (Formerly: WIC - Woodwork Institute of California)

WIC Woodwork Institute of California

(Now WI)

WMMPA Wood Moulding & Millwork Producers Association

WSRCA Western States Roofing Contractors Association

WWPA Western Wood Products Association

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and upto-date as of the date of the Contract Documents.

IAPMO International Association of Plumbing and Mechanical Officials

ICC International Code Council

ICC-ES ICC Evaluation Service, Inc.

UBC Uniform Building Code

(See ICC)

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CE Army Corps of Engineers

CPSC Consumer Product Safety Commission

DOC Department of Commerce

DOD Department of Defense

DOE Department of Energy

EPA Environmental Protection Agency

FAA Federal Aviation Administration

FCC Federal Communications Commission

FDA Food and Drug Administration

GSA General Services Administration

HUD Department of Housing and Urban Development

LBL Lawrence Berkeley National Laboratory

NCHRP National Cooperative Highway Research Program

(See TRB)

NIST National Institute of Standards and Technology

OSHA Occupational Safety & Health Administration

PBS Public Buildings Service

(See GSA)

PHS Office of Public Health and Science

RUS Rural Utilities Service

(See USDA)

SD State Department

TRB Transportation Research Board

USDA Department of Agriculture

USPS Postal Service

E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG Americans with Disabilities Act (ADA)

Architectural Barriers Act (ABA)

Accessibility Guidelines for Buildings and Facilities

Available from U.S. Access Board

CFR Code of Federal Regulations

Available from Government Printing Office

DOD Department of Defense Military Specifications and Standards

Available from Department of Defense Single Stock Point

DSCC Defense Supply Center Columbus

(See FS)

FED-STD Federal Standard

(See FS)

FS Federal Specification

Available from Department of Defense Single Stock Point

Available from Defense Standardization Program

Available from General Services Administration

Available from National Institute of Building Sciences

FTMS Federal Test Method Standard

(See FS)

MIL (See MILSPEC)

MIL-STD (See MILSPEC)

MILSPEC Military Specification and Standards

Available from Department of Defense Single Stock Point

UFAS Uniform Federal Accessibility Standards

Available from Access Board

F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CBHF State of California, Department of Consumer Affairs Bureau of Home Furnishings and Thermal Insulation

CCR California Code of Regulations

CPUC California Public Utilities Commission

TFS Texas Forest Service

Forest Resource Development

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01420

### SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

### 1.2 USE CHARGES

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

# 1.3 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.
- C. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

# 1.4 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Coordinate the use of existing facilities with County. All existing systems required for temporary use shall be returned to preconstruction conditions.

#### PART 2 - PRODUCTS

## 2.1 TEMPORARY FACILITIES

A. Field Office and Material Storage: Location shall be approved by Bucks County Free Library prior to commencement of work.

# 2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Existing HVAC system shall be used.

#### PART 3 - EXECUTION

# 3.1 INSTALLATION, GENERAL

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

## 3.2 TEMPORARY UTILITY INSTALLATION

- A. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations.
  - 1. Install electric power service overhead unless otherwise indicated.
  - 2. Connect temporary service to Library's existing power source, as directed by Library.

## 3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
  - 1. Maintain support facilities until Engineer schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Bucks County Free Library.
- B. Waste Disposal Facilities: Contractor shall be responsible for removal of trash from site daily.
- C. Waste Disposal Facilities: Coordinate waste removal with Library. Waste shall not be allowed to accumulate in any areas. Waste shall be removed from site daily.

### TEMPORARY FACILITIES AND CONTROLS

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

### 3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
- B. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- C. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- D. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Library and from fumes and noise.
  - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant-treated plywood on construction operations side.
  - 2. Construct dustproof partitions with two layers of 6-mil (0.14-mm) polyethylene sheet on each side. Cover floor with two layers of 6-mil (0.14-mm) polyethylene sheet, extending sheets 18 inches (460 mm) up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.
    - a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches (1219 mm) between doors. Maintain water-dampened foot mats in vestibule.
  - 3. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
  - 4. Insulate partitions to control noise transmission to occupied areas.
  - 5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
  - 6. Protect air-handling equipment.
  - 7. Provide walk-off mats at each entrance through temporary partition.
- E. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire prevention program.
  - 1. Prohibit smoking in construction areas.
  - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
  - 3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

## 3.5 OPERATION, TERMINATION, AND REMOVAL

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

END OF SECTION 01500

### SECTION 01600 - PRODUCT REQUIREMENTS

### PART 1 - GENERAL

### 1.1 SUMMARY

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

### B. Related Requirements:

1. Division 1 Section "Substitution Procedures" for requests for substitutions.

## 1.2 DEFINITIONS

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

### 1.3 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within one week of receipt of a comparable product

# PRODUCT REQUIREMENTS

request. Engineer will notify Contractor of approval or rejection of proposed comparable product request within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

- a. Form of Approval: As specified in Division 1 Section "Submittal Procedures."
- b. Use product specified if Engineer does not issue a decision on use of a comparable product request within time allocated.
- B. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

## 1.4 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

## 1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

## B. Delivery and Handling:

- 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
- 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
- 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
- 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

# C. Storage:

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

### 1.6 PRODUCT WARRANTIES

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

## PART 2 - PRODUCTS

### 2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
  - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
  - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
  - 3. Bucks County free Library reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
  - 4. Where products are accompanied by the term "as selected," Engineer will make selection.
  - 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

## B. Product Selection Procedures:

- 1. Products:
  - a. Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" for consideration of an unnamed product.

### 2. Manufacturers:

a. Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that

## PRODUCT REQUIREMENTS

complies with requirements. Comply with requirements in "Comparable Products" for consideration of an unnamed manufacturer's product.

- 3. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
- C. Visual Matching Specification: Where Specifications require "match Engineer's sample", provide a product that complies with requirements and matches Engineer's sample. Engineer's decision will be final on whether a proposed product matches.
  - 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Division 1 Section "Substitution Procedures" for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Engineer from manufacturer's full range" or similar phrase, select a product that complies with requirements. Engineer will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

### 2.2 COMPARABLE PRODUCTS

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

END OF SECTION 01600

#### SECTION 01635 - SUBSTITUTION PROCEDURES

### PART 1 - GENERAL

### 1.1 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

## B. Related Requirements:

1. Division 01 Section "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

### 1.2 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

### 1.3 ACTION SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
  - 1. Substitution Request Form: Use CSI Form 13.1A (Refer to Appendix for sample form).
  - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
    - b. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Bucks County Free Library and separate contractors, that will be necessary to accommodate proposed substitution.
    - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
    - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
    - e. Samples, where applicable or requested.
    - f. Certificates and qualification data, where applicable or requested.

- g. List of similar installations for completed projects with project names and addresses and names and addresses of Engineers and Libraries.
- h. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
- i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
- j. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
- k. Cost information, including a proposal of change, if any, in the Contract Sum.
- 1. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
- m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
- 3. Engineer's Action: If necessary, Engineer will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Engineer will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
  - a. Forms of Acceptance: Change Order, Construction Change Directive, or Engineer's Supplemental Instructions for minor changes in the Work.
  - b. Use product specified if Engineer does not issue a decision on use of a proposed substitution within time allocated

### 1.4 QUALITY ASSURANCE

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

### PART 2 - PRODUCTS

#### 2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.
  - 1. Conditions: Engineer will consider Contractor's request for substitution when the following conditions are satisfied:

#### SUBSTITUTION PROCEDURES

- a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
- b. Requested substitution will not adversely affect Contractor's construction schedule.
- c. Requested substitution has received necessary approvals of authorities having jurisdiction.
- d. Requested substitution is compatible with other portions of the Work.
- e. Requested substitution has been coordinated with other portions of the Work.
- f. Requested substitution provides specified warranty.
- g. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
- B. Substitutions for Convenience: Not allowed.

END OF SECTION 01635

### SECTION 01700 - EXECUTION REQUIREMENTS

### PART 1 - GENERAL

### 1.1 SUMMARY

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

# B. Related Requirements:

1. Division 1 Section "Summary" for limits on use of Project site.

## 1.2 INFORMATIONAL SUBMITTALS

A. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

### 1.3 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
  - 1. Structural Elements: When cutting and patching structural elements, notify Engineer of locations and details of cutting and await directions from Engineer before proceeding. Shore, brace, and support structural element during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
  - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
  - 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in

# EXECUTION REQUIREMENTS

- reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
- 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Engineer's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

#### PART 2 - PRODUCTS

### 2.1 MATERIALS

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

### **PART 3 - EXECUTION**

### 3.1 EXAMINATION

- A. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
  - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
  - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
  - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- B. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility and County that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

### **EXECUTION REQUIREMENTS**

- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for information to Engineer according to requirements in Division 1 Section "Project Management and Coordination."

### 3.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Engineer promptly.
  - 1. Do not scale Drawings to obtain required dimensions.
  - 2. Inform installers of lines and levels to which they must comply.
  - 3. Check the location, level and plumb, of every major element as the Work progresses.
  - 4. Notify Engineer when deviations from required lines and levels exceed allowable tolerances.

#### 3.4 INSTALLATION

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

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

### 3.5 CUTTING AND PATCHING

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

### **EXECUTION REQUIREMENTS**

- F. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.
- G. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
  - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  - 4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  - 5. Proceed with patching after construction operations requiring cutting are complete.
- H. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
  - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
  - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
  - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
  - 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
  - 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather-tight condition and ensures thermal and moisture integrity of building enclosure.
- I. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

### 3.6 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

- 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
- 2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
- 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
  - 1. Remove liquid spills promptly.
  - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

### 3.7 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.

### **EXECUTION REQUIREMENTS**

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

# 3.8 PROTECTION OF INSTALLED CONSTRUCTION

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

END OF SECTION 01700

#### SECTION 01732 - SELECTIVE DEMOLITION

## PART 1 - GENERAL

### 1.1 SUMMARY

### A. Section Includes:

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

### 1.2 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: Carefully detach from existing construction, in a manner to prevent damage, and deliver to County.
- C. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

### 1.3 PREINSTALLATION MEETINGS

A. Predemolition Conference: Conduct conference at Project site prior to commencement of demolition.

## 1.4 FIELD CONDITIONS

- A. County will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so County's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by County as far as practical.
- C. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: Hazardous materials are present in buildings and structures to be selectively demolished.

#### SELECTIVE DEMOLITION

- 1. Hazardous material remediation is the responsibility of the Contractor.
- 2. Existing conditions in areas of new work, or work disturbed due to demolition, shall be tested by Contractor, and proper remediation provided.
- 3. All hazardous materials removal shall be coordinated with County's Representative.
- 4. All hazardous material remediation in occupied areas of the building shall occur on the Weekends.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
  - 1. Maintain fire-protection facilities in service during selective demolition operations.

## 1.5 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

# 2.1 PEFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

#### PART 3 - EXECUTION

## 3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- C. 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 Engineer.
- D. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

## SELECTIVE DEMOLITION

E. Survey of Existing Conditions: Record existing conditions by use of measured drawings or preconstruction photographs.

## 3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
  - 1. Comply with requirements for existing services/systems interruptions specified in Division 1 Section "Summary."
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.
  - 1. County will arrange to shut off indicated services/systems when requested by Contractor.
  - 2. Arrange to shut off indicated utilities with utility companies.
  - 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
  - 4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.
    - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
    - b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
    - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
    - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
    - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to County.
    - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
    - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.
- C. Refrigerant: Remove refrigerant from mechanical equipment to be selectively demolished according to 40 CFR 82 and regulations of authorities having jurisdiction.

## 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.
  - 1. Comply with requirements for access and protection specified in Division 1 Section "Temporary Facilities and Controls."

- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
- C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

# 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. 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
  - 2. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
  - 3. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
  - 4. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
  - 5. Dispose of demolished items and materials promptly.

## 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 County.
- 4. Transport items to County's storage area designated by County.
- 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.
- 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 Engineer, items may be removed to a suitable,

protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

# 3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain County'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.
  - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off County's property and legally dispose of them.

## 3.6 CLEANING

A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

**END OF SECTION 01732** 

#### SECTION 01770 - CLOSEOUT PROCEDURES

# PART 1 - GENERAL

## 1.1 SUMMARY

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

# B. Related Requirements:

- 1. Division 1 Section "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
- 2. Division 1 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.
- 3. Division 1 Section "Demonstration and Training" for requirements for instructing County's personnel.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For cleaning agents.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

## 1.3 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.

# 1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

#### CLOSEOUT PROCEDURES

# 1.5 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting Bucks County Free Library unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
  - 2. Submit closeout submittals specified in other Division 1 Sections, including project record documents, operation and maintenance manuals, final completion construction photographic documentation, damage or settlement surveys, property surveys, and similar final record information.
  - 3. Submit test/adjust/balance records.
  - 4. Submit changeover information related to Library's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
  - 1. Advise Bucks County Free Library of pending insurance changeover requirements.
  - 2. Make final changeover of permanent locks and deliver keys to Bucks County Free Library. Advise Library's personnel of changeover in security provisions.
  - 3. Complete startup and testing of systems and equipment.
  - 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
  - 5. Instruct Bucks County Free Library's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Division 1 Section "Demonstration and Training."
  - 6. Advise Bucks County Free Library of changeover in heat and other utilities.
  - 7. Participate with Bucks County Free Library in conducting inspection and walkthrough with local emergency responders.
  - 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
  - 9. Complete final cleaning requirements, including touchup painting.
  - 10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Engineer, that must be completed or corrected before certificate will be issued.

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

## 1.6 FINAL COMPLETION PROCEDURES

- A. Preliminary Procedures: Before requesting final inspection for determining final completion, complete the following:
  - 1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures."
  - 2. Certified List of Incomplete Items: Submit certified copy of Engineer's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Engineer. Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
  - 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
  - 4. Submit pest-control final inspection report and warranty.
  - 5. Instruct Bucks County Free Library's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings.
- B. Inspection: Submit a written request for final inspection to determine acceptance. On receipt of request, Engineer will either proceed with inspection or notify Contractor of unfulfilled requirements. Engineer will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
  - 1. Reinspection: Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

# 1.7 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
  - 1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor.
  - 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
  - 3. Submit list of incomplete items in the following format:
    - a. Three paper copies unless otherwise indicated. Engineer will return two copies.

# 1.8 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Engineer for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated, or when delay in submittal of warranties might limit Bucks County Free Library's rights under warranty.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
  - 1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.
  - 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
  - 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
  - 4. Warranty Electronic File: Scan warranties and bonds and assemble complete warranty and bond submittal package into a single indexed electronic PDF file with links enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

## PART 2 - PRODUCTS

## 2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
  - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels

## PART 3 - EXECUTION

## 3.1 FINAL CLEANING

A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

#### CLOSEOUT PROCEDURES

- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
  - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
    - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
    - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
    - c. Rake grounds that are neither planted nor paved to a smooth, even-textured surface.
    - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
    - e. Remove snow and ice to provide safe access to building.
    - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
    - g. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
    - h. Sweep concrete floors broom clean in unoccupied spaces.
    - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
    - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces.
    - k. Remove labels that are not permanent.
    - l. Wipe surfaces of mechanical and electrical equipment, elevator equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
    - m. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
    - n. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
    - o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
    - p. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Division 1 Section "Temporary Facilities and Controls." Prepare written report.

## 3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.

- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
  - 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
  - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that that already show evidence of repair or restoration.
    - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
  - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
  - 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

**END OF SECTION 01770** 

## SECTION 01781 - PROJECT RECORD DOCUMENTS

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for project record documents, including the following:
  - 1. Record Drawings.
  - 2. Record Specifications.
  - 3. Record Product Data.

# B. Related Requirements:

1. Division 1 Section "Operation and Maintenance Data" for operation and maintenance manual requirements.

## 1.2 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
  - 1. Number of Copies: Submit copies of record Drawings as follows:
    - a. Initial Submittal:
      - 1) Submit three paper-copy set(s) of marked-up record prints.
      - 2) Submit record digital data files and two set(s) of plots.
      - 3) Engineer will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.

#### b. Final Submittal:

- 1) Submit three paper-copy set(s) of marked-up record prints.
- 2) Submit PDF electronic files of scanned record prints and three set(s) of prints.
- 3) Print each drawing, whether or not changes and additional information were recorded.
- B. Record Specifications: Submit three paper copies, and one annotated PDF electronic file, of Project's Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit three paper copies, and one annotated PDF electronic file, of each submittal.

# 2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised Drawings as modifications are issued.
  - 1. Preparation: Mark record prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
    - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
    - b. Record data as soon as possible after obtaining it.
    - c. Record and check the markup before enclosing concealed installations.
  - 2. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording graphic information in production of marked-up record prints.
  - 3. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
  - 4. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.
- B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Engineer. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
  - 1. Format: Same digital data software program, version, and operating system as the original Contract Drawings.
  - 2. Format: DWG, Version, Microsoft Windows or Apple Macintosh operating system.
  - 3. Format: Annotated PDF electronic file with comment function enabled.
  - 4. Incorporate changes and additional information previously marked on record prints. Delete, redraw, and add details and notations where applicable.
  - 5. Refer instances of uncertainty to Engineer for resolution.
  - 6. Engineer will furnish Contractor one set of digital data files of the Contract Drawings for use in recording information.
- C. Format: Identify and date each record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
  - 1. Record Prints: Organize record prints and newly prepared record Drawings into manageable sets. Bind each set with durable paper cover sheets. Include identification on cover sheets.
  - 2. Format: Annotated PDF electronic file with comment function enabled.
  - 3. Record Digital Data Files: Organize digital data information into separate electronic files that correspond to each sheet of the Contract Drawings. Name each file with the sheet identification. Include identification in each digital data file.

- 4. Identification: As follows:
  - a. Project name.
  - b. Date.
  - c. Designation "PROJECT RECORD DRAWINGS."
  - d. Name of Engineer.
  - e. Name of Contractor.

#### 2.2 RECORD SPECIFICATIONS

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

# 2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
  - 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
  - 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
  - 3. Note related Change Orders, record Specifications, and record Drawings where applicable.
- B. Format: Submit record Product Data as annotated PDF electronic file, paper copy and scanned PDF electronic file(s) of marked-up paper copy of Product Data.

# 2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as PDF electronic file, paper copy and scanned PDF electronic file(s) of marked-up miscellaneous record submittals.

## **PART 3 - EXECUTION**

# 3.1 RECORDING AND MAINTENANCE

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

END OF SECTION 01781

## SECTION 01782 - OPERATION AND MAINTENANCE DATA

## PART 1 - GENERAL

#### 1.1 SUMMARY

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

# 1.2 CLOSEOUT SUBMITTALS

- A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
  - 1. Engineer will comment on whether content of operations and maintenance submittals are acceptable.
  - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operations and maintenance manuals in the following format:
  - 1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Engineer.
    - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
    - b. Enable inserted reviewer comments on draft submittals.
  - 2. Three paper copies. Include a complete operation and maintenance directory. Enclose title pages and directories in clear plastic sleeves. Engineer will return two copies.
- C. Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Engineer will return copy with comments.
  - 1. Correct or revise each manual to comply with Engineer's comments. Submit copies of each corrected manual within 15 days of receipt of Engineer's comments and prior to commencing demonstration and training.

# 2.1 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information.
- B. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
  - 1. Title page.
  - 2. Table of contents.
  - 3. Manual contents.
- C. Title Page: Include the following information:
  - 1. Subject matter included in manual.
  - 2. Name and address of Project.
  - 3. Name and address of Bucks County Free Library.
  - 4. Date of submittal.
  - 5. Name and contact information for Contractor.
  - 6. Name and contact information for Construction Manager.
  - 7. Name and contact information for Engineer.
  - 8. Name and contact information for Commissioning Authority.
  - 9. Names and contact information for major consultants to the Engineer that designed the systems contained in the manuals.
  - 10. Cross-reference to related systems in other operation and maintenance manuals.
- D. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
- E. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- F. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
  - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
  - 2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily

navigated file tree. Configure electronic manual to display bookmark panel on opening file.

- G. Manuals, Paper Copy: Submit manuals in the form of hard copy, bound and labeled volumes.
  - 1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
    - a. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.
  - 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
  - 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment.
  - 4. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
    - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

# 2.2 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
  - 1. Type of emergency.
  - 2. Emergency instructions.
  - 3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
  - 1. Fire.
  - 2. Flood.
  - 3. Gas leak.
  - 4. Water leak.
  - 5. Power failure.
  - 6. Water outage.
  - 7. System, subsystem, or equipment failure.
  - 8. Chemical release or spill.

- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of County's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
  - 1. Instructions on stopping.
  - 2. Shutdown instructions for each type of emergency.
  - 3. Operating instructions for conditions outside normal operating limits.
  - 4. Required sequences for electric or electronic systems.
  - 5. Special operating instructions and procedures.

#### 2.3 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
  - 1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
  - 2. Performance and design criteria if Contractor is delegated design responsibility.
  - 3. Operating standards.
  - 4. Operating procedures.
  - 5. Operating logs.
  - 6. Wiring diagrams.
  - 7. Control diagrams.
  - 8. Piped system diagrams.
  - 9. Precautions against improper use.
  - 10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
  - 1. Product name and model number. Use designations for products indicated on Contract Documents.
  - 2. Manufacturer's name.
  - 3. Equipment identification with serial number of each component.
  - 4. Equipment function.
  - 5. Operating characteristics.
  - 6. Limiting conditions.
  - 7. Performance curves.
  - 8. Engineering data and tests.
  - 9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
  - 1. Startup procedures.
  - 2. Equipment or system break-in procedures.
  - 3. Routine and normal operating instructions.
  - 4. Regulation and control procedures.
  - 5. Instructions on stopping.

- 6. Normal shutdown instructions.
- 7. Seasonal and weekend operating instructions.
- 8. Required sequences for electric or electronic systems.
- 9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification

#### 2.4 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Product Information: Include the following, as applicable:
  - 1. Product name and model number.
  - 2. Manufacturer's name.
  - 3. Color, pattern, and texture.
  - 4. Material and chemical composition.
  - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
  - 1. Inspection procedures.
  - 2. Types of cleaning agents to be used and methods of cleaning.
  - 3. List of cleaning agents and methods of cleaning detrimental to product.
  - 4. Schedule for routine cleaning and maintenance.
  - 5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

# 2.5 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures,

#### OPERATION AND MAINTENANCE DATA

- maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
  - 1. Standard maintenance instructions and bulletins.
  - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
  - 3. Identification and nomenclature of parts and components.
  - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
  - 1. Test and inspection instructions.
  - 2. Troubleshooting guide.
  - 3. Precautions against improper maintenance.
  - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - 5. Aligning, adjusting, and checking instructions.
  - 6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

# PART 3 - EXECUTION

# 3.1 MANUAL PREPARATION

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Bucks County Free Library's operating personnel for types of emergencies indicated.

#### OPERATION AND MAINTENANCE DATA

- B. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- C. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
- D. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
- E. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in record Drawings to ensure correct illustration of completed installation.
  - 1. Do not use original project record documents as part of operation and maintenance manuals.
- F. Comply with Division 1 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01782

## SECTION 01820 - DEMONSTRATION AND TRAINING

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section includes administrative and procedural requirements for instructing County's personnel, including the following:
  - 1. Demonstration of operation of systems, subsystems, and equipment.
  - 2. Training in operation and maintenance of systems, subsystems, and equipment.

# 1.2 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
  - 1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

# 1.3 CLOSEOUT SUBMITTALS

A. At completion of training, submit complete training manual(s) for Bucks County Free Library's use prepared and bound in format matching operation and maintenance manuals and in PDF electronic file format on compact disc.

# 1.4 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative experienced in operation and maintenance procedures and training.
- C. Pre-instruction Conference: Conduct conference at Project site review methods and procedures related to demonstration and training.

# 1.5 COORDINATION

- A. Coordinate instruction schedule with Bucks County Free Library's operations. Adjust schedule as required to minimize disrupting Bucks County Free Library's operations and to ensure availability of County's personnel.
- B. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Engineer.

## PART 2 - PRODUCTS

## 2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
  - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
    - a. System, subsystem, and equipment descriptions.
    - b. Performance and design criteria if Contractor is delegated design responsibility.
    - c. Operating standards.
    - d. Regulatory requirements.
    - e. Equipment function.
    - f. Operating characteristics.
    - g. Limiting conditions.
    - Performance curves.
  - 2. Documentation: Review the following items in detail:
    - a. Emergency manuals.
    - b. Operations manuals.
    - c. Maintenance manuals.
    - d. Project record documents.
    - e. Identification systems.
    - f. Warranties and bonds.
    - g. Maintenance service agreements and similar continuing commitments.
  - 3. Emergencies: Include the following, as applicable:
    - a. Instructions on meaning of warnings, trouble indications, and error messages.
    - b. Instructions on stopping.

- c. Shutdown instructions for each type of emergency.
- d. Operating instructions for conditions outside of normal operating limits.
- e. Sequences for electric or electronic systems.
- f. Special operating instructions and procedures.
- 4. Operations: Include the following, as applicable:
  - a. Startup procedures.
  - b. Equipment or system break-in procedures.
  - c. Routine and normal operating instructions.
  - d. Regulation and control procedures.
  - e. Control sequences.
  - f. Safety procedures.
  - g. Instructions on stopping.
  - h. Normal shutdown instructions.
  - i. Operating procedures for emergencies.
  - j. Operating procedures for system, subsystem, or equipment failure.
  - k. Seasonal and weekend operating instructions.
  - 1. Required sequences for electric or electronic systems.
  - m. Special operating instructions and procedures.
- 5. Adjustments: Include the following:
  - a. Alignments.
  - b. Checking adjustments.
  - c. Noise and vibration adjustments.
  - d. Economy and efficiency adjustments.
- 6. Troubleshooting: Include the following:
  - a. Diagnostic instructions.
  - b. Test and inspection procedures.
- 7. Maintenance: Include the following:
  - a. Inspection procedures.
  - b. Types of cleaning agents to be used and methods of cleaning.
  - c. List of cleaning agents and methods of cleaning detrimental to product.
  - d. Procedures for routine cleaning
  - e. Procedures for preventive maintenance.
  - f. Procedures for routine maintenance.
  - g. Instruction on use of special tools.
- 8. Repairs: Include the following:
  - a. Diagnosis instructions.
  - b. Repair instructions.
  - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
  - d. Instructions for identifying parts and components.

#### DEMONSTRATION AND TRAINING

e. Review of spare parts needed for operation and maintenance.

# PART 3 - EXECUTION

## 3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01782 "Operation and Maintenance Data."

#### 3.2 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Bucks County Free Library for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Bucks County Free Library's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
  - 1. Engineer will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
  - 2. County will furnish an instructor to describe Bucks County Free Library's operational philosophy.
  - 3. Bucks County Free Library will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
  - 1. Schedule training with Bucks County Free Library, through Engineer, with at least Two (2) weeks advance notice.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.

END OF SECTION 01820

## 230593 - TESTING, ADJUSTING AND BALANCING FOR HVAC

## PART I - GENERAL

## 1.1 RELATED DOCUMENTS

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

# 1.2 DESCRIPTION OF WORK

- A. Extent of testing, adjusting, and balancing work required by this SECTION is indicated on drawings and schedules, and by requirements of this SECTION; and is defined to include, but is not necessarily limited to: air distribution systems, and associated equipment and apparatus of mechanical work. The work consists of setting speed and volume (flow) adjusting facilities provided for systems, recording data, conducting tests, preparing and submitting reports, and recommending modifications to work as required by Contract Documents.
- B. Components types of testing, adjusting and balancing specified in this SECTION includes the following as applied to mechanical equipment:
  - 1. Fans
  - 2. Ductwork systems

## 1.3 QUALITY ASSURANCE

A. Tester's Qualifications: Firm certified by National Environmental Balancing Bureau (NEBB) in those testing and balancing disciplines similar to those required for Project; who is not the installer of system to be tested and is otherwise independent of Project.

## 1.4 CODES AND STANDARDS

- A. NEBB Compliance: Comply with NEBB's "Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems" as applicable to mechanical air and hydronic distribution systems, and associated equipment and apparatus.
- B. AABC Compliance: Comply with AABC's Manual MN-1 "AABC National Standards", as applicable to mechanical air and hydronic distribution systems, and associated equipment and apparatus.
- C. Industry Standards: Comply with ASHRAE recommendations pertaining to measurements, instruments, and testing, adjusting and balancing, except as otherwise indicated.

#### 1.5 SUBMITTALS

- A. Submit three (3) copies of documents conforming compliance with Quality Assurance provisions.
- B. Submit certified test reports, signed by Test and Balance Supervisor who performed TAB work. In addition, have report certified by Professional Engineer who is familiar with TAB work and also with Project, and who is registered in jurisdiction where testing is being conducted.
- C. Include identification and types of instruments used, and their most recent calibration date with submission of final test report.

## 1.6 JOB CONDITIONS

- A. Do not proceed with testing, adjusting and balancing until work has been completed and is operable. Ensure that there is no latent residual work still to be completed.
- B. Do not proceed until work scheduled for testing, adjusting and balancing is clean and free from debris, dirt, and discarded building materials.
- C. Perform testing, adjusting and balancing after leakage and pressure tests on air and liquid distribution systems have been satisfactorily completed.
- D. Visit the Site during installation of the work. Should any potential, or developing problems be discovered relating to materials, equipment or methods being used in the work, and where such problems may adversely affect the testing and adjusting work, immediately report these findings in writing to the Engineer with recommendations for correction.

# 1.7 WARRANTY

- A. General Warranty: The national project performance guarantee specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Guarantee: Provide a guarantee on NEBB forms stating that NEBB will assist in completing the requirements of the Contract Documents if the testing, adjusting and balancing Agent fails to comply with the Contract Documents. Guarantee includes the following provisions:
  - The certified Agent has tested and balanced systems according to the Contract Documents.
  - 2. Systems are balanced to optimum performance capabilities within design and installation limits.

## 1.8 AIR DISTRIBUTION DUCT LEAKAGE TEST VERIFICATION

- A. Installing Contractor shall perform leakage tests on the supply air duct systems. Verify and record the results of each test on standard NEBB test forms and submit copies of same to the Engineer for review.
- B. Mark tested sections of ductwork with the date and initials of the balancing technician. Tests shall be made before duct sections are concealed and before systems are balanced.
- C. Verify and record the results of all leakage tests, both successful and unsuccessful.

## PART 2 - PRODUCTS

## 2.1 PATCHING MATERIALS

- A. Except as otherwise indicated, use same products as used by original Installer for patching holes in insulation, ductwork and housings which have been cut or drilled for test purposes, including access for test instruments, attaching jigs, and similar purposes.
- B. At Tester's option, plastic plugs with retainers may be used to patch drilled holes in ductwork and housings.

## 2.2 TEST INSTRUMENTS

- A. Utilize test instruments and equipment for TAB work required, of type, precision, and capacity as recommended in the following TAB Standards:
  - 1. NEBB's Procedural Standards for Testing, Adjusting and Balancing of Environmental Systems.
  - 2. AABC's Manual MN-1 "AABC National Standards".

# PART 3 - EXECUTION

## 3.1 PROCEDURES

- A. Examine installed work and conditions under which testing is to be done to ensure that work has been completed, cleaned and is operable. Do not proceed with TAB work until unsatisfactory conditions have been corrected in manner acceptable to Tester.
- B. Test, adjust and balance environmental systems and components, as indicated in accordance with procedures outlined in applicable standards.

C. Test, adjust and balance system during summer season for air conditioning systems and during winter season for heating systems, including at least period of operation at outside conditions within 5 degrees F (3 degrees C) wet bulb temperature of maximum summer design condition, and within 10 degrees F (6 degrees C) dry bulb temperature of minimum winter design condition. When seasonal operation does not permit measuring final temperatures, then take final temperature readings when seasonal operation does permit.

## 3.2 TOLERANCES

- A. Set HVAC system airflow and water flow rates within the following tolerances:
  - 1. Supply, Return and Exhaust Fans: Plus 5 to plus 10 percent.

# 3.3 REPORTS

- A. Prepare report of test results, including instrumentation calibration reports, in format recommended by applicable standards.
- B. Include the following data in the Balancing and Testing Reports:
  - 1. Air Moving Equipment Data:
    - a. Fan or Unit no.
    - b. Location
    - c. Area served
    - d. Manufacturer
    - e. Model No. and Serial No.
    - f. Rated and actual motor data:
      - 1) HP
      - 2) Phase
      - 3) Voltage
      - 4) Amperage
    - g. Design and actual air flow measurements:
      - 1) Total CFM
      - 2) Total and external static pressure, in w.g.
      - 3) Fan section static pressure, in w.g.
      - 4) Fan discharge static pressure, in w.g.
      - 5) Fan RPM.
    - h. Design and actual pressure drops.
      - 1) Across filter bank
      - 2) Across each heat transfer coil.
    - i. Evaluate building and room pressure conditions to determine adequate supply and return air proportions.
    - j. Provide manufacturer's fan curve for all fans with fan performance readings plotted.
- C. Prepare report of recommendations for correcting unsatisfactory mechanical performances when system cannot be successfully balanced; including, where

necessary, modifications which exceed requirements of Contract Documents for mechanical work.

#### 3.4 COMPLETION

- A. Patch holes in insulation, ductwork, and housings, which have been cut or drilled for test purposes, in manner recommended by original Installer.
- B. Mark equipment settings, including damper control positions, valve indicators, fan speed control levers, and similar controls and devices to show final settings at completion of TAB work. Provide markings with paint or other suitable permanent identification materials. Retest, adjust and balance systems subsequent to significant system modifications, and resubmit test results.

END OF SECTION 230593

## SECTION 231123 - NATURAL GAS PIPING

# PART 1 - GENERAL

# 1.1 PRESSURE REGULATING VALVES - GAS

A. Pressure regulator valves shall be provided and installed by the Local Gas Company.

# 1.2 GAS PIPING - NATURAL

- A. All interior gas piping shall be standard weight seamless black steel pipe with 125 pound malleable iron fittings.
- B. Shutoff valves shall be of the approved type and installed at points of distribution within the building and at each piece of gas consuming equipment. Provide drip pockets where condensation may collect and pitch all piping to such pockets. Drip pocket shall be extended three times the diameter of the pipe.

**END OF SECTION 231123** 

NATURAL GAS PIPING 231123-1

#### DOCUMENT 237413 - PACKAGED ROOFTOP AIR CONDITIONING UNITS

# PART 1 GENERAL

# 1.01 SECTION INCLUDES

- A. Package rooftop unit.
- B. Heat exchanger.
- C. Refrigeration components.
- D. Unit operating controls.
- E. Roof curb.
- F. Electrical power connections.
- G. Operation and maintenance service.

# 1.02 REFERENCES

- A. ANSI/NFPA 90A Installation of Air Conditioning and Ventilation Systems.
- B. AHRI 360 Unitary Air-Conditioning Equipment.
- C. ANSI/ASHRAE/IESNA 90.1-1999 Energy Standard for New Buildings Except Low-Rise Residential Buildings.

# 1.03 SUBMITTALS

- A. Submit drawings indicating components, dimensions, weights and loadings, required clearances, and location and size of field connections.
- B. Submit product data indicating rated capacities, weights, accessories, and electrical requirements.
- C. Submit manufacturer's installation instructions.

# 1.04 OPERATION AND MAINTENANCE DATA

- A. Submit operation and maintenance data.
- B. Include manufacturer's descriptive literature, start-up and operating instructions, installation instructions, and maintenance procedures.

# PACKAGED ROOFTOP AIR CONDITIONING UNITS

# 1.05 HANDLING

- A. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.
- B. Protect units from physical damage. Leave factory shipping covers in place until installation.

## 1.06 WARRANTY

- A. Provide a full parts warranty for one year from start-up or 18 months from shipment, whichever occurs first.
- B. Provide 5 year parts only warranty for compressors.
- C. Provide 10 year limited parts warranty for heat exchanger.

#### PART 2 PRODUCTS

# 2.01 SUMMARY

A. The contractor shall furnish and install package rooftop air conditioning unit(s) as shown and scheduled on the contract documents. The unit(s) shall be installed in accordance with this specification and perform at the specified conditions as scheduled.

# 2.02 GENERAL UNIT DESCRIPTION

- A. Unit(s) furnished and installed shall be gas heat packaged rooftop as scheduled on contract documents and these specifications. Cooling performance shall be based on AHRI testing procedures. Wiring internal to the unit shall be numbered for simplified identification. Units shall be cULus listed and labeled, classified in accordance with cULus for Central Cooling Air Conditioners. Unit(s) shall be factory assembled, internally wired, fully charged and consist of insulated weathertight casing with compressors, air cooled condenser coil, condenser fans, evaporator coil, filters, supply and/or exhaust motors and drives, microprocessor unit controls
- B. Unit(s) shall be single piece construction as manufactured at the factory.
- C. Unit(s) shall be factory run tested to include the operation of all fans, compressors, heat exchangers, safeties, limits, and control sequences.
- D. Unit(s) shall have labels, decals, and/or tags to aid in the service of the unit and indicate caution areas.

## 2.03 UNIT CASING

A. Cabinet: Galvanized steel, phosphatized, and finished with a pre-applied baked polyure-

thane enamel. Cabinet surface shall be tested 672 hours in salt spray in compliance with ASTM B117. Fully gasketed removable access panels. Structural members shall be heavy gauge with access doors and removable panels of heavy gauge. Provide 1/2 inch thick foil faced fiberglass insulation on all exterior panels and roof in contact with the return and conditioned air stream. Cabinet top cover shall be one piece construction or where seams exits, it shall be double hemmed and gasket sealed.

B. Access Doors: Fully-gasketed hinged doors with hold-back apparatus shall provide access to filters, supply air fan section, evaporator coil section, and unit control section.

## 2.04 ELECTRICAL POWER CONNECTIONS

- A. Factory-made penetrations shall be provided for connection of all electrical wiring. These wiring provisions shall be through the base. Field penetrations of the unit base pan shall not be acceptable.
- B. Provide a factory-installed non-fused disconnect switch which satisfies NEC requirements for a service disconnect switch. Disconnect handle shall be accessible through the control box door such that high voltage power must be off before door can be opened.
- C. Provide a factory-installed and wired 15A 115V convenience outlet capable of ground fault protection.
- D. Unit shall include a phase monitor as standard that protects equipment from phase loss, phase reversal, and low voltage. Any fault condition shall produce a Failure Indicator LED, and send the unit into an emergency stop condition. The entire unit with this option shall be cULus approved. If not, a field UL inspection is required.
- E. High Fault Unit Interrupt Rating (Short Circuit Current Rating-SCCR)An optional 65,000 Amp rating (480V) and 25,000 Amp rating (600V) shall be applied to the unit enclosure using a non-fused circuit breaker for disconnect switch purposes. Fan motors, compressors, and electric heat circuits shall be provided with series rated circuit breakers that will provide the unit rated level of protection. The unit shall be marked with approved cULus markings and will adhere to cULus regulations.

# 2.05 AIR FILTERS

A. Air Filters: Filters shall mount integrally within unit and be accessible through hinged access panels. Filters shall be MERV 8.

# 2.06 FANS - SUPPLY

- A. Provide forward-curved fan mounted with fixed pitch sheave drive assembly. Complete fans assemblies shall be statically and dynamically balanced.
- B. Fan shaft shall be mounted on grease lubricated ball bearings.
- C. All motors shall be circuit breaker protected.

# PACKAGED ROOFTOP AIR CONDITIONING UNITS

# 2.07 GAS FIRED HEATING SECTION

- A. Completely assembled and factory-installed heating system shall be integral to unit, cU-Lus approved specifically for outdoor applications for use downstream from refrigerant cooling coils. Threaded connection with plug or cap provided. Provide capability for gas piping connection through side of unit.
- B. Heating section shall be factory run tested prior to shipment.
- C. Gas Burner shall be forced combustion type power burner, negative pressure gas valve, manual shut-off, hot surface ignition, and flame sensing safety control.
- D. Gas Burner Safety Controls: Provide safety controls for the proving of combustion air prior to ignition, and continuous flame supervision. Upon a failure to ignite, three attempts of ignition will occur before lockout of the ignition system.
- E. Combustion blower shall be centrifugal type fan with built-in thermal overload protection on fan motor.
- F. Heat Exchanger: Provide drum and tube heat exchanger of free floating design manufactured from 14-gauge 304 stainless steel drum and 16-gauge 304 stainless steel tubes. Factory pressure and leak tested.
- G. Limit controls: High temperature limit controls will shut off gas flow in the event of excessive temperatures resulting from restricted indoor airflow or loss of indoor airflow.
- H. Gas heater shall be modulating and be made from grades of stainless steel suitable for condensing situations. The heater shall have a turn down ratio of 2.5 to 1 for low heat and 5 to 1 for high heat.

## 2.08 EVAPORATOR COIL

- A. Provide heavy duty aluminum fins mechanically bonded to internally enhanced, copper tubes.
- B. Provide a thermostatic expansion valve for each refrigeration circuit. All coils shall be leak tested at the factory to ensure pressure integrity. The evaporator coil is pressure tested to 450 psig.
- C. Unit shall include a Condensate Overflow Switch to shut the unit down in the event that a clogged condensate drain line prevents proper condensate removal from the unit.
- D. Unit shall include Sloped Stainless Steel evaporator coil drain pans that are durable, long-lasting and highly corrosion resistant.

# 2.09 CONDENSER SECTION

- A. Provide all Aluminum Microchannel condenser coils. All condenser coils shall be leak tested at the factory to ensure pressure integrity and pressure tested to 650 psig.
- B. Provide integral subcooling circuit(s) to prevent premature refrigerant flashing and to insure maximum operating efficiency.
- C. Provide vertical discharge, direct drive fans with steel blades, and three phase motors. Fans shall be statically balanced. Motors shall be permanently lubricated, with built-in current and thermal overload protection in a weathertight casing.
- D. Provide wire mesh coil guards coil guards on condensing section to protect unit piping and coils from damage.

## 2.10 REFRIGERATION SYSTEM

- A. R410A refrigerant
- B. Compressor(s) shall be manufactured by manufacturer of rooftop unit.
- C. Compressor: Hermetic compliant scroll compressor operating at 3600 rpm with isolated mounting, centrifugal oil pump, and oil sight glass.
- D. Provide with thermostatic temperature motor winding control for protection against excessive temperatures caused by over-/undervoltage operation or loss of charge. Also provide high and low pressure cutouts.
- E. Units shall have cooling capabilities down to 0 degree F as standard or manufacturer shall furnish unit with installed low ambient controls to allow for operation down to 0 degree F. For field installed low ambient accessory, the manufacturer shall provide a factory authorized serviceman that will assure proper installation and operation.
- F. Provide a High Efficiency Unit (eStage) which shall provide five stages of mechanical cooling with the ability to be at or below 25% compressor displacement at stage one. Achieving this through Hot Gas Bypass shall be unacceptable.

# 2.11 EXHAUST/RETURN SECTION

A. Modulating 100% Exhaust Fan with Statitrac Control Option shall include a differential pressure control system, Statitrac, shall use a differential pressure transducer to compare indoor building pressure to outdoor ambient atmospheric pressure and shall turn the exhaust fans on and off and modulate the barometric exhaust dampers to control the building pressure to within the adjustable, specified dead band that shall be adjustable at the RTVM board

# 2.12 OUTDOOR AIR SECTION

A. Provide a fully integrated factory installed 100% modulating outside air economizer with unit return and barometric relief air dampers. Economizer operation shall be through mi-

croprocessor based primary temperature controls that automatically modulate dampers to maintain space temperature conditions.

- 1. Provide economizer with differential enthalpy control.
- 2. Provide adjustable minimum position control.
- 3. Provide spring return motor for outside air damper closure during unit shutdown or power interruption.
- 4. Provide duct mounted CO2 sensor to monitor space occupancy levels within the building by measuring the parts per million of CO2 (Carbon Dioxide) in the air. As CO2 levels increase, the economizer fresh air damper shall modulate to meet the CO2 space ventilation requirements.

## 2.13 UNIT CONTROLS

- A. General: Microprocessor controls shall be provided for all 24 volt control functions. The resident control algorithms shall make all heating, cooling and/or ventilating decisions in response to electronic signals from sensors measuring indoor and outdoor temperatures. The control algorithm maintains accurate temperature control, minimizes drift from set point and provides better building comfort. A centralized microprocessor shall provide anti-short cycle timing and time delay between compressors to provide a higher level of machine protection.
- B. Constant Volume Controls: Provide all necessary controls to operate rooftop from a zone based temperature sensor, including microprocessor unit control and economizer control.
- 2.14 Clogged filter indication: Provide factory installed differential pressure switch to indicate filter replacement status. Differential pressure switch shall cause a contact closure to display a service indication and unit will continue to operate normally.

# 2.15 ROOF CURB

- A. Provide factory supplied roof curb, heavy gauge zinc coated steel with supply and return air gasketing. Curb shall provide insulation underneath outdoor section to prevent consensate formation. Ship knocked down and provide instructions for easy assembly.
- B. Curb shall be manufactured in accordance with the National Roofing Contractors Association guidelines.

#### PART 3 EXECUTION

# 3.01 EXAMINATION

- A. Verify that roof is ready to receive work.
- B. Verify that proper power supply is available.

# PACKAGED ROOFTOP AIR CONDITIONING UNITS

# 3.02 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Mount units on factory built roof mounting frame providing watertight enclosure to protect ductwork. Install roof mounting curb level.

**END OF SECTION** 

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

# PART 1 - GENERAL

# 1.1 SUMMARY

- A. This Section includes the following:
  - 1. Building wires and cables rated 600 V and less.
  - 2. Connectors, splices, and terminations rated 600 V and less.

## 1.2 ACTION SUBMITTALS

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

# 1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control test reports.

## 1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

# PART 2 - PRODUCT

# 2.1 CONDUCTORS AND CABLES

- A. Copper Conductors: Comply with NEMA WC 70.onductor Insulation: Comply with NEMA WC 70 for Types THW, THHN-THWN, and XHHW.
- B. Multiconductor Cable: Comply with NEMA WC 70 for metal-clad cable, Type MC with ground wire.

# 2.2 CONNECTORS AND SPLICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. AFC Cable Systems, Inc.
  - 2. Hubbell Power Systems, Inc.
  - 3. O-Z/Gedney; EGS Electrical Group LLC.
  - 4. 3M; Electrical Products Division.
  - 5. Tyco Electronics Corp.
- B. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

## PART 3 - EXECUTION

# 3.1 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

# 3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type THHN-THWN, single conductors in raceway, or Type XHHW, single conductors in raceway.
- B. Exposed Feeders: Type THHN-THWN, single conductors in raceway.
- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: Type THHN-THWN, single conductors in raceway, or Metal-clad cable, Type MC.
- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.
- E. Exposed Branch Circuits, Including in Crawlspaces: Type THHN-THWN, single conductors in raceway.
- F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN-THWN, single conductors in raceway, Metal-clad cable, Type MC.
- G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN-THWN, single conductors in raceway.

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- H. Class 1 Control Circuits: Type THHN-THWN, in raceway.
- I. Class 2 Control Circuits: Type THHN-THWN, in raceway, or Power-limited cable.

# 3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.
- B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- E. Support cables according to Division 26 Sections "Hangers and Supports for Electrical Systems."
- F. Identify and color-code conductors and cables according to Division 26 Section "Identification for Electrical Systems."
- G. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.
- H. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- I. Wiring at Outlets: Install conductor at each outlet, with at least 6 inches of slack.
- J. Install anti-short bushings on all flexible cable assemblies.

# 3.4 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Division 26 Section "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

## 3.5 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

# 3.6 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Tests and Inspections:
  - After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors, and conductors feeding the following critical equipment and services for compliance with requirements.
    - All equipment indicated on single line diagram.
  - 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
  - 3. Infrared Scanning: With-in 10 days of establishment of Substantial Completion, perform an infrared scan of each splice in cables and conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner.
    - a. Infrared scanning report shall be forwarded to Owner and Engineer for review and comment. Any additional information or repairs will be incorporated into the punch list.
    - b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each splice 11 months after date of Substantial Completion.
    - c. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
    - d. Record of Infrared Scanning: Prepare a certified report that identifies splices checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
- C. Test Reports: Prepare a written report to record the following:
  - 1. Test procedures used.
  - 2. Test results that comply with requirements.
  - 3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.
- D. Remove and replace malfunctioning units and retest as specified above.

**END OF SECTION 260519** 

#### SECTION 260523 - CONTROL-VOLTAGE ELECTRICAL POWER CABLES

# PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. UTP cabling.
  - 2. RS-232 cabling.
  - 3. RS-485 cabling.
  - 4. Low-voltage control cabling.
  - 5. Control-circuit conductors.
  - 6. Identification products.

## 1.2 DEFINITIONS

- A. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control and signaling power-limited circuits.
- B. Open Cabling: Passing telecommunications cabling through open space (e.g., between the study of a wall cavity).

## 1.3 SUBMITTALS

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

# 1.4 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
  - 1. Flame-Spread Index: 25 or less.
  - 2. Smoke-Developed Index: 450 or less.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

# 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Test cables upon receipt at Project site.
- B. Test each pair of UTP cable for open and short circuits.

#### CONTROL-VOLTAGE ELECTRICAL POWER CABLES

#### 2.1 PATHWAYS

- A. Support of Open Cabling: NRTL labeled for support of Category 5e cabling, designed to prevent degradation of cable performance and pinch points that could damage cable.
  - 1. Support brackets with cable tie slots for fastening cable ties to brackets.
  - 2. Lacing bars, spools, J-hooks, and D-rings.
  - 3. Straps and other devices.
- B. Conduit and Boxes: Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems."
  - Outlet boxes shall be no smaller than 2 inches wide, 3 inches high, and 2-1/2 inches deep.

# 2.2 BACKBOARDS

A. Description: Plywood, fire-retardant treated, 3/4 by 48 by 96 inches.

## 2.3 UTP CABLE

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Belden CDT Inc.; Electronics Division.
  - 2. Berk-Tek; a Nexans company.
  - 3. CommScope, Inc.
  - Draka USA.
  - 5. Genesis Cable Products; Honeywell International, Inc.
  - 6. KRONE Incorporated.
  - 7. Mohawk; a division of Belden CDT.
  - 8. Nordex/CDT; a subsidiary of Cable Design Technologies.
  - 9. Superior Essex Inc.
  - 10. SYSTIMAX Solutions; a CommScope, Inc. brand.
  - 11. 3M
  - 12. Tyco Electronics/AMP Netconnect; Tyco International Ltd.
- B. Description: 100-ohm, four-pair UTP.
  - 1. Comply with ICEA S-90-661 for mechanical properties.
  - 2. Comply with TIA/EIA-568-B.1 for performance specifications.
  - 3. Comply with TIA/EIA-568-B.2, Category 5e.
  - 4. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:
    - a. Communications, General Purpose: Type CM or Type CMG.
    - b. Communications, Plenum Rated: Type CMP, complying with NFPA 262.
    - c. Communications, Riser Rated: Type CMR, complying with UL 1666.
    - d. Communications, Limited Purpose: Type CMX.
    - e. Multipurpose: Type MP or Type MPG.

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- f. Multipurpose, Plenum Rated: Type MPP, complying with NFPA 262.
- g. Multipurpose, Riser Rated: Type MPR, complying with UL 1666.

# 2.4 UTP CABLE HARDWARE

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. American Technology Systems Industries, Inc.
  - 2. Dynacom Corporation.
  - 3. Hubbell Premise Wiring.
  - 4. KRONE Incorporated.
  - 5. Leviton Voice & Data Division.
  - 6. Molex Premise Networks; a division of Molex, Inc.
  - 7. Nordex/CDT; a subsidiary of Cable Design Technologies.
  - 8. Panduit Corp.
  - 9. Siemon Co. (The).
  - 10. Tyco Electronics/AMP Netconnect; Tyco International Ltd.
- B. UTP Cable Connecting Hardware: IDC type, using modules designed for punch-down caps or tools. Cables shall be terminated with connecting hardware of the same category or higher.
- C. Connecting Blocks: 110 style for Category 5e. Provide blocks for the number of cables terminated on the block, plus 25 percent spare; integral with connector bodies, including plugs and jacks where indicated.

#### 2.5 RS-232 CABLE

- A. Standard Cable: NFPA 70, Type CM.
  - 1. Paired, two pairs, No. 22 AWG, stranded (7x30) tinned-copper conductors.
  - 2. Polypropylene insulation.
  - 3. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
  - 4. PVC jacket.
  - 5. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned-copper drain wire
  - 6. Flame Resistance: Comply with UL 1581.
- B. Plenum-Rated Cable: NFPA 70, Type CMP.
  - 1. Paired, two pairs, No. 22 AWG, stranded (7x30) tinned-copper conductors.
  - 2. Plastic insulation.
  - 3. Individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage.
  - 4. Plastic jacket.
  - 5. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned-copper drain wire.
  - 6. Flame Resistance: Comply with NFPA 262.

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# 2.6 RS-485 CABLE

- A. Standard Cable: NFPA 70, Type CM.
  - 1. Paired, two pairs, twisted, No. 22 AWG, stranded (7x30) tinned-copper conductors.
  - 2. PVC insulation.
  - 3. Unshielded.
  - 4. PVC jacket.
  - 5. Flame Resistance: Comply with UL 1581.
- B. Plenum-Rated Cable: NFPA 70, Type CMP.
  - 1. Paired, two pairs, No. 22 AWG, stranded (7x30) tinned-copper conductors.
  - 2. Fluorinated ethylene propylene insulation.
  - 3. Unshielded.
  - 4. Fluorinated ethylene propylene jacket.
  - 5. Flame Resistance: NFPA 262, Flame Test.

## 2.7 LOW-VOLTAGE CONTROL CABLE

- A. Paired Cable: NFPA 70, Type CMG.
  - 1. One pair, twisted, No. 16 AWG, stranded (19x29) tinned-copper conductors.
  - 2. PVC insulation.
  - Unshielded.
  - 4. PVC jacket.
  - 5. Flame Resistance: Comply with UL 1581.
- B. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.
  - 1. One pair, twisted, No. 16 AWG, stranded (19x29) tinned-copper conductors.
  - 2. PVC insulation.
  - Unshielded.
  - 4. PVC jacket.
  - 5. Flame Resistance: Comply with NFPA 262.
- C. Paired Cable: NFPA 70, Type CMG.
  - 1. One pair, twisted, No. 18 AWG, stranded (19x30) tinned-copper conductors.
  - 2. PVC insulation.
  - 3. Unshielded.
  - 4. PVC jacket.
  - 5. Flame Resistance: Comply with UL 1581.
- D. Plenum-Rated, Paired Cable: NFPA 70, Type CMP.
  - 1. One pair, twisted, No. 18 AWG, stranded (19x30) tinned-copper conductors.
  - 2. Fluorinated ethylene propylene insulation.
  - 3. Unshielded.
  - 4. Plastic jacket.
  - 5. Flame Resistance: NFPA 262, Flame Test.

# 2.8 CONTROL-CIRCUIT CONDUCTORS

- A. Class 1 Control Circuits: Stranded copper, Type THHN-THWN, in raceway, complying with UL 44.
- B. Class 2 Control Circuits: Stranded copper, power-limited cable, concealed in building finishes, complying with UL 44.
- C. Class 3 Remote-Control and Signal Circuits: Stranded copper, Type TW or Type TF, complying with UL 83.

## 2.9 IDENTIFICATION PRODUCTS

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Brady Corporation.
  - 2. HellermannTyton.
  - 3. Kroy LLC.
  - 4. Panduit Corp.
- B. Comply with UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.
- C. Comply with requirements in Division 26 Section "Identification for Electrical Systems."

## PART 3 - EXECUTION

# 3.1 INSTALLATION OF PATHWAYS

- A. Comply with TIA/EIA-569-A for pull-box sizing and length of conduit and number of bends between pull points.
- B. Comply with requirements in Division 26 Section "Raceway and Boxes for Electrical Systems" for installation of conduits and wireways.
- C. Install manufactured conduit sweeps and long-radius elbows if possible.
- D. Pathway Installation in Equipment Rooms:
  - Position conduit ends adjacent to a corner on backboard if a single piece of plywood is installed or in the corner of room if multiple sheets of plywood are installed around perimeter walls of room.
  - 2. Install cable trays to route cables if conduits cannot be located in these positions.
  - 3. Secure conduits to backboard if entering room from overhead.
  - 4. Extend conduits 6 inches above finished floor.
  - 5. Install metal conduits with grounding bushings and connect with grounding conductor to grounding system.

#### CONTROL-VOLTAGE ELECTRICAL POWER CABLES

E. Backboards: Install backboards with 96-inch dimension vertical. Butt adjacent sheets tightly and form smooth gap-free corners and joints.

# 3.2 INSTALLATION OF CONDUCTORS AND CABLES

- A. Comply with NECA 1.
- B. General Requirements for Cabling:
  - 1. Comply with TIA/EIA-568-B.1.
  - 2. Comply with BICSI ITSIM, Ch. 6, "Cable Termination Practices."
  - 3. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, and cross-connect and patch panels.
  - 4. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
  - 5. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIM, "Cabling Termination Practices" Chapter. Install lacing bars and distribution spools.
  - 6. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
  - 7. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
  - 8. Pulling Cable: Comply with BICSI ITSIM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
- C. UTP Cable Installation:
  - 1. Comply with TIA/EIA-568-B.2.
  - 2. Install 110-style IDC termination hardware unless otherwise indicated.
  - 3. Do not untwist UTP cables more than 1/2 inch from the point of termination to maintain cable geometry.
- D. Installation of Control-Circuit Conductors:
  - Install wiring in raceways. Comply with requirements specified in Division 26 Section "Raceway and Boxes for Electrical Systems."
- E. Open-Cable Installation:
  - 1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
  - 2. Suspend copper cable not in a wireway or pathway a minimum of 8 inches above ceilings by cable supports not more than 60 inches apart.
  - 3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.
- F. Separation from EMI Sources:
  - 1. Comply with BICSI TDMM and TIA/EIA-569-A recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.

- 2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
  - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches.
  - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches.
  - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches.
- 3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
  - a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches.
  - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches.
  - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches.
- 4. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
  - Electrical Equipment Rating Less Than 2 kVA: No requirement.
  - b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches.
  - c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches.
- 5. Separation between Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches.
- 6. Separation between Cables and Fluorescent Fixtures: A minimum of 5 inches.

## 3.3 REMOVAL OF CONDUCTORS AND CABLES

A. Remove abandoned conductors and cables.

## 3.4 CONTROL-CIRCUIT CONDUCTORS

- A. Minimum Conductor Sizes:
  - 1. Class 1 remote-control and signal circuits, No 14 AWG.
  - 2. Class 2 low-energy, remote-control, and signal circuits, No. 16 AWG.
  - 3. Class 3 low-energy, remote-control, alarm, and signal circuits, No 12 AWG.

# 3.5 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

## 3.6 GROUNDING

- A. For data communications wiring, comply with ANSI-J-STD-607-A and with BICSI TDMM, "Grounding, Bonding, and Electrical Protection" Chapter.
- B. For low-voltage wiring and cabling, comply with requirements in Division 26 Section "Grounding and Bonding for Electrical Systems."

## 3.7 IDENTIFICATION

A. Identify system components, wiring, and cabling according to TIA/EIA-606-A. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."

## 3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
  - 1. Visually inspect UTP cable jacket materials for UL or third-party certification markings. Inspect cabling terminations to confirm color-coding for pin assignments, and inspect cabling connections to confirm compliance with TIA/EIA-568-B.1.
  - 2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
  - 3. Test UTP cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not after cross connection.
    - a. Test instruments shall meet or exceed applicable requirements in TIA/EIA-568-B.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
- D. Document data for each measurement. Print data for submittals in a summary report that is formatted using Table 10.1 in BICSI TDMM as a guide, or transfer the data from the instrument to the computer, save as text files, print, and submit.
- E. End-to-end cabling will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.

**END OF SECTION 260523** 

## SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

# PART 1 - GENERAL

# 1.1 SUMMARY

A. Section Includes: Grounding systems and equipment.

## 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Field quality-control reports.

## 1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with UL 467 for grounding and bonding materials and equipment.

# PART 2 - PRODUCTS

# 2.1 CONDUCTORS

- A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
- B. Bare Copper Conductors:
  - 1. Solid Conductors: ASTM B 3.
  - Stranded Conductors: ASTM B 8.
  - 3. Tinned Conductors: ASTM B 33.
  - 4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
  - 5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
  - 6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
  - 7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

## GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

# 2.2 CONNECTORS

- A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
- B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, pressure type with at least two bolts.
  - 1. Pipe Connectors: Clamp type, sized for pipe.
- C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

# 2.3 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad Zinc-coated steel; 3/4 inch by 10 feet in diameter.

## PART 3 - EXECUTION

# 3.1 APPLICATIONS

- A. Conductors: Install solid conductor for No. 8 AWG and smaller, and stranded conductors for No. 6 AWG and larger unless otherwise indicated.
- B. Underground Grounding Conductors: Install bare copper conductor, No. 2/0 AWG minimum. Bury at least 24 inches below grade.
- C. Isolated Grounding Conductors: Green-colored insulation with continuous yellow stripe. On feeders with isolated ground, identify grounding conductor where visible to normal inspection, with alternating bands of green and yellow tape, with at least three bands of green and two bands of yellow.
- D. Conductor Terminations and Connections:
  - 1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
  - 2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
  - 3. Connections to Ground Rods at Test Wells: Bolted connectors.
  - 4. Connections to Structural Steel: Welded connectors.

# 3.2 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:

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- 1. Feeders and branch circuits.
- 2. Lighting circuits.
- 3. Receptacle circuits.
- 4. Single-phase motor and appliance branch circuits.
- 5. Three-phase motor and appliance branch circuits.
- 6. Flexible raceway runs.
- 7. Busway Supply Circuits: Install insulated equipment grounding conductor from grounding bus in the switchgear, switchboard, or distribution panel to equipment grounding bar terminal on busway.
- 8. Computer and Rack-Mounted Electronic Equipment Circuits: Install insulated equipment grounding conductor in branch-circuit runs from equipment-area power panels and power-distribution units.
- B. Air-Duct Equipment Circuits: Install insulated equipment grounding conductor to duct-mounted electrical devices operating at 120 V and more, including air cleaners, heaters, dampers, humidifiers, and other duct electrical equipment. Bond conductor to each unit and to air duct and connected metallic piping.
- C. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install a separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
- D. Signal and Communication Equipment: In addition to grounding and bonding required by NFPA 70, provide a separate grounding system complying with requirements in TIA/ATIS J-STD-607-A.
  - 1. For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each service location, terminal cabinet, wiring closet, and central equipment location.
  - 2. Service and Central Equipment Locations and Wiring Closets: Terminate grounding conductor on a 1/4-by-4-by-12-inch grounding bus.
  - 3. Terminal Cabinets: Terminate grounding conductor on cabinet grounding terminal.
- E. Metal Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

# 3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

- B. Ground Rods: Drive rods until tops are 2 inches below finished floor or final grade unless otherwise indicated.
  - 1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
  - 2. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.
- C. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes shall be at least 12 inches deep, with cover.
  - 1. Test Wells: Install at least one test well for each service unless otherwise indicated. Install at the ground rod electrically closest to service entrance. Set top of test well flush with finished grade or floor.
- D. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
  - 1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
  - 2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
  - 3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
- E. Grounding and Bonding for Piping:
  - Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lugtype connector to a pipe flange using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
  - 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
  - 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- F. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

## 3.4 LABELING

- A. Comply with requirements in Division 26 Section "Identification for Electrical Systems" Article for instruction signs. The label or its text shall be green.
- B. Install labels at the telecommunications bonding conductor and grounding equalizer and at the grounding electrode conductor where exposed.
  - 1. Label Text: "If this connector or cable is loose or if it must be removed for any reason, notify the facility manager."

# 3.5 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections and prepare test reports:
  - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
  - 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
  - 3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells. Make tests at ground rods before any conductors are connected.
- B. Report measured ground resistances that exceed the following values:
  - 1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less:
  - 2. Power and Lighting Equipment or System with Capacity of 500 to 1000 kVA: 5 ohms.
  - 3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: 3 ohms.
  - 4. Power Distribution Units or Panelboards Serving Electronic Equipment: 3 ohm(s).
- C. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

**END OF SECTION 260526** 

## SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

# PART 1 - GENERAL

# 1.1 SUMMARY

#### A. Section includes:

- 1. Hangers and supports for electrical equipment and systems.
- 2. Construction requirements for concrete bases.

# 1.2 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
- D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of five times the applied force.

#### 1.3 SUBMITTALS

- A. Product Data: For steel slotted support systems.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following:
  - 1. Trapeze hangers. Include Product Data for components.
  - 2. Steel slotted channel systems. Include Product Data for components.
  - 3. Equipment supports.
- C. Welding certificates.

# 1.4 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code Steel."
- B. Comply with NFPA 70.

#### PART 2 - PRODUCTS

# 2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
  - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Allied Tube & Conduit.
    - b. Cooper B-Line, Inc.; a division of Cooper Industries.
    - c. ERICO International Corporation.
    - d. GS Metals Corp.
    - e. Thomas & Betts Corporation.
    - f. Unistrut: Tyco International, Ltd.
    - g. Wesanco, Inc.
  - 3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
  - 4. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
  - 5. Channel Dimensions: Selected for applicable load criteria.
- B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- C. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

- E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
  - 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
    - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      - 1) Hilti Inc.
      - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      - 3) MKT Fastening, LLC.
      - 4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
  - 2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
    - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) Cooper B-Line, Inc.; a division of Cooper Industries.
      - 2) Empire Tool and Manufacturing Co., Inc.
      - 3) Hilti Inc.
      - 4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      - 5) MKT Fastening, LLC.
  - 3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
  - 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
  - 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
  - 6. Toggle Bolts: All-steel springhead type.
  - 7. Hanger Rods: Threaded steel.

## PART 3 - EXECUTION

# 3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted or other support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
  - 1. Secure raceways and cables to these supports with two-bolt conduit clamps.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

# 3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
  - 1. To Wood: Fasten with lag screws or through bolts.
  - 2. To New Concrete: Bolt to concrete inserts.
  - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
  - 4. To Existing Concrete: Expansion anchor fasteners.

- 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
- 6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69.
- 7. To Light Steel: Sheet metal screws.
- 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

# 3.3 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated but not less than 4 inches larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000-psi, 28-day compressive-strength concrete.
- C. Anchor equipment to concrete base.
  - 1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  - 2. Install anchor bolts to elevations required for proper attachment to supported equipment.
  - 3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

## 3.4 PAINTING

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
  - 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Touchup: Clean and touchup paint on all field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.

C. 0	Galvanized Surfaces: Clean welds, bolted connections, and a apply galvanizing-repair paint to comply with ASTM A 780.	braded areas and	
END OF SECTION 260529			
HANGERS	S AND SUPPORTS FOR ELECTRICAL SYSTEMS	<u>'</u>	2

# SECTION 260533 - RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

# PART 1 - GENERAL

# 1.1 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

# 1.2 SUBMITTALS

- A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, details, and attachments to other work.

# 1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- B. Comply with NFPA 70.

## PART 2 - PRODUCTS

# 2.1 METAL CONDUIT AND TUBING

- A. Rigid Steel Conduit: ANSI C80.1.
- B. IMC: ANSI C80.6.
- C. EMT: ANSI C80.3.
- D. FMC: Zinc-coated steel.
- E. LFMC: Flexible steel conduit with PVC jacket.
- F. Fittings for Conduit (Including all Types and Flexible and Liquid-tight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

# RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

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- 1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
- 2. Fittings for EMT: Steel or die-cast, set-screw or compression type.

# 2.2 NONMETALLIC CONDUIT AND TUBING

- A. ENT: NEMA TC 13.
- B. RNC: NEMA TC 2, Type EPC-40-PVC, unless otherwise indicated.
- C. LFNC: UL 1660.
- D. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.
- E. Fittings for LFNC: UL 514B.

# 2.3 METAL WIREWAYS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Cooper B-Line, Inc.
  - 2. Hoffman.
  - 3. Square D; Schneider Electric.
- B. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type 1, unless otherwise indicated.
- C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.
- D. Wireway Covers: Screw-cover type, or As indicated.
- E. Finish: Manufacturer's standard enamel finish.

## 2.4 NONMETALLIC WIREWAYS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Hoffman.
  - 2. Lamson & Sessions: Carlon Electrical Products.

- B. Description: PVC plastic, extruded and fabricated to size and shape indicated, with snap-on cover and mechanically coupled connections with plastic fasteners.
- C. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

# 2.5 SURFACE RACEWAYS

- A. Surface Metal Raceways: Galvanized steel with snap-on covers. Manufacturer's standard enamel finish in color selected by Architect.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Thomas & Betts Corporation.
    - b. Walker Systems, Inc.; Wiremold Company (The).
    - c. Wiremold Company (The); Electrical Sales Division.
- B. Surface Nonmetallic Raceways: Two-piece construction, manufactured of rigid PVC with texture and color selected by Architect from manufacturer's standard colors.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Butler Manufacturing Company; Walker Division.
    - b. Enduro Systems, Inc.; Composite Products Division.
    - c. Hubbell Incorporated; Wiring Device-Kellems Division.
    - d. Lamson & Sessions; Carlon Electrical Products.
    - e. Panduit Corp.
    - f. Walker Systems, Inc.; Wiremold Company (The).
    - g. Wiremold Company (The); Electrical Sales Division.

# 2.6 BOXES, ENCLOSURES, AND CABINETS

- A. Sheet Metal Outlet and Device Boxes: NEMA OS 1.
- B. Cast-Metal Outlet and Device Boxes: NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- C. Nonmetallic Outlet and Device Boxes: NEMA OS 2.
- D. Metal Floor Boxes: Cast or sheet metal, fully adjustable, rectangular.
- E. Nonmetallic Floor Boxes: Nonadjustable, round.
- F. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

# RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

- G. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, galvanized, cast iron with gasketed cover.
- H. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.
  - 1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
  - 2. Nonmetallic Enclosures: Plastic.

## I. Cabinets:

- 1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
- 2. Hinged door in front cover with flush latch and concealed hinge.
- 3. Key latch to match panelboards.
- 4. Metal barriers to separate wiring of different systems and voltage.
- 5. Accessory feet where required for freestanding equipment.

## PART 3 - EXECUTION

# 3.1 RACEWAY APPLICATION

- A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:
  - 1. Exposed Conduit: Rigid steel conduit, or as indicated on plans.
  - 2. Concealed Conduit, Aboveground: Rigid steel conduit, or as indicated on plans.
  - 3. Underground Conduit: RNC, Type EPC-40-PVC (or as required by installation), direct buried.
  - 4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
  - 5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Comply with the following indoor applications, unless otherwise indicated:
  - 1. Exposed, Not Subject to Physical Damage: EMT, or as indicated on plans.
  - 2. Exposed, Not Subject to Severe Physical Damage: EMT, or as indicated on plans.
  - 3. Exposed and Subject to Severe Physical Damage: Rigid steel conduit. Includes raceways in the following locations:
    - a. Loading dock.
    - b. Corridors used for traffic of mechanized carts, forklifts, and pallethandling units.
    - c. Mechanical rooms.

# RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS

- 4. Concealed in Ceilings and Interior Walls and Partitions: EMT, or as indicated on plans.
- 5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
- 6. Damp or Wet Locations: Rigid steel conduit.
- 7. Raceways for Optical Fiber or Communications Cable: EMT, or as indicated on plans.
- 8. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, stainless steel in damp or wet locations.
- C. Minimum Raceway Size: 3/4-inch trade size.
- D. Raceway Fittings: Compatible with raceways and suitable for use and location.
  - 1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

## 3.2 INSTALLATION

- A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.
- B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hotwater pipes. Install horizontal raceway runs above water and steam piping.
- C. Complete raceway installation before starting conductor installation.
- D. Support raceways as specified in Division 26 Section "Hangers and Supports for Electrical Systems."
- E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.
- F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.
- G. Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.
- H. Raceways Embedded in Slabs:
  - 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
  - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.

- 3. Change from ENT to RNC, Type EPC-40-PVC, rigid steel conduit, or IMC before rising above the floor.
- I. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.
- J. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.
- K. Raceways for Optical Fiber and Communications Cable: Install as follows:
  - 1. 3/4-Inch Trade Size and Smaller: Install raceways in maximum lengths of 50 feet.
  - 2. 1-Inch Trade Size and Larger: Install raceways in maximum lengths of 75 feet.
  - 3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.
- L. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:
  - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
  - 2. Where otherwise required by NFPA 70.
- M. Expansion-Joint Fittings for RNC: Install in each run of aboveground conduit that is located where environmental temperature change may exceed 30 deg F, and that has straight-run length that exceeds 25 feet.
  - 1. Install expansion-joint fittings for each of the following locations, and provide type and quantity of fittings that accommodate temperature change listed for location:
    - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
    - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
    - c. Indoor Spaces: Connected with the Outdoors without Physical Separation: 125 deg F temperature change.
    - d. Attics: 135 deg F temperature change.

- 2. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change.
- 3. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at the time of installation.
- N. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
  - 1. Use LFMC in damp or wet locations subject to severe physical damage.
  - 2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.
- O. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.
- P. Set metal floor boxes level and flush with finished floor surface.
- Q. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

# 3.3 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

**END OF SECTION 260533** 

# SECTION 260544 - SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

# PART 1 - GENERAL

## 1.1 SUMMARY

## A. Section Includes:

- 1. Sleeves for raceway and cable penetration of non-fire-rated construction walls and floors.
- 2. Sleeve-seal systems.
- 3. Sleeve-seal fittings.
- 4. Grout.
- 5. Silicone sealants.

# 1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

# PART 2 - PRODUCTS

# 2.1 SLEEVES

## A. Wall Sleeves:

- 1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.
- 2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductileiron pressure pipe, with plain ends and integral water stop unless otherwise indicated.
- B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.
- C. Sleeves for Rectangular Openings:
  - 1. Material: Galvanized sheet steel.
  - Minimum Metal Thickness:

- a. For sleeve cross-section rectangle perimeter less than 50 inches and with no side larger than 16 inches, thickness shall be 0.052 inch.
- b. For sleeve cross-section rectangle perimeter 50 inches or more and one or more sides larger than 16 inches, thickness shall be 0.138 inch.

# 2.2 SLEEVE-SEAL SYSTEMS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Advance Products & Systems, Inc.
    - b. CALPICO, Inc.
    - c. Metraflex Company (The).
    - d. Pipeline Seal and Insulator, Inc.
    - e. Proco Products, Inc.
  - 2. Sealing Elements: EPDM or Nitrile (Buna N) rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
  - 3. Pressure Plates: Carbon steel.
  - 4. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

## 2.3 SLEEVE-SEAL FITTINGS

- A. Description: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit shall have plastic or rubber waterstop collar with center opening to match piping OD.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Presealed Systems.

# 2.4 GROUT

- A. Description: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.
- B. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.

- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

## 2.5 SILICONE SEALANTS

- A. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below.
  - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.
- B. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

#### PART 3 - EXECUTION

- 3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS
  - A. Comply with NECA 1.
  - B. Comply with NEMA VE 2 for cable tray and cable penetrations.
  - C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:
    - 1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
      - a. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint.
      - b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.
    - 2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
    - 3. Size pipe sleeves to provide 1/4-inch annular clear space between sleeve and raceway or cable unless sleeve seal is to be installed.
    - 4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
    - 5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches above finished floor level. Install sleeves during erection of floors.

- D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:
  - 1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
  - 2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.
- E. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work. Contractor shall retain a roofing contractor certified by the Owner's existing roofing manufacturer to maintain the existing roof warranty. A letter shall be provided from the existing roof manufacturer indicating acceptance of the work, and identifying the terms of the remaining warranty.
- F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- G. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch annular clear space between raceway or cable and sleeve for installing sleeve-seal system.

## 3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.
- B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

# 3.3 SLEEVE-SEAL-FITTING INSTALLATION

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Using grout, seal the space around outside of sleeve-seal fittings.

# END OF SECTION 260544

## SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

#### PART 1 - GENERAL

#### 1.1 SUMMARY

#### A. Section Includes:

- 1. Identification for raceways.
- 2. Identification of power and control cables.
- 3. Identification for conductors.
- 4. Warning labels and signs.
- 5. Instruction signs.
- 6. Equipment identification labels.
- 7. Miscellaneous identification products.

#### 1.2 ACTION SUBMITTALS

A. Product Data: For each electrical identification product indicated.

#### 1.3 QUALITY ASSURANCE

- A. Comply with ANSI A13.1.
- B. Comply with NFPA 70.
- C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- D. Comply with ANSI Z535.4 for safety signs and labels.
- E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

## PART 2 - PRODUCTS

# 2.1 POWER RACEWAY IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.
- B. Colors for Raceways Carrying Circuits at 600 V or Less:

#### IDENTIFICATION FOR ELECTRICAL SYSTEMS

- 1. Black letters on an orange field.
- 2. Legend: Indicate voltage.
- C. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- D. Snap-Around Labels for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeve, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- E. Snap-Around, Color-Coding Bands for Raceways Carrying Circuits at 600 V or Less: Slit, pretensioned, flexible, solid-colored acrylic sleeve, 2 inches (50 mm) long, with diameter sized to suit diameter of raceway or cable it identifies and to stay in place by gripping action.
- F. Write-On Tags: Polyester tag, 0.010 inch (0.25 mm) thick, with corrosion-resistant grommet and cable tie for attachment to conductor or cable.
  - 1. Marker for Tags: Permanent, waterproof, black ink marker recommended by tag manufacturer.
  - 2. Marker for Tags: Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

# 2.2 CONDUCTOR IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide.

# 2.3 WARNING LABELS AND SIGNS

- A. Comply with NFPA 70 and 29 CFR 1910.145.
- B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

#### 2.4 INSTRUCTION SIGNS

- A. Engraved, laminated acrylic or melamine plastic, minimum 1/16 inch (1.6 mm) thick for signs up to 20 sq. inches (129 sq. cm) and 1/8 inch (3.2 mm) thick for larger sizes.
  - 1. Engraved legend with black letters on white face.

#### IDENTIFICATION FOR ELECTRICAL SYSTEMS

- 2. Punched or drilled for mechanical fasteners.
- 3. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.
- B. Adhesive Film Label: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm).
- C. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm). Overlay shall provide a weatherproof and UV-resistant seal for label.

## 2.5 EQUIPMENT IDENTIFICATION LABELS

- A. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch (10 mm). Overlay shall provide a weatherproof and UV-resistant seal for label.
- B. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a dark-gray background. Minimum letter height shall be 3/8 inch (10 mm).

#### 2.6 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

## PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Apply identification devices to surfaces that require finish after completing finish work.
- C. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

#### IDENTIFICATION FOR ELECTRICAL SYSTEMS

- D. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
- E. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot (15-m) maximum intervals in straight runs, and at 25-foot (7.6-m) maximum intervals in congested areas.
- F. Painted Identification: Comply with requirements in painting Sections for surface preparation and paint application.

#### 3.2 IDENTIFICATION SCHEDULE

- A. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
  - 1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.
    - a. Color shall be factory applied or field applied for sizes larger than No. 8 AWG, if authorities having jurisdiction permit.
    - b. Colors for 208/120-V Circuits:
      - 1) Phase A: Black.
      - 2) Phase B: Red.
      - 3) Phase C: Blue.
    - c. Colors for 480/277-V Circuits:
      - 1) Phase A: Brown.
      - 2) Phase B: Orange.
      - 3) Phase C: Yellow.
    - d. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- B. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.
- C. Conductors to Be Extended in the Future: Attach write-on tags to conductors and list source.

- D. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
  - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
  - 2. Use system of marker tape designations that is uniform and consistent with system used by manufacturer for factory-installed connections.
  - 3. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual.
- E. Locations of Underground Lines: Identify with underground-line warning tape for power, lighting, communication, and control wiring and optical fiber cable.
  - 1. Limit use of underground-line warning tape to direct-buried cables.
  - 2. Install underground-line warning tape for both direct-buried cables and cables in raceway.
- F. Workspace Indication: Install floor marking tape to show working clearances in the direction of access to live parts. Workspace shall be as required by NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
- G. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels.
  - 1. Comply with 29 CFR 1910.145.
  - 2. Identify system voltage with black letters on an orange background.
  - 3. Apply to exterior of door, cover, or other access.
  - 4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
    - a. Power transfer switches.
    - b. Controls with external control power connections.
- H. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.
- I. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
- 1. Labeling Instructions: IDENTIFICATION FOR ELECTRICAL SYSTEMS

- a. Indoor Equipment: Adhesive film label. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.
- b. Outdoor Equipment: Stenciled legend 4 inches (100 mm) high.
- c. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
- d. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.

**END OF SECTION 260553** 

#### SECTION 262813 - FUSES

#### PART 1 - GENERAL

#### 1.1 SUMMARY

A. Section Includes: Cartridge fuses rated 600-V ac and less for use in control circuits, enclosed switches, enclosed controllers and motor-control centers.

#### 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Operation and maintenance data.

#### 1.3 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NEMA FU 1 for cartridge fuses.
- C. Comply with NFPA 70.

#### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Cooper Bussmann, Inc.
  - 2. Edison Fuse, Inc.
  - 3. Ferraz Shawmut, Inc.
  - 4. Littelfuse, Inc.

#### 2.2 CARTRIDGE FUSES

A. Characteristics: NEMA FU 1, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.

EUSES 262813-1

#### PART 3 - EXECUTION

# 3.1 FUSE APPLICATIONS

- A. Service Entrance: Provide types as indicated on plans or required by installation.
- B. Feeders: Provide types as indicated on plans or required by installation.
- C. Motor Branch Circuits: Class RK1 or Class RK5, time delay.
- D. Other Branch Circuits: Class J, fast acting, Class J, time delay, as indicated on drawings or required by application.
- E. Control Circuits: Class CC, fast acting.

# 3.2 INSTALLATION

A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

#### 3.3 IDENTIFICATION

A. Install labels complying with requirements for identification specified in Division 26 Section "Identification for Electrical Systems" and indicating fuse replacement information on inside door of each fused switch and adjacent to each fuse block and holder.

**END OF SECTION 262813** 

FUSES 262813-2

## SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

#### PART 1 - GENERAL

#### 1.1 SUMMARY

#### A. Section Includes:

- 1. Fusible switches.
- 2. Nonfusible switches.
- 3. Receptacle switches.
- 4. Shunt trip switches.
- 5. Molded-case circuit breakers (MCCBs).
- 6. Enclosures.

#### 1.2 DEFINITIONS

- A. NC: Normally closed.
- B. NO: Normally open.
- C. SPDT: Single pole, double throw.

#### 1.3 SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated.
- B. Shop Drawings: For enclosed switches and circuit breakers. Include plans, elevations, sections, details, and attachments to other work.
  - 1. Wiring Diagrams: For power, signal, and control wiring.
- C. Field quality-control reports.
- D. Operation and maintenance data.

# 1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

#### ENCLOSED SWITCHES AND CIRCUIT BREAKERS

B. Comply with NFPA 70.

#### PART 2 - PRODUCTS

# 2.1 FUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  - 2. General Electric Company; GE Consumer & Industrial Electrical Distribution.
  - 3. Siemens Energy & Automation, Inc.
  - 4. Square D; a brand of Schneider Electric.
- B. Type GD, General Duty, Single Throw, 240-V ac, 800 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with cartridge fuse interiors to accommodate indicated fuses, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.
- C. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- D. Type HD, Heavy Duty, Six Pole, Single Throw, 600-V ac, 200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- E. Type HD, Heavy Duty, Double Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

## F. Accessories:

- 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
- 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
- 3. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
- 4. Lugs: Suitable for number, size, and conductor material.
- 5. Service-Rated Switches: Labeled for use as service equipment.

# 2.2 NONFUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  - 2. General Electric Company; GE Consumer & Industrial Electrical Distribution.
  - 3. Siemens Energy & Automation, Inc.
  - 4. Square D; a brand of Schneider Electric.
- B. Type GD, General Duty, Single Throw, 600 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept two padlocks, and interlocked with cover in closed position.
- C. Type HD, Heavy Duty, Single Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- D. Type HD, Heavy Duty, Six Pole, Single Throw, 600-V ac, 200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.
- E. Type HD, Heavy Duty, Double Throw, 600-V ac, 1200 A and Smaller: UL 98 and NEMA KS 1, horsepower rated, lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

#### F. Accessories:

- 1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
- 2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
- 3. Lugs: Suitable for number, size, and conductor material.

#### 2.3 RECEPTACLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  - 2. General Electric Company: GE Consumer & Industrial Electrical Distribution.
  - 3. Siemens Energy & Automation, Inc.
  - 4. Square D; a brand of Schneider Electric.
- B. Type HD, Heavy-Duty, Single-Throw Fusible Switch: Voltage and ampacity adequate for installation; UL 98 and NEMA KS 1; horsepower rated, with clips or

- bolt pads to accommodate indicated fuses; lockable handle with capability to accept three padlocks; interlocked with cover in closed position.
- C. Type HD, Heavy-Duty, Single-Throw Nonfusible Switch Voltage and ampacity adequate for installation; UL 98 and NEMA KS 1; horsepower rated, lockable handle with capability to accept three padlocks; interlocked with cover in closed position.
- D. Interlocking Linkage: Provided between the receptacle and switch mechanism to prevent inserting or removing plug while switch is in the on position, inserting any plug other than specified, and turning switch on if an incorrect plug is inserted or correct plug has not been fully inserted into the receptacle.
- E. Receptacle: Polarized, three-phase, four-wire receptacle (fourth wire connected to enclosure ground lug).

#### 2.4 SHUNT TRIP SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Cooper Bussmann, Inc.
  - 2. Ferraz Shawmut, Inc.
  - 3. Littelfuse, Inc.
- B. General Requirements: Comply with ASME A17.1, UL 50, and UL 98, with 200-kA interrupting and short-circuit current rating when fitted with Class J fuses.
- C. Switches: Three-pole, horsepower rated, with integral shunt trip mechanism and Class J fuse block; lockable handle with capability to accept three padlocks; interlocked with cover in closed position.
- D. Control Circuit: 120-V ac; obtained from source as indicated on plans with a control power source of enough capacity to operate shunt trip, connected pilot, and indicating and control devices.

#### E. Accessories:

- 1. Oiltight key switch for key-to-test function.
- 2. Oiltight ON pilot light.
- 3. Isolated neutral lug.
- 4. Mechanically interlocked auxiliary contacts that change state when switch is opened and closed.
- 5. Form C alarm contacts that change state when switch is tripped.
- 6. Three-pole, double-throw, fire-safety and alarm relay; 120-V ac or 24-V dc as indicated or required coil voltage.

#### ENCLOSED SWITCHES AND CIRCUIT BREAKERS

7. Three-pole, double-throw, fire-alarm voltage monitoring relay complying with NFPA 72.

#### 2.5 MOLDED-CASE CIRCUIT BREAKERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Eaton Electrical Inc.; Cutler-Hammer Business Unit.
  - 2. General Electric Company; GE Consumer & Industrial Electrical Distribution.
  - 3. Siemens Energy & Automation, Inc.
  - 4. Square D; a brand of Schneider Electric.
- B. General Requirements: Comply with UL 489, NEMA AB 1, and NEMA AB 3, with interrupting capacity to comply with available fault currents.
- C. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
- D. Electronic Trip Circuit Breakers: Field-replaceable rating plug, rms sensing, with the following field-adjustable settings:
  - 1. Instantaneous trip.
  - 2. Long- and short-time pickup levels.
  - 3. Long- and short-time time adjustments.
  - 4. Ground-fault pickup level, time delay, and I<sup>2</sup>t response.
- E. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.

# F. Features and Accessories:

- 1. Standard frame sizes, trip ratings, and number of poles.
- 2. Lugs: Suitable for number, size, trip ratings, and conductor material.
- 3. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.
- 4. Ground-Fault Protection: Comply with UL 1053; integrally mounted, self-powered type with mechanical ground-fault indicator; relay with adjustable pickup and time-delay settings, push-to-test feature, internal memory, and shunt trip unit; and three-phase, zero-sequence current transformer/sensor.
- 5. Shunt Trip: Trip coil energized from separate circuit, with coil-clearing contact.
- 6. Auxiliary Contacts: Two SPDT switches with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts, "b" contacts operate in reverse of circuit-breaker contacts.

ENCLOSED SWITCHES AND CIRCUIT BREAKERS

- 7. Alarm Switch: One NO contact that operates only when circuit breaker has tripped.
- 8. All relays and contacts shall have LED indicator lights to confirm circuit status. LED's shall be visible outside of panels.

#### 2.6 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: NEMA AB 1, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
  - 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
  - 2. Outdoor Locations: NEMA 250, Type 3R.
  - 3. Kitchen Areas: NEMA 250, Type 4X, stainless steel.
  - 4. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
  - 5. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.

#### PART 3 - EXECUTION

#### 3.1 INSTALLATION

- A. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- B. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
- C. Install fuses in fusible devices.
- D. Comply with NECA 1.

#### 3.2 IDENTIFICATION

- A. Comply with requirements in Division 26 Section "Identification for Electrical Systems."
  - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
  - 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

#### 3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections.

#### ENCLOSED SWITCHES AND CIRCUIT BREAKERS

# B. Acceptance Testing Preparation:

- 1. Test insulation resistance for each enclosed switch and circuit breaker, component, connecting supply, feeder, and control circuit.
- 2. Test continuity of each circuit.

# C. Tests and Inspections:

- 1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
- 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- D. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports, including a certified report that identifies enclosed switches and circuit breakers and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

END OF SECTION 262816

## SECTION 280528 - PATHWAYS FOR COMMUNICATIONS SYSTEMS

#### PART 1 - GENERAL

#### 1.1 SUMMARY

#### A. Section Includes:

- 1. Metal conduits and fittings.
- 2. Nonmetallic conduits and fittings.
- 3. Optical-fiber-cable pathways and fittings.
- 4. Surface pathways.
- 5. Boxes, enclosures, and cabinets.
- 6. Handholes and boxes for exterior underground cabling.

# B. Related Requirements:

 Section 260533 "Raceways and Boxes for Electrical Systems" for conduits, wireways, surface raceways, boxes, enclosures, cabinets, handholes, and faceplate adapters serving electrical systems.

#### 1.2 ACTION SUBMITTALS

- A. Product Data: For surface pathways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.
- B. Shop Drawings: For custom enclosures and cabinets.

#### PART 2 - PRODUCTS

# 2.1 METAL CONDUITS AND FITTINGS

- A. General Requirements for Metal Conduits and Fittings:
  - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
  - 2. Comply with TIA-569-B.
- B. GRC: Comply with ANSI C80.1 and UL 6.
- C. ARC: Comply with ANSI C80.5 and UL 6A.

#### PATHWAYS FOR COMMUNICATIONS SYSTEMS

- D. EMT: Comply with ANSI C80.3 and UL 797.
- E. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.
  - 1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886 and NFPA 70.
  - 2. Fittings for EMT:
    - a. Material: Steel or die cast.
    - b. Type: Setscrew or compression.
  - 3. Expansion Fittings: PVC or steel to match conduit type, complying with UL-467, rated for environmental conditions where installed, and including flexible external bonding jumper.
- F. Joint Compound for GRC or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

# 2.2 NONMETALLIC CONDUITS AND FITTINGS

- A. General Requirements for Nonmetallic Conduits and Fittings:
  - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
  - 2. Comply with TIA-569-B.
- B. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
- C. Continuous HDPE: Comply with UL 651B.
- D. Fittings for RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
- E. Solvent cements and adhesive primers shall have a VOC content of 510 and 550 g/L or less, respectively, when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- F. Solvent cements and adhesive primers shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

#### 2.3 SURFACE PATHWAYS

- A. General Requirements for Surface Pathways:
  - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
  - 2. Comply with TIA-569-B.
- B. Surface Metal Pathways: Galvanized steel with snap-on covers complying with UL 5. Manufacturer's standard enamel finish.
- C. Surface Nonmetallic Pathways: Two- or three-piece construction, complying with UL 5A, and manufactured of rigid PVC with texture and color selected by Architect from manufacturer's standard colors. Product shall comply with UL-94 V-0 requirements for self-extinguishing characteristics.

# 2.4 BOXES, ENCLOSURES, AND CABINETS

- A. General Requirements for Boxes, Enclosures, and Cabinets:
  - 1. Comply with TIA-569-B.
  - 2. Boxes, enclosures and cabinets installed in wet locations shall be listed for use in wet locations.
- B. Sheet-Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
- D. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- F. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.
- G. Gangable boxes are prohibited.
- H. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.
- I. Cabinets:
  - 1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
  - 2. Hinged door in front cover with flush latch and concealed hinge.
  - 3. Key latch to match panelboards.
  - 4. Metal barriers to separate wiring of different systems and voltage.

#### PATHWAYS FOR COMMUNICATIONS SYSTEMS

- 5. Accessory feet where required for freestanding equipment.
- 6. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

#### 2.5 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND CABLING

- A. General Requirements for Handholes and Boxes:
  - 1. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.
  - 2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
  - 3. Comply with TIA-569-B.
- B. Polymer-Concrete Handholes and Boxes with Polymer-Concrete Cover: Molded of sand and aggregate, bound together with polymer resin, and reinforced with steel, fiberglass, or a combination of the two.
  - 1. Standard: Comply with SCTE 77.
  - 2. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
  - 3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
  - 4. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
  - 5. Cover Legend: Molded lettering, "COMMUNICATIONS." or as required to identify installed system.
- C. Fiberglass Handholes and Boxes: Molded of fiberglass-reinforced polyester resin, with frame and covers of polymer concrete.
  - 1. Standard: Comply with SCTE 77.
  - 2. Color of Frame and Cover: Gray.
  - 3. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
  - 4. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.
  - 5. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
  - 6. Cover Legend: Molded lettering, "COMMUNICATIONS." Or as required to identify system installed.

#### PART 3 - EXECUTION

# 3.1 PATHWAY APPLICATION

- A. Outdoors: Apply pathway products as specified below unless otherwise indicated:
  - Exposed Conduit: RNC, Type EPC-80-PVC.
  - 2. Concealed Conduit, Aboveground: RNC, Type EPC-40-PVC.
  - 3. Underground Conduit: RNC, Type EPC-40-PVC,...
  - 4. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.
- B. Indoors: Apply pathway products as specified below unless otherwise indicated:
  - 1. Exposed, Not Subject to Physical Damage: EMT.
  - 2. Exposed, Not Subject to Severe Physical Damage: EMT.
  - 3. Exposed and Subject to Severe Physical Damage: GRC.
  - 4. Concealed in Ceilings and Interior Walls and Partitions: EMT or MC.
  - 5. Damp or Wet Locations: GRC.
  - 6. Boxes and Enclosures: NEMA 250 Type 1, except use NEMA 250 Type 4 nonmetallic in institutional and commercial kitchens and damp or wet locations
- C. Minimum Pathway Size: 3/4-inch trade size. Minimum size for optical-fiber cables is 1 inch.
- D. Pathway Fittings: Compatible with pathways and suitable for use and location.
  - 1. Rigid Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
  - 2. EMT: Use setscrew or compression, steel fittings. Comply with NEMA FB 2.10.
- E. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.
- F. Install surface pathways only where indicated on Drawings.
- G. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

#### 3.2 INSTALLATION

A. Comply with NECA 1, NECA 101, and TIA-569-B for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum pathways. Comply with NFPA 70 limitations for types of pathways allowed in specific occupancies and number of floors.

- B. Keep pathways at least 6 inches away from parallel runs of flues and steam or hotwater pipes. Install horizontal pathway runs above water and steam piping.
- C. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- D. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- E. Install no more than the equivalent of two 90-degree bends in any pathway run. Support within 12 inches of changes in direction. Utilize long radius ells for all optical-fiber cables.
- F. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- G. Pathways Embedded in Slabs:
  - 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure pathways to reinforcement at maximum 10-foot intervals.
  - 2. Arrange pathways to cross building expansion joints at right angles with expansion fittings.
  - 3. Arrange pathways to keep a minimum of 1 inch of concrete cover in all directions.
  - 4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
- H. Stub-ups to Above Recessed Ceilings:
  - 1. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.
- I. Coat field-cut threads on PVC-coated pathway with a corrosion-preventing conductive compound prior to assembly.
- J. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install insulated bushings on conduits terminated with locknuts.
- K. Install pathways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- L. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to assure a continuous ground path.

M. Spare Pathways: Install pull wires in empty pathways. Cap underground pathways designated as spare above grade alongside pathways in use.

# N. Surface Pathways:

- 1. Install surface pathway for surface telecommunications outlet boxes only where indicated on Drawings.
- O. Pathways for Optical-Fiber and Communications Cable: Install pathways as follows:
  - 1. 3/4-Inch Trade Size and Smaller: Install pathways in maximum lengths of 50 feet.
  - 2. 1-Inch Trade Size and Larger: Install pathways in maximum lengths of 75 feet.
  - 3. Install with a maximum of two 90-degree bends or equivalent for each length of pathway unless Drawings show stricter requirements.
- P. Install pathway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound.
- Q. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all pathways at the following points:
  - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
  - 2. Where an underground service pathway enters a building or structure.
  - 3. Where otherwise required by NFPA 70.

# R. Expansion-Joint Fittings:

- Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F and that has straight-run length that exceeds 25 feet. Install in each run of aboveground RMC and EMT conduit that is located where environmental temperature change may exceed 100 deg F and that has straight-run length that exceeds 100 feet.
- 2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:
  - a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F temperature change.
  - b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F temperature change.
  - c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F temperature change.
  - d. Attics: 135 deg F temperature change.

- 3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F of temperature change for metal conduits.
- 4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
- 5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.
- S. Mount boxes at heights indicated on Drawings in accordance with ADA requirements. Install boxes with height measured to of box unless otherwise indicated.
- T. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

#### 3.3 INSTALLATION OF UNDERGROUND CONDUIT

#### A. Direct-Buried Conduit:

- 1. Excavate trench bottom to provide firm and uniform support for conduit.
- 2. Install backfill.
- 3. After installing conduit, backfill and compact. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction.
- 4. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
  - a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete for a minimum of 12 inches on each side of the coupling.
  - b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.
- 5. Underground Warning Tape: Comply with requirements in Section 260553 "Identification for Electrical Systems."

#### 3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

- A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.
- B. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.
- C. Install handholes with bottom below frost line, below grade.
- D. Field cut openings for conduits according to enclosure manufacturer's written instructions.

# 3.5 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR COMMUNICATIONS PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 280544 "Sleeves and Sleeve Seals for Communications Pathways and Cabling."

#### 3.6 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies.

#### 3.7 PROTECTION

A. Protect coatings, finishes, and cabinets from damage or deterioration.

**END OF SECTION 280528** 

# SECTION 280544 - SLEEVES AND SLEEVE SEALS FOR COMMUNICATIONS PATHWAYS AND CABLING

#### PART 1 - GENERAL

#### 1.1 SUMMARY

#### A. Section Includes:

- 1. Sleeves for pathway and cable penetration of non-fire-rated construction walls and floors.
- 2. Sleeve-seal systems.
- 3. Sleeve-seal fittings.
- 4. Grout.
- 5. Silicone sealants.
- B. Electrical contractor shall be responsible for boxes with mud rings, conduits, and pull strings to accessible ceiling space. All low voltage communications (Data, TV, and phone) wiring and devices shall be furnished by owners vendor. Coordinate locations of all head end equipment and provide 120 volt power as required.

#### 1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

#### PART 2 - PRODUCTS

# 2.1 SLEEVES

## A. Wall Sleeves:

- 1. Steel Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, plain ends.
- 2. Cast-Iron Pipe Sleeves: Cast or fabricated "wall pipe," equivalent to ductileiron pressure pipe, with plain ends and integral water stop unless otherwise indicated.
- B. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies: Galvanized-steel sheet; 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

SLEEVES AND SLEEVE SEALS FOR COMMUNICATIONS PATHWAYS AND CABLING

- C. Sleeves for Rectangular Openings:
  - 1. Material: Galvanized-steel sheet.
  - 2. Minimum Metal Thickness:
    - a. For sleeve cross-section rectangle perimeter less than 50 inches (1270 mm) and with no side larger than 16 inches (400 mm), thickness shall be 0.052 inch (1.3 mm).
    - b. For sleeve cross-section rectangle perimeter 50 inches (1270 mm) or more and one or more sides larger than 16 inches (400 mm), thickness shall be 0.138 inch (3.5 mm).

#### 2.2 SLEEVE-SEAL SYSTEMS

- A. Description: Modular sealing device, designed for field assembly, to fill annular space between sleeve and pathway or cable.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - a. Advance Products & Systems, Inc.
    - b. CALPICO, Inc.
    - c. Metraflex Company (The).
    - d. Pipeline Seal and Insulator, Inc.
    - e. Proco Products, Inc.
  - 2. Sealing Elements: EPDM or Nitrile (Buna N) rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
  - 3. Pressure Plates: Carbon steel or Plastic.
  - 4. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

#### 2.3 SLEEVE-SEAL FITTINGS

- A. Description: Manufactured plastic, sleeve-type, water stop assembly made for embedding in concrete slab or wall. Unit shall have plastic or rubber water stop collar with center opening to match piping OD.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by the following:
    - a. Presealed Systems.

SLEEVES AND SLEEVE SEALS FOR COMMUNICATIONS PATHWAYS AND CABLING

#### 2.4 SILICONE SEALANTS

- A. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below.
  - 1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces that are not fire rated.
- B. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

#### PART 3 - EXECUTION

- 3.1 SLEEVE INSTALLATION FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS
  - A. Comply with NECA 1.
  - B. Comply with NEMA VE 2 for cable tray and cable penetrations.
  - C. Sleeves for Conduits Penetrating Above-Grade Non-Fire-Rated Concrete and Masonry-Unit Floors and Walls:
    - 1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
      - a. Seal annular space between sleeve and pathway or cable, using joint sealant appropriate for size, depth, and location of joint.
      - b. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall so no voids remain. Tool exposed surfaces smooth; protect material while curing.
    - 2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
    - 3. Size pipe sleeves to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pathway or cable unless sleeve seal is to be installed.
    - 4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
    - 5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inches (50 mm) above finished floor level. Install sleeves during erection of floors.
  - D. Sleeves for Conduits Penetrating Non-Fire-Rated Gypsum Board Assemblies:

SLEEVES AND SLEEVE SEALS FOR COMMUNICATIONS PATHWAYS AND CABLING

- 1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
- 2. Seal space outside of sleeves with approved joint compound for gypsum board assemblies.
- E. Roof-Penetration Sleeves: Seal penetration of individual pathways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- F. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve seals. Select sleeve size to allow for 1-inch (25-mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- G. Underground, Exterior-Wall and Floor Penetrations: Install cast-iron pipe sleeves. Size sleeves to allow for 1-inch (25-mm) annular clear space between pathway or cable and sleeve for installing sleeve-seal system.

#### 3.2 SLEEVE-SEAL-SYSTEM INSTALLATION

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at pathway entries into building.
- B. Install type and number of sealing elements recommended by manufacturer for pathway or cable material and size. Position pathway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pathway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

#### 3.3 SLEEVE-SEAL-FITTING INSTALLATION

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position water stop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Using grout, seal the space around outside of sleeve-seal fittings.

#### **END OF SECTION 280544**

# **APPENDICIES**

- 1. Section Not Used
- 2. Section Not Used
- 3. Section Not Used
- 4. AIA Document G701 Change Order (01250.1.4.1)
- 5. AIA Document G702 Application for Payment (01290.1.3.C)
- 6. AIA Document G703 Schedule of Values (01290.1.2.B.2)
- 7. AIA Document G710 Supplemental Instructions (01250.1.2)
- 8. AIA Document G714 Construction Change Directive (01250.1.5.A)
- 9. AIA Document G716 RFI Form (01310.1.6.C)
- 10. CSI Form 1.5A Subcontractor List (01310.1.3.A)
- 11. Section Not Used
- 12. CSI Form 13.1A Substitution Request Form (01635.1.3.A.1)
- 13. CSI Log Form 13.2B RFI Log (01310.1.6.E)
- 14. CSI Form 13.6A Change Order Request (01250.1.3.B.7)
- 15. CSI Form 13.6C Proposal Worksheet Detail (01250.1.3.A.2.e)
- 16. CSI Form 13.6D Proposal Worksheet Summary (01250.1.3.A.2.e)

# APPENDIX 4

AIA Document G701 – Change Order (01250.1.4.1)

# DRAFT AIA Document G701™ - 2001

# Change Order

PROJECT (Name and address):	CHANGE ORDER NUMBER:		OWNER:		
	DATE:		ARCHITECT:		
TO CONTRACTOR (Name and address):	ARCHITECT'S PROJECT NUMBER:		CONTRACTOR:		
(i. ame and addition).	CONTRACT DATE:				
	CONTRACT FOR:		OTHER:		
			OTTIER.		
THE CONTRACT IS CHANGED AS FOLLOW (Include, where applicable, any undispute		uted Construction Chang	e Directives)		
The original Contract Sum was The net change by previously authorized C The Contract Sum prior to this Change Or The Contract Sum will be increased by thi The new Contract Sum including this Cha	der was is Change Order in the amount of		\$ 0.00 \$ 0.00		
The Contract Time will be increased by Z The date of Substantial Completion as of					
NOTE: This Change Order does not includ have been authorized by Construction Cha Contractor, in which case a Change Order NOT VALID UNTIL SIGNED BY THE AR	ange Directive until the cost and time have is executed to supersede the Construction	e been agreed upon by b n Change Directive.			
ARCHITECT (Firm name)	CONTRACTOR (Firm name)	OWNER (Firm	name)		
AROTHEOT (1 tim name)	SONTHASTON (1 tim name)	OWNER (1 tim	nume)		
ADDRESS	ADDRESS	ADDRESS			
BY (Signature)	BY (Signature)	BY (Signature)			
(Typed name)	(Typed name)	(Typed name)			
DATE	DATE	DATE			

# APPENDIX 5

AIA Document G702 – Application for Payment (01290.1.3.C)

# DRAFT AIA® Document G702™ - 1992

# Application and Certificate for Payment

TO OWNER:	PROJECT:	APPLICATION NO: PERIOD TO:	Distribution to: OWNER:	
FROM	VIA	CONTRACT FOR:	ARCHITECT:	
CONTRACTOR:	ARCHITECT:	CONTRACT DATE: PROJECT NOS: / /	CONTRACTOR:	
SONTHAGION.	AROTHEOT.	FROSECT NOS.	FIELD:	
			OTHER:	
<b>CONTRACTOR'S APPLICATION</b>	FOR PAYMENT	The undersigned Contractor certifies that to the best of the Contractor		
Application is made for payment, as shown below		and belief the Work covered by this Application for Payment has with the Contract Documents, that all amounts have been paid b	been completed in accordance	
Continuation Sheet, AIA Document G703, is atta		which previous Certificates for Payment were issued and payments	s received from the Owner, and	
1. ORIGINAL CONTRACT SUM	\$			
2. Net change by Change Orders	\$	CONTRACTOR:		
3. CONTRACT SUM TO DATE (Line $1 \pm 2$ )	\$	By:	Date:	
4. TOTAL COMPLETED & STORED TO DATE (Colo				
5. RETAINAGE:		County of:		
<b>a.</b> % of Completed Work		Subscribed and sworn to before		
(Column D + E on $G703$ )	\$	me this day of		
b% of Stored Material	•	N		
(Column F on G703)	\$	Notary Public:		
Total Retainage (Lines 5a + 5b or Total in Co	olumn I of G703)\$	My Commission expires:		
6. TOTAL EARNED LESS RETAINAGE	\$	ARCHITECT'S CERTIFICATE FOR PAYMENT		
(Line 4 Less Line 5 Total)		In accordance with the Contract Documents, based on on-site obser this application, the Architect certifies to the Owner that to the bes	vations and the data comprising	
7. LESS PREVIOUS CERTIFICATES FOR PAYMEN	T\$	- information and belief the Work has progressed as indicated,	the quality of the Work is in	
(Line 6 from prior Certificate)		accordance with the Contract Documents, and the Contractor	is entitled to payment of the	
8. CURRENT PAYMENT DUE	\$	AMOUNT CERTIFIED.		
9. BALANCE TO FINISH, INCLUDING RETAINAGE		AMOUNT CERTIFIED		
(Line 3 less Line 6)	\$	(Attach explanation if amount certified differs from the amount appl Application and on the Continuation Sheet that are changed to conf		
CHANGE ORDER SUMMARY	ADDITIONS DEDUCTIONS	ARCHITECT:	orm with the amount certified.)	
Total changes approved in previous months by C			Date:	
Total approved this Month	\$ \$	This Certificate is not negotiable. The AMOUNT CERTIFIED is		
TOT		named herein. Issuance, payment and acceptance of payment are w		
NET CHANGES by Change Order	\$	the Owner or Contractor under this Contract	. , , , , ,	

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# **APPENDIX 6**

AIA Document G703 – Schedule of Values (01290.1.2.B.2)



#### Continuation Sheet

User Notes:

AIA Document G702, APPLICATION AND CERTIFICATION FOR PAYMENT, containing Contractor's signed certification is attached. In tabulations below, amounts are stated to the nearest dollar. Use Column I on Contracts where variable retainage for line items may apply.

**APPLICATION NO: APPLICATION DATE: PERIOD TO: ARCHITECT'S PROJECT NO:** 

Α	В	C	D	Е	F	G		Н	I
			WORK CO	MPLETED	MATERIALC	TOTAL			
ITEM NO.	DESCRIPTION OF WORK	SCHEDULED VALUE	FROM PREVIOUS APPLICATION (D + E)	THIS DEDIOD	MATERIALS PRESENTLY STORED (NOT IN D OR E)	COMPLETED	% (G ÷ C)	BALANCE TO FINISH (C - G)	RETAINAGE (IF VARIABLE RATE)
									1
	GRAND TOTAL								

AIA Document G710 – Supplemental Instructions (01250.1.2)

# PAFT AIA® Document G710™ - 1992

#### Architect's Supplemental Instructions

PROJECT (Name and address):	ARCHITECT'S SUF	PPLEMENTAL	OWNER:
	INSTRUCTION NO	:	ARCHITECT:
			CONSULTANT:
<b>OWNER</b> (Name and address):	DATE OF ISSUANCE	CE:	CONTRACTOR:
	CONTRACT FOR:		FIELD:
FROM ARCHITECT (Name and	CONTRACT DATE	:	OTHER:
TO CONTRACTOR (Name and address):	ARCHITECT'S PR	OJECT NUMBER:	
The Work shall be carried out in accordance the Contract Documents without change in accordance with these instructions indicate or Contract Time.	Contract Sum or C	Contract Time. Proceeding with	the Work in
DESCRIPTION:			
ATTACHMENTS: (Here insert listing of documents that supplied in the supplied i	port description.)		
(Signature)		(Printed name and title)	
(Signatur o)		(1. mea name and time)	

1

AIA Document G714 – Construction Change Directive (01250.1.5.A)

#### DRAFT AIA® Document G714™ - 2007

#### Construction Change Directive

PROJECT: (Name and address)	DIRECTIVE NUMBER:	OWNER:
	DATE: CONTRACT FOR:	ARCHITECT: □
TO CONTRACTOR: (Name and address)	CONTRACT DATED:	CONSULTANT:
10 00 mmoron. (Name and address)	ARCHITECT'S PROJECT NUMBER:	CONTRACTOR:
		FIELD: □
		OTHER:
You are hereby directed to make the foll (Describe briefly any proposed changes	owing change(s) in this Contract: or list any attached information in the alto	ernative)
PROPOSED ADJUSTMENTS  1. The proposed basis of adjustments	nt to the Contract Sum or Guaranteed Ma	ximum Price is:
Lump Sum of \$		
☐ •Unit Price of \$ pe	r	
☐ • As provided in Section 7	3.3 of AIA Document A201–2007	
☐ • As follows:		
2. The Contract Time is proposed	to . The proposed adjustment, if any	y, is .
When signed by the Owner and Architect and becomes effective IMMEDIATELY as a Cor Contractor shall proceed with the change(s) of	nstruction Change Directive (CCD), and the	Contractor signature indicates agreement with the proposed adjustments in Contract Sum and Contract Time set forth in this CCD.
ARCHITECT (Firm name)	OWNER (Firm name)	CONTRACTOR (Firm name)
ADDRESS	ADDRESS	ADDRESS
BY (Signature)	BY (Signature)	BY (Signature)
(Typed name)	(Typed name)	(Typed name)
DATE	DATE	DATE

AIA Document G716 – RFI Form (01310.1.6.C)

#### RAFT AIA Document G716 - 2004

#### Request for Information ("RFI") TO: FROM: PROJECT: **ISSUE DATE:** RFI No. REQUESTED REPLY DATE: **PROJECT NUMBERS: COPIES TO: RFI DESCRIPTION:** (Fully describe the question or type of information requested.) REFERENCES/ATTACHMENTS: (List specific documents researched when seeking the information requested.) SPECIFICATIONS: DRAWINGS: OTHER: **SENDER'S RECOMMENDATION:** (If RFI concerns a site or construction condition, the sender may provide a recommended solution, including cost and/or schedule considerations.) RECEIVER'S REPLY: (Provide answer to RFI, including cost and/or schedule considerations.) BY DATE COPIES TO Note: This reply is not an authorization to proceed with work involving additional cost, time or both. If any reply requires a change to the Contract Documents, a Change Order, Construction Change Directive or a Minor Change in the work must be executed in accordance with the Contract Documents.

CSI Form 1.5A – Subcontractor List (01310.1.3.A)



# SUBCONTRACTORS AND MAJOR MATERIAL SUPPLIERS LIST

© Copyright 19	Copies:	Signed by:	☐ Attachments	Section Number	List Subcontra	1	To (A/E):	Project:	
94, Construction Plaza, Suite 300	□ Owner		its	Section Title	ctors and Majo				
© Copyright 1994, Construction Specifications Institute, 99 Canal Center Plaza, Suite 300, Alexandria, VA 22314	☐ Consultants			'n	or Material Sup				
astitute, 22314	its 🗆			Fi	pliers prop				
				Firm	osed for use on this Pro				
Page I of _				Address	ject as required by th	Cc	A/	Da	n !
					e Construction Docur	Contract For:	A/E Project Number: _	Date:	· ()
				\$	ments. Att				
		Date:		Phone Number (Fax Number)	List Subcontractors and Major Material Suppliers proposed for use on this Project as required by the Construction Documents. Attach supplemental sheets if necessary.				
				Co	necessary				
July 1994 CSI Form 1.5A	∏ File			Contact					

CSI Form 13.1A – Substitution Request Form (01635.1.3.A.1)



#### SUBSTITUTION REQUEST

(After the Bidding/Negotiating Stage)

Project:	Substitution Request Number:
	From:
To:	_
	A/E Project Number:
Re:	Contract For:
Specification Title:	
Section: Page:	Article/Paragraph:
Proposed Substitution:	
Manufacturer: Address:	
Trade Name:	
Installer: Address:	
History: ☐ New product ☐ 1-4 years old ☐ 5-10 years old	
Differences between proposed substitution and specified produc	
☐ Point-by-point comparative data attached — REQUIRED BY	A/E
Reason for not providing specified item:	<b>&gt;</b>
LIGHT SAGRE AND MATERIAL VI	
Similar Installation:	
Project:	Architect:
Address:	
Proposed substitution affects other parts of Work:	
Savings to Owner for accepting substitution:	(\$).
Proposed substitution changes Contract Time:   No	☐ Yes [Add] [Deduct]days.
Supporting Data Attached: ☐ Drawings ☐ Product Data	□ Samples □ Tests □ Reports □

#### SUBSTITUTION REQUEST

(After the Bidding/Negotiating Stage - Continued)

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become
  apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- · Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by:							
Signed by:							
Firm:				A			
Address:				<b>(</b>		A	
				A			
Telephone:							
ritacimonts.							
			The second second				
		458		MA .			
☐ Substitution rejected☐ Substitution Request	ed - Make submitted as noted - Mak I - Use specified it t received too late	e súbmittals in acc naterials.	ordance with S	Specification Section	on 01635	Substitution Procedures.	
Signed by:				Da	ate:		
Additional Comments:	☐ Contractor	☐ Subcontractor	☐ Supplier	☐ Manufacturer	□А⁄Е	Δ	
					<del>i i</del>		
	***						
						, , , , , , , , , , , , , , , , , , , ,	

CSI Log Form 13.2B – RFI Log (01310.1.6.E)



#### REQUEST FOR INTERPRETATION LOG

		Contractor:		
R.F.I. NO.	DATE REC'D	BRIEF DESCRIPTION OF INFORMATION REQUESTED	DATE OF RESPONSE	R.F.P. NO.
······			700	
****				
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		Section Control of the Control of th		1
		"Magazar"		
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CSI Form 13.6A – Change Order Request (01250.1.3.B.7)



#### CHANGE ORDER REQUEST (PROPOSAL)

Project:	Change Order Request Number:
To:	From (Contractor):  Date:
10.	A/E Project Number:
Re:	Contract For:
This Change Order Request (C.O.R.) contains an itemized quotation proposed modifications to the Contract Documents based on Proposal	for changes in the Contract Sum or Contract Time in response to Request No
Description of Proposed Change:	<u> </u>
Attached supporting information from:   Subcontractor   Suppli	
Does Proposed Change involve a change in Contract Sum? ☐ No	☐ Yes [Increase] [Decrease] \$
Does Proposed Change involve a change in Contract Time?   No	☐ Yes [Increase] [Decrease] days.
Attached pages:   Proposal Worksheet Summary:  Proposal Worksheet Detail(s):	
Signed by:	Date:
Copies:   Owner   Consultants	□ □ File

CSI Form 13.6C – Proposal Worksheet Detail (01250.1.3.A.2.e)



# PROPOSAL WORKSHEET DETAIL

ONLI FRICES		Subtotal (Enter this number on Worksheet Summary)	4	3		Ref. No. Item Description Quantity Materials Labor Materials Labor	ADDITIONS  UNIT PRICES SUBTOTALS	SHADED AREAS FOR A/E USE	Proposal Request Number:	Re: Date:	To:Contact:	Project: Change Order Request Number:	
Materials Labor	OTALS	_				faterials Labor	)TALS				Contact:		
	TOTAL						TOTAL						

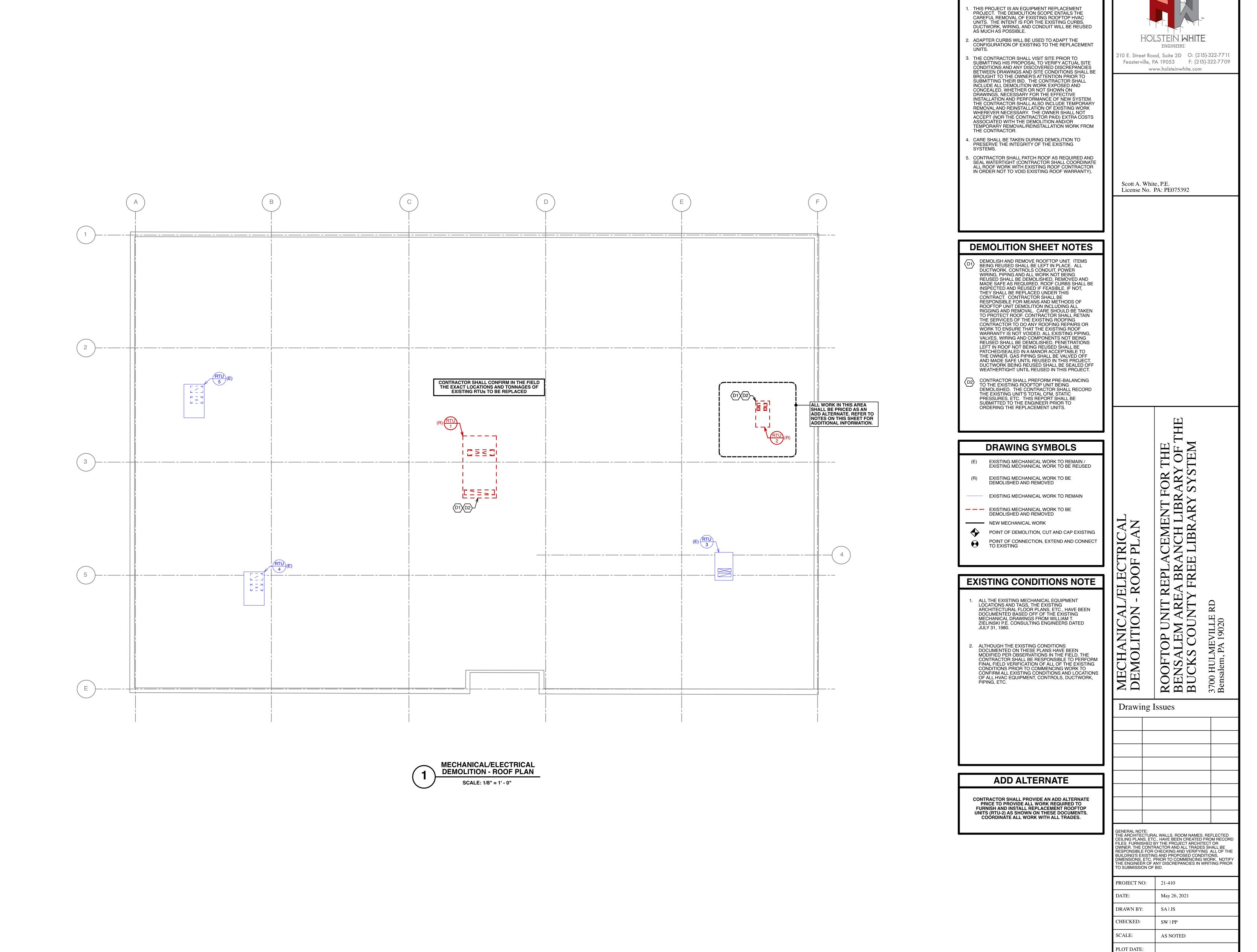
Subtotal (Enter this number on Worksheet Summary.)

CSI Form 13.6D – Proposal Worksheet Summary (01250.1.3.A.2.e)



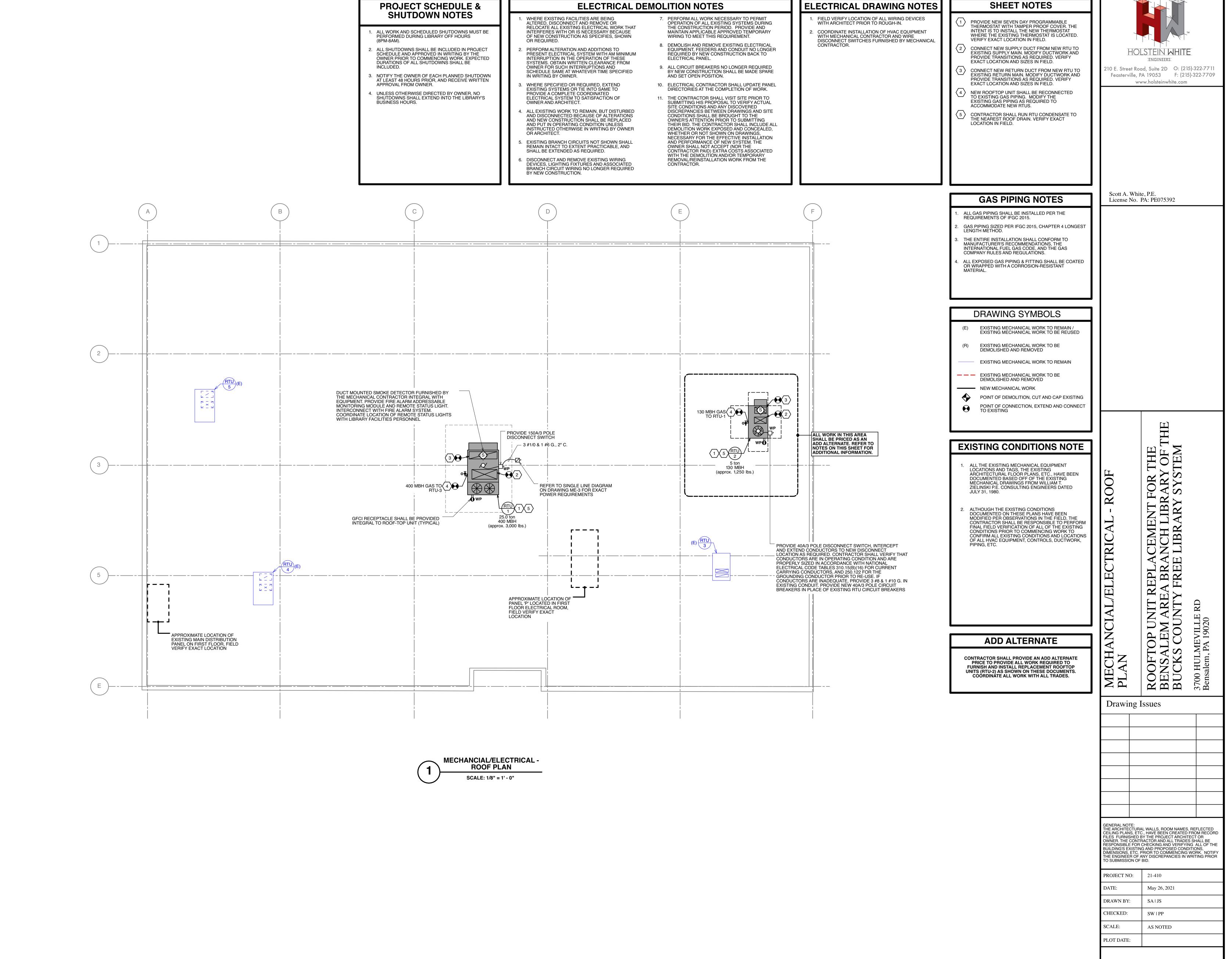
#### PROPOSAL WORKSHEET SUMMARY

			***	MINDITLE	T BUNINIAKI
Proje	ect:	Char	ige Order Request	Number:	
То:		Fron	n:		
Re:		Date			
Prop	osal Requ	est Number: A/E	Project Number:		
Com	plete and	attach Proposal Worksheet Detail for each element of Work. I	Enter Worksheet In	formation below.	
ADE	OITIONS				
	Sheet	Description	Material	Labor	Subtotal
1					
2					
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4				ÀV	
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6 7					
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	Sheet	Description	Material	Labor	Subtotal
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		Subtotal			
			Subcontractor's	NI-4.	
			Subcontractor's		
			Subcontractor's		
			Subcontractor's	Total:	<u> </u>
			Contractor's OH		
			Contractor's Bor Insurance:	ıd:	
			Tax:		
			WORKSHEET	TOTAL	\$ -



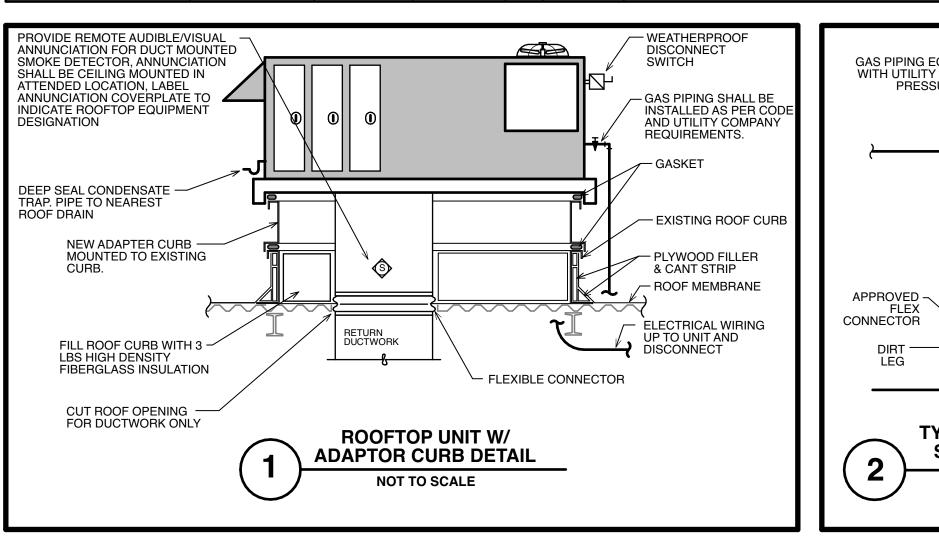
DME-1

**DEMOLITION NOTES** 



ME-1

	Material		Insulation			
System	Basis of Design	Basis of Design	Туре	Wall (in.)	Vapor Barrier	Remarks
Ductwork; Supply	Galvanized Steel	Certainteed	Duct Wrap	1	Integral	ASHRAE 2" Pressure Class. Seal Class "A"
Ductwork; Return	Galvanized Steel	Certainteed	Duct Liner	1/2	Integral	ASHRAE 2" Pressure Class. Seal Class "A"
Condensate Piping - A/C	Type "L" Copper	Certainteed	500° Snap On	1	Integral	Alt. insulation 3/4" Rubatex R180FS
Natural Gas Piping	Sch. 40 Black Steel	_	_	_	_	Comply w. Utility Company Standards & IFGC 2015, All Exposed Gas Piping & Fittings shall be Coated/Wrapped with a Corrosion-Resistant Material



aterial	Weight (IDS)	3,000	1,230
	Dimensions (L x W x H) (in.)	121-11/16x84-3/4x66-1/4	88-5/8 x 53-1/4 x 40-7/8
	Service	Refer to Plans	Refer to Plans
	Cooling		
	Nominal Tons	25.0	5.0
	Gross Total Cooling Capacity (MBH)	283.44	63.49
	Gross Sensible Capacity (MBH)	229.56	47.33
	ARIEER	10.6	11.9
	ARI IEER	12.4	14.2
EQUIPMENT HOOK-UPS SHALL COMPLY	EAT db/wb(°F)	80.0/67.0	80.0/67.0
EQUIPMENT HOOK-UPS SHALL COMPLY Y COMPANY REQUIREMENTS. PROVIDE SSURE REDUCERS AS REQUIRED.	LAT db/wb(°F)	58.74/57.91	58.09/56.71
SSURE REDUCERS AS REQUIRED.	Heating Performance		
	EAT	70	70
	LAT	99.49	118.4
	Heating		
	Heating Fuel	Natural Gas	Natural Gas
T ← PRESSURE	Input Capacity (MBH)	400	130.0
TAP	Output Capacity (MBH)	320	106.6
	Thermal Efficiency	80%	82%
	Stages	2	1
	Electrical	208/230 - 3Ø - 60	208/230 - 3Ø - 60
	Compressor Power (kW)	20.96	4.01
	Indoor motor bhp (HP)	8.01	1.14
、 🕇 📗 📗 GAS	Power Supply MCA	122.2	26.0
EQUIPMENT	Power Supply MOCP	150.0	40.0
	Options		
	410A Refrigerant	Yes	Yes
<u> </u>	Powered Convenience Outlet	Yes	Yes
2" MIN	OA Hood w/ M.O.D.	Yes	Yes
<u> </u>	Insulated Roof Curb	Yes	Yes
	Filters	Yes	Yes
TVDIOAL OAC FOLUDATAT	Mfg. Start-up & Checkout Service	Yes	Yes
TYPICAL GAS EQUIPMENT	Drain Pan	Yes	Yes
SUPPLY PIPING DETAIL	Duel Enthalpy Economizer	Yes	Yes
	Factory Installed Smoke Detector	Yes	Yes
NOT TO SCALE	Adapter Curb	MicroMetl - CA-TRN-593-CAR-TM25	Carrier 50DJ900771 to Baycurb 043A
	Stages Gas Heat	Two	Single
	4" Pleated Filters (MERV 13)	Yes	Yes
	Microchannel Condenser Coil	Yes	Yes
	Removable Access Panels	Yes	Yes
	PACNET controls compatible for future tic		

ROOFTOP UNIT SCHEDULE

Jnit Designation

#### . Run 1" condenstate drain line to nearest roof drain, splash block or approved interior location as required, wrap interior pipe

2. Contractor shall coordinate with General Contractor to provide provisions for and location of thermostat and controls.

into a building automation system

Hot Gas Bypass

**GFI** Receptical

BACNET controls compatible for future tie

- 3. RTU shall be mounted on standard insulated roof curb. Refer to manufacturers recommendations for further information.
- 4. Mechanical Contractor shall furnish equipment disconnect switch and Electrical Contractor shall install equipment disconnect switch.
- . Contractor shall preform pre-balancing to the existing Rooftop units being replaced. The contractor shall record the existing unit's total cfm, internal and external static pressures, etc. This report shall be submitted to the engineer prior to ordering the replacement units. The contractor shall include all added pressures from the new roof curbs in their internal static pressure calculations for the replacement units.

Basis of Design

Supply Fan CFM

Minimum O.A. CFM

E.S.P. Supply Fan (IN. W.G.)

Model No.

Weight (lbs)

YHD300G3RZD

10,000

2,000

YHC060E3RZA

2,000

400

1,250

Yes

This unit shall be priced as add alternate #1. Contractor shall provide an add alternate price to provide all work required to furnish and install replacement rooftop unit (RTU-2) as shown on these documents. Coordinate all work with all trades.

#### **SEQUENCE OF OPERATIONS: ROOFTOP UNITS**

#### A. OCCUPANCY:

A USER ADJUSTABLE OCCUPANCY SCHEDULE WILL BE ESTABLISHED AND MAINTAINED BY THE BUILDING OWNER/OPERATOR. OCCUPIED AND UNOCCUPIED HEATING AND COOLING SETPOINTS WILL BE ESTABLISHED. THE FAN SYSTEM WILL MAINTAIN SPACE CONDITIONS TO THE OCCUPIED AND UNOCCUPIED SETPOINTS BASED ON THIS OPERATING SCHEDULE. **INITIAL SETPOINTS:** 

OCCUPIED HEATING OCCUPIED COOLING UNOCCUPIED HEATING 65°F = UNOCCUPIED COOLING 82°F

#### B. OPTIMAL START:

AN OPTIMAL START ROUTINE WILL CALCULATE AN EARLY START TIME TO BRING SPACE CONDITIONS TO WITHIN OCCUPIED SETPOINTS BY THE BEGINNING OF THE SCHEDULED OCCUPANCY TIME PERIOD. THE OPTIMAL START ROUTINE FACTORS SPACE TEMPERATURE(S) AND OUTDOOR CONDITIONS TO CALCULATE AND LEARN THE START-UP RECOVERY TIME FROM THE UN-OCCUPIED MODE.

#### C. FIRE / SMOKE - SAFETY DEVICE:

UPON ACTIVATION OF THE FIRE/SMOKE SAFETY DEVICE. THE FAN SYSTEM WILL SHUTDOWN AND CEASE ALL FUNCTION, EXCEPT WHERE SPECIFIED OTHÉRWISE. A MANUAL RESET OF THE DEVICE WILL BE REQUIRED TO ALLOW THE SYSTEM RE-START IN ITS APPROPRIATE MODE OF OPERATION. AN ALARM WILL BE ACTIVATED AT THE OPERATOR'S TERMINAL.

#### D. COOLING:

DURING OCCUPIED COOLING MODE OF OPERATION, THE ECONOMIZER (IF AVAILABLE) AND PRIMARY COOLING ARE USED TO CONTROL THE SUPPLY AIR TEMPERATURE. THE SUPPLY AIR TEMPERATURE SETPOINT IS USER-DEFINED AT THE UNIT MOUNTED VAV SETPOINT POTENTIOMETER OR AT THE REMOTE PANEL. IF THE ENTHALPY OF THE OUTSIDE AIR IS APPROPRIATE TO USE "FREE COOLING" THE ECONOMIZER WILL BE USED FIRST TO ATTEMPT TO SATISFY THE SUPPLY SETPOINT. ON UNITS WITH ECONOMIZER, A CALL FOR COOLING WILL MODULATE THE FRESH AIR DAMPERS OPEN. THE RATE OF ECONOMIZER MODULATION IS BASED ON DEVIATION OF THE DISCHARGE TEMPERATUR FROM SETPOINT, I.E., THE FURTHER AWAY FROM SETPOINT, THE FASTER THE FRESH AIR DAMPER WILL OPEN. NOTE THAT THE ECONOMIZER IS ONLY ALLOWED TO FUNCTION FREELY IF AMBIENT CONDITIONS ARE BELOW THE ENTHALPY CONTROL SETTING OR BELOW THE RETURN AIR ENTHALPY IF UNIT HAS COMPARATIVE ENTHALPY INSTALLED. IF OUTSIDE AIR IS NOT SUITABLE FOR "ECONOMIZING", THE FRESH AIR DAMPERS DRIVE TO THE MINIMUM OPEN POSITION. A FIELD ADJUSTABLE POTENTIOMETER ON THE ECONOMIZER ACTUATOR, OR A REMOTE POTENTIOMETER CAN PROVIDE THE INPUT TO ESTABLISH THE MINIMUM DAMPER POSITION. AT OUTDOOR AIR CONDITIONS ABOVE THE ENTHALPY CONTROL SETTING, PRIMARY COOLING ONLY IS USED AND THE FRESH AIR DAMPERS REMAIN AT MINIMUM POSITION. IF THE UNIT DOES NOT INCLUDE AN ECONOMIZER, PRIMARY COOLING ONLY IS USED TO SATISFY COOLING REQUIREMENTS.

#### **HEATING:**

WHEN THE THERMOSTAT CALLS FOR HEATING, POWER IS SENT TO W ON THE INTEGRATED GAS CONTROLLER (IGC) BOARD. AN LED ON THE IGC BOARD TURNS ON AND REMAINS ON DURING NORMAL OPERATION. A CHECK IS MADE TO ENSURE THAT THE ROLLOUT SWITCH AND LIMIT SWITCH ARE CLOSED. IF THE CHECK WAS SUCCESSFUL, THE INDUCED-DRAFT MOTOR IS ENERGIZED AND WHEN ITS SPEED IS SATISFACTORY, AS PROVEN BY THE "HALL EFFECT" SENSOR. THE IGNITION ACTIVATION PERIOD BEGINS. THE BURNERS WILL IGNITE WITHIN 5 SECONDS. IF THE BURNERS DO NOT LIGHT, THERE IS A 22-SECOND DELAY BEFORE ANOTHER 5-SECOND ATTEMPT. THIS SEQUENCE IS REPEATED FOR 15 MINUTES OR UNTIL THE BURNERS LIGHT. IF, AFTER THE 15 MINUTES. THE BURNERS STILL HAVE NOT LIT, HEATING IS LOCKED OUT. TO RESET THE CONTROL, BREAK 24V POWER TO THE

WHEN IGNITION OCCURS, THE IGC BOARD WILL CONTINUE TO MONITOR THE CONDITION OF THE ROLLOUT SWITCH. THE LIMIT SWITCHES. THE "HALL EFFECT" SENSOR, AS WELL AS THE FLAME SENSOR. 45-SECONDS AFTER IGNITION OCCURS, ASSUMING THE UNIT IS CONTROLLED THROUGH A ROOM THERMOSTAT SET FOR FAN AUTO, THE INDOOR FAN MOTOR WILL ENERGIZE (AND THE OUTDOOR AIR DAMPERS WILL OPEN TO THEIR MINIMUM POSITION). IF, FOR SOME REASON, THE OVER-TEMPERATURE LIMIT OPENS PRIOR TO THE START OF THE INDOOR FAN BLOWER. THE UNIT WILL SHORTEN THE 45-SECOND DELAY TO 5-SECONDS LESS THAN THE TIME FROM INITIATION OF HEAT TO WHEN THE LIMIT TRIPPED. GAS WILL NOT BE INTERRUPTED TO THE BURNERS AND HEATING WILL CONTINUE. ONCE THE FAN-ON DELAY HAS BEEN MODIFIED, IT WILL NOT CHANGE BACK TO 45-SECONDS UNTIL POWER IS RESET TO THE CONTROL.

ON UNITS WITH 2 STAGES OF HEAT. WHEN ADDITIONAL HEAT IS REQUIRED. W2 CLOSES AND INITIATES ON UNITS WITH 2 STAGES OF HEAT. WHEN ADDITIONAL HEAT IS REQUIRED. W2 CLOSES AND INITIATES POWER TO THE SECOND STAGE OF THE MAIN GAS VALVE. WHEN THE THERMOSTAT IS SATISFIED, W1 AND W2 OPEN AND THE GAS VALVE CLOSES, INTERRUPTING THE FLOW OF GAS TO

IF THE CALL FOR W1 LASTED LESS THAN 1 MINUTE, THE HEATING CYCLE WILL NOT TERMINATE UNTIL 1 MINUTE AFTER W1 BECAME ACTIVE. IF THE UNIT IS CONTROLLED THROUGH A ROOM THERMOSTAT SET FOR FAN AUTO, THE INDOOR FAN MOTOR WILL CONTINUE TO OPERATE FOR AN ADDITIONAL 45-SECONDS THEN STOP. IF THE OVER-TEMPERATURE LIMIT OPENS AFTER THE INDOOR MOTOR IS STOPPED, BUT WITHIN 10 MINUTES OF W1 BECOMING INACTIVE, ON THE NEXT CYCLE THE TIME WILL BE EXTENDED BY 15-SECONDS. THE MAXIMUM DELAY IS 3 MINUTES. ONCE MODIFIED. THE FAN OFF DELAY WILL NOT CHANGE BACK TO 45-SECONDS UNLESS POWER IS RESET TO THE CONTROL. AN LED INDICATOR IS PROVIDED ON THE IGC TO MONITOR OPERATION.

#### ReliaTel<sup>™</sup> CONTROL DEHUMIDIFICATION:

COMPRESSOR OPERATION.

ON A CALL FOR DEHUMIDIFICATION, THE REHEAT VALVE IS ENERGIZED AND THE COMPRESSOR IS TURNED ON, WHEN THE HUMIDITY CONTROL SETPOINT IS SATISFIED. THE VALVE IS DEENERGIZED AND THE COMPRESSOR IS TURNED OFF. IF THERE IS A CALL FOR COOLING OR HEATING FROM THE SPACE TEMPERATURE CONTROLLER, I.E. ZONE SENSOR OR THERMOSTAT, WHILE IN REHEAT, THE REHEAT VALVE IS DE-ENERGIZED AND THE COMPRESSOR CONTINUES TO RUN, OR THE HEAT IS TURNED ON. THE 3 MINUTE COMPRESSOR ON AND OFF TIMES ARE STILL ACTIVE DURING

#### **MECHANICAL SPECIFICATIONS**

- Contractor shall provide all labor, materials, tools, apparatus and equipment required to complete his work in accordance with the contract documents, codes, laws and ordinances and accepted trade procedures.
- The Contractor shall review all of the contract documents including those of the other trades in order to acquaint himself with the existing and related conditions that may, will or could affect his work. He shall be experienced, skilled and knowledgeable with this type of construction and shall be expert and proficient in the preparation of estimates and the comprehension, implementation and interpretation of contract documents such as those prepared for this project.
- The Contractor shall visit the site before he submits his proposal. He shall examine all existing conditions which affect the work. Submission of the proposal shall be considered evidence that this requirement has been fulfilled. No extra payment will be allowed for additional work made necessary by the failure to visit the site.
- The Contractor by his acceptance of the contract guarantees that all work installed shall be free from all defects in workmanship and materials and that all apparatus furnished by him shall develop the capacities and characteristics specified. He further guarantees that if during a period of one (1) year from the date of the certificate of completion and acceptance of the work, any such defects in workmanship material or performance appear, such defects shall be remedied by him without cost to the Owner. If the Contractor fails to remedy the defects as outlined within a reasonable length of time, to be specified in a notice from the Owner's Authorized Representative to the Contractor, the Owner will have such work done and he will charge the cost to the Contractor.
- Mechanical equipment shall be installed in a neat and workmanlike manner in accordance with the latest and best practices of the trade. Only mechanics skilled in this type of work shall be employed and utilized by the Contractor for this division in the execution of this work. The contract drawings are diagrammatic and indicate the general arrangement of systems. The Contractor shall provide all work required for a complete installation. The contract drawings are not to be scaled. The architectural contract drawings and details together with the
- other contract documents shall be examined for all dimensional information.
- The Contractor shall follow the contract drawings in laying out his work and he shall also check the contract drawings of the other trades to verify spaces in which his work shall be provided. Equipment locations shall be coordinated with the Architect and the General Contractor.
- The Contractor shall, without additional costs to the Owner, make reasonable modifications in the layout of his work in order to prevent conflicts with the work of other trades or for the proper execution of his work. The Contractor shall provide and maintain in good order a complete set of blueline prints of the contract drawings. As the work progresses the actual location of all work shall be clearly recorded, including all changes to the contract and equipment size and type. These prints

shall be available at the site for inspection at all times. At the conclusion of the work, the Contractor shall, at his own expense, obtain a set

of reproducibles of the original contract drawings and utilizing the symbols on the contract drawings, shall incorporate all "As-Built" data in

ncorporated on these reproducibles including all sketches and written directives. All concealed equipment, mainfeeders, pull and junction

boxes, etc. shall be dimensionally located from the building structure. As a condition for acceptance of the work, the "As-Built" reproducibles and one (1) set of prints shall be signed, dated and delivered to the Engineer. The Contractor shall supply all labor required to perform all work which may be claimed by trade organizations within his jurisdiction. All work shall be performed without any additional cost to the Owner irregardless of which section of the contract documents the work is described. The Contractor shall be responsible to verify with all local organizations the extent of any collective bargaining agreements and/or any jurisdictional decisions rendered regarding disputes between the respective trades and provide and install his work in

a clearly legible and reproducible manner. All schedules shall be corrected to indicate "As-Built" conditions. All revisions shall be

- accordance with the accepted trade practice in the area. The entire installation shall conform with all pertinent codes and regulations of the local, municipal, county, state and federal authorities, The National Board of Fire Underwriters, the codes of the International Codes Council, the National Fire Protective Association and all
- other regulatory bodies having jurisdiction. All materials and equipment shall bear the stamps or seals of the NFPA, ASME, NEMA, IEEE, UL and other recognized industry regulatory groups. The Contractor shall give all necessary notices, obtain all permits, pay all governmental taxes, fees and other costs in connection with his
- work. He shall file all necessary plans, and prepare all other documents including additional detailed plans that are required for compliance with all applicable laws, ordinances, rules and regulations.
- The Contractor shall be responsible for all working conditions and shall maintain a safe working environment at the job site for all
- Openings around ductwork and piping passing through the construction shall be sealed with fire barrier caulking.

. All work shall be installed in strict accordance with the equipment Manufacturer's recommendations and requirements.

- 6. All systems are to be tested, adjusted and balanced to provide performance as indicated on the drawings. Test and adjust all safety
- Coordinate to assure that all work of all trades will be concealed within the wall and ceiling construction and without the need to reduce ceiling heights. Report exceptions to the Architect prior to construction and erection of the work. All work shall be supported from the building structural system. Work shall not be supported from the ceiling suspension system, from
- plumbing work, sprinkler piping, electrical work, nor from other mechanical work. The HVAC and Plumbing trades shall coordinate all work with the General Contractor prior to installation.
- 0. All work shall be located to avoid conflicts with other work and provide adequate clearances for architectural design, proper operation, adjustments, filter replacement, component service and provide a minimum 2" clearance between all piping, ductwork, conduit and other
- The Contractor shall maintain as-built drawings and deliver them to the Owner upon completion of the project.
- Provide supports, hangers, flexible pipe connections, vibration isolation, supplementary supports, controls and wiring, cleaning, painting, specialties and all other labor, materials, devices and services required for a complete, quality installation. Unless otherwise indicated, run all piping, ductwork and conduit as high as possible. Provide starters for all motor driven equipment.
- 3 The HVAC trades shall coordinate all electrical loads with the Electrical Contractor.
- 24 Contractor shall perform all system commissioning with an approved agency per section C408 of the 2015 International Energy Conservation Code (if required).
- The Contractor shall coordinate with the General Contractor. Locate all required cutting and patching and the like required by the installation of the Mechanical work.
- Provide all specialties, accessories, controls and the like to provide a complete, quiet, properly operating automatically controlled systems. The HVAC trade shall provide all safety and operating controls, transformers, motor starters, devices and control wiring required for the systems to operate in a safe and satisfactory manner
- Do not operate the air conditioning systems during construction except for testing and provide new filters for all units and immediately prior
- to substantial completion. Ductwork shall be constructed of galvanized sheet metal fabricated and erected in accordance with ASHRAE and SMACNA standards.
- Provide turning vanes in all elbows, manual volume dampers in all branches, air equalizers and similar devices as required to properly palance the systems and produce quiet, draftless operation. Ductwork sizes shown on the plans are sheet metal I.D. free area. Ductwork shall be constructed to the sizes shown and made airtight during erection with caulked, taped or hardcast joints to restrict
- All ductwork shall be closely coordinated prior to fabrication. The architectural contract drawings and details together with the other
- contract documents shall be examined for all dimensional information. Full sheet metal shop drawings drawings shall be developed with all spacial requirements worked out and shown on drawings. These drawing must show: locations of openings to be cut through the building's exterior, floors, etc. and any problems. These drawing shall be submitted for review by the Architect and Engineer prior to fabrication.
- Provide UL labeled and inspected fire dampers for all ducts and openings passing through floors, fire rated walls and ceilings, where shown on the drawings and in locations required by codes.
- Balance all air quantities to within 5% of the CFM shown on the drawings. Finally balance individual outlets to the occupants' satisfaction. Install all devices required for balancing in the system during construction. Provide balancing reports by a certified testing and balancing agency for review by the Engineer.
- 10. Provide written operating and maintenance instructions including all warranty certificates, in duplicate, to the Architect.
- Contractor shall coordinate all diffuser, grille and register locations with architectural ceiling plans and lighting layouts. . All HVAC equipment shall be rated in excess of the available fault current and shall be permanently labeled in accordance with the National Electrical Code sections 110.24, 430.98, 430.99, 440.10, 700.5 and all applicable local codes. Coordinate exact available fault current and labeling with the Electrical Contractor. The Electrical Contractor shall provide all fault current labels.

# MECHANICAL SYMBOLS, INDICATIONS & ABBREVIATIONS

FLEXIBLE DUCTWORK **EQUIPMENT DESIGNATION TAG** ----DUCT W/ ACOUSTICAL LINING SUPPLY AIR DIFFUSER (CEILING) RETURN/EXHAUST AIR DUCT UP RETURN/EXHAUST AIR DUCT DN SUPPLY AIR DIFFUSER (SIDEWALL) SUPPLY/MAKE-UP AIR DUCT UP SUPPLY AIR DIFFUSER (LINEAR, CEILING) SUPPLY/MAKE-UP AIR DUCT DN SUPPLY AIR DIFFUSER (LINEAR, WALL) ----CD----CONDENSATE DRAIN RETURN AIR DIFFUSER (CEILING)  $\longrightarrow$ DIRECTION OF FLOW PIPE TURNING DOWN EXHAUST AIR DIFFUSER (CEILING) PIPE TURNING UP RETURN/EXHAUST AIR DIFFUSER (SIDEWALL) CAPPED FLANGE BRANCH DAMPER ABOVE FINISHED FLOOR CUBIC FEET OF AIR PER MINUTE CFM VOLUME DAMPER **FXHAUST AIR** 2" DOOR UNDERCUT FXHAUST FAN FAN FORCED HEATER THERMOSTAT MOTORIZED DAMPER UTSIDE AIR DUCT MOUNTED SMOKE DETECTOR RETURN AIR ROOFTOP UNIT DUCT SIZE TRANSITION SUPPLY AIR UNDERCUT

#### PIPING AND DUCT CRITERIA

EXHAUST FAN

- ALL DUCTWORK SHALL BE SIZED USING A STANDARD DUCTULATOR. THE FOLLOWING CRITERIA SHALL BE
- USED TO CALCULATE DUCT SIZES: a. SUPPLY DUCTS SHALL BE NO MORE THAN 0.10 IN. PER 100 FEET OF PRESSURE DROP. b. RETURN AND EXHAUST DUCTS SHALL BE NO
- MORE THAN 0.05 IN. PER 100 FEET OF PRESSURE DROP. VENTILATION DUCTS SHALL BE NO MORE THAN 0.075 IN. PER 100 FEET OF PRESSURE
- d. FLEXIBLE DUCTWORK SHALL NOT BE PERMITTED IN RESIDENTIAL UNITS. CONDENSATE SHALL BE COLLECTED AND RUN WITH ADEQUATE PITCH TO THE CLOSEST SAFE-WASTE. PROVIDE CONDENSATE PUMPS IF PITCH CAN NOT BE
- ACHIEVED. CONDENSATE PIPING SHALL BE SIZED AS CONDENSATE PIPE SIZING CHART 40-90
- . ALL CONDENSATE TRAPS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.

#### **ELECTRICAL COORDINATION** . IT SHALL BE THE RESPONSIBILITY OF THE

UNIT HEATER

- MECHANICAL CONTRACTOR TO COORDINATE THE LOCATIONS OF DUCTWORK AND REGRIGERANT PIPING WITH THE ELECTRICAL CONTRACTOR DUCTWORK SHALL NOT BE INSTALLED WITHIN THE DEDICATED EQUIPMENT SPACE REQUIRED FOR EXISTING OR NEW ELECTRICAL EQUIPMENT.
- 2. COORDINATION OF DUCTWORK LOCATIONS SHALL BE SOLELY THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR, APPROVAL OF SHEET METAL SUBMITTAL DRAWINGS DOES NOT RELEASE THE CONTRACTOR FROM COORDINATION RESPONSIBILITY, FINAL COORDINATION SHALL OCCUR IN FIELD WITH ELECTRICAL CONTRACTOR FAILURE TO COMPLY WITH THIS REQUIREMENT
- SYSTEM PIPING AT CONTRACTOR'S EXPENSE. PER NEPA 70. ARTICLE 110.26(F): DEDICATED EQUIPMENT SPACE SHALL APPLY TO SWITCHBOARDS, DISTRIBUTION PANELS AND MOTOR CONTROL CENTERS. THE SPACE EQUAL O THE WIDTH AND DEPTH OF THE EQUIPMENT AND EXTENDING FROM THE FLOOR TO A HEIGHT OF 6' ABOVE THE EQUIPMENT OR TO THE STRUCTURAL CEILING, WHICHEVER IS LOWER. SHALL BE DEDICATED TO THE ELECTRICAL INSTALLATION, NO PIPING, DUCTS, LEAK PROTECTION APPARATUS OR OTHER EQUIPMENT FOREIGN TO THE ELECTRICAL INSTALLATION

SHALL BE LOCATED IN THIS ZONE.

MAY RESULT IN RELOCATION OF SUPPRESSION



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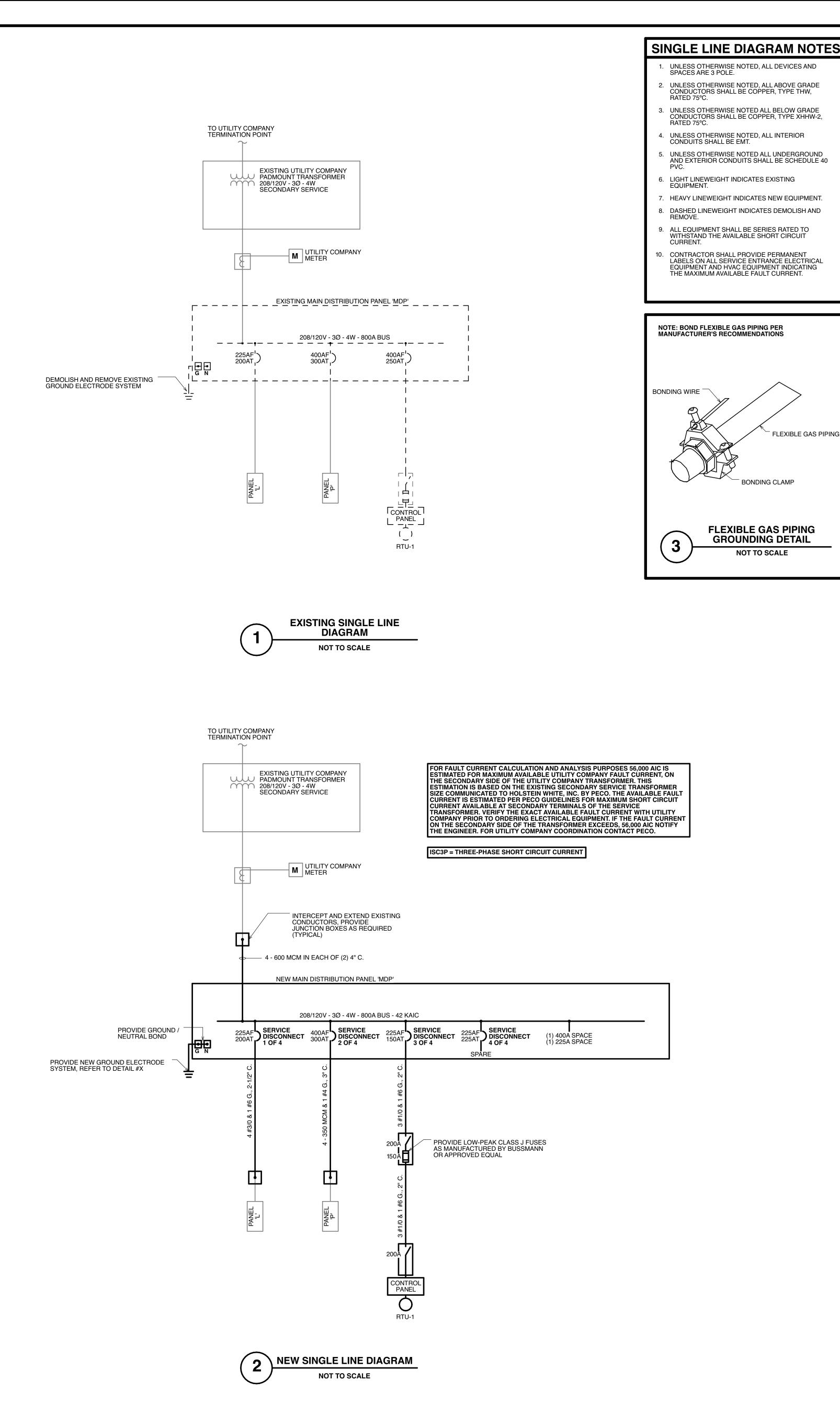
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Drawing Issues

E ARCHITECTURAL WALLS, ROOM NAMES, REFLECTED EILING PLANS, ETC., HAVE BEEN CREATED FROM RECORD FILES FURNISHED BY THE PROJECT ARCHITECT OR OWNER. THE CONTRACTOR AND ALL TRADES SHALL BE RESPONSIBLE FOR CHECKING AND VERIFYING ALL OF THE BUILDING'S EXISTING AND PROPOSED CONDITIONS, MENSIONS, ETC. PRIOR TO COMMENCING WORK. NOTIFY THE ENGINEER OF ANY DISCREPANCIES IN WRITING PRIOR

PROJECT NO: 21-410 May 26, 2021 DRAWN BY: SAIJS CHECKED: SW | PP SCALE: AS NOTED PLOT DATE:

TO SUBMISSION OF BID.



#### **ELECTRICAL SPECIFICATIONS**

- Contractor shall provide all labor, materials, tools, apparatus and equipment required to complete his work in accordance with the contract documents, codes, laws and ordinances, and accepted trade procedures. The contractor by his acceptance of the contract guarantees that all work installed shall be free from all defects in workmanship and materials and that all apparatus furnished by him shall develop the capacities and characteristics specified. He further guarantees that if, during a period of one (1) year from the date of the certificate of completion and acceptance of the work, any such defects in workmanship, material or performance appear, such defects shall be remedied by him without cost to the owner. If the contractor fails to remedy the defects as outlined within a reasonable length of time, to be specified in a notice from the owner's authorized representative to the contractor, the owner will have such work done, and he will charge the cost to the contractor.
- The contractor shall visit the site before he submits his proposal. He shall examine all existing conditions which affect the work. The submission of the proposal shall be considered evidence that this requirement has been fulfilled. No extra payment will be allowed for additional work made necessary by the failure to visit the site.
- Electrical equipment shall be installed in a neat and workmanlike manner in accordance with latest and best practices of the trade. Only mechanics skilled in this type of Work shall be employed and utilized by Contractor for this Division in the execution of this Work.
- The contract drawings are diagrammatic and indicate the general arrangement of all systems and work included in the contract. The contract drawings are not to be scaled. The architectural contract drawings and details together with the other contract documents shall be examined for all dimensional information.
- The contractor shall, without additional costs to the owner, make reasonable modifications in the layout of his work in order to prevent conflicts with the work of other trades or for the proper execution of his work.
- The contractor shall provide and maintain in good order a complete set of blueline prints of the contract drawings. As the work progresses, the actual location of all work shall be clearly recorded, including all changes to the contract and equipment size and type. These prints shall be available at the site for inspection at all times. At the conclusion of the work, the contractor shall, at his own expense, obtain a set of reproducibles of the original contract drawings, and utilizing the symbols on the contract drawings, shall incorporate all "as built" data in a clearly legible and reproducible manner. All schedules shall be corrected to indicate "as built" conditions. All revisions shall be incorporated on these reproducibles including all sketches and written directives. All concealed equipment, mainfeeders, pull and junction boxes, etc. shall be dimensionally located from the building structure. As a condition for
- The contractor shall supply all labor required to perform all work which may be claimed by trade organizations within his jurisdiction. All work shall be performed without any additional cost to the owner irregardless of which section of the contract documents the work is described. The contractor shall be responsible to verify with all local organizations the extent of any collective bargaining agreements and/or any jurisdictional decisions rendered regarding disputes between the respective trades, and provide and install his work in accordance with the accepted trade practice in the area.

acceptance of the work, the "as built" reproducibles and one (1) set of prints shall be signed, dated and delivered to the engineer.

- The entire installation shall conform with all pertinent codes and regulations of the local, municipal, county, state, and federal authorities, The National Board of Fire Underwriters, the codes of the International Codes Council, the codes of the National Fire Protective Association, and all other regulatory bodies having jurisdiction. All materials and equipment shall bear the stamps or seals of the NFPA, ASME, NEMA, IEEE, UL and other recognized industry regulatory groups.
- The contractor shall give all necessary notices, obtain all permits, pay all governmental taxes, fees and other costs in connection with his work. He shall file all necessary plans, and prepare all other documents including additional detailed plans that are required for compliance with all applicable laws, ordinances, rules and regulations.
- Before starting any work under this Contract, file for inspection with the Middle Department Inspection Agency or other certified Agency. Upon completion of the work, furnish Electrical Certificates from said Agency for all Electrical equipment and systems installed or furnished and installed as part of the work.
- 12. The contractor shall at all times keep the premises free from the accumulation of waste materials or rubbish caused by his employees or work. At the completion of the work, he shall remove all superfluous materials, equipment and debris resulting from the work. All feeder wiring shall be soft drawn copper of 98% conductivity, installed in code conforming metallic raceways or cable assemblies. All wiring shall be copper, thermoplastic covered insulated Type 75° C. THW or 90° C. Type THHN, 600 volt rating. Wire No. 8 AWG
- and smaller shall be solid. Wire larger than No. 8 shall be stranded. All wiring shall be run concealed wherever possible. All exposed conduit shall be EMT or rigid steel as required. Flexible conduit shall be smooth liquid tight with appropriate fittings. Conduit drops from above ceiling shall be structurally secured and supported. Cable assemblies used for branch circuits shall not be run exposed. Cable assemblies shall be permitted exposed for final connections to
- Mechanical and Plumbing equipment and shall be limited to 6 feet total length, routing shall not interfere with equipment workspace. Where conductors connect directly to equipment, the insulation temperature rating of the conductor shall meet or exceed the equipment temperature rating.
- Color code conductors to designate neutral conductor and phases. Color coding shall conform with existing building standard. Exercise great care in maintaining a uniform and consistent arrangement of phase conductors on all systems. Throughout the entire wiring systems, each phase conductor must always be in the same physical position with respect to the other phase wires at
- Grounding shall comply with Article 250 of NEC and to approval of local Underwriters inspection authorities.

PROVIDE GROUND/

NEUTRAL BOND

MAIN BONDING

JUMPER

MAIN DISTRIBUTION PANEL'MDP'

GROUND BAR LOCATED INSIDE

FLEXIBLE GAS PIPING

- Circuit Breakers shall be molded case, bolted, thermal magnetic trip in each pole, enclosure-compensated to carry full rated load at 40°C., trip-free handles shall clearly indicate trip, on and off condition, quick-make and quick-break action. Lugs approved for copper and aluminum conductors and compression type. Ground Fault type breakers shall be provided with thermal and magnetic protection, UL Class A, 5 milliampere ground fault sensitivity, where required. Circuit breakers used as switches in 120 and 277 volt circuits feeding incandescent, fluorescent, and/or HID fixtures shall be approved for such use and marked "SWD", per NEC. Circuit breakers serving Heating and Air Conditioning equipment shall be HACR rated.
- Where new circuit breakers are to be installed within existing panel boards, they shall be listed for use with the existing panel board type, and of sufficient short circuit rating for the application.

BOND GAS PIPE. CONNECT TO

STREET SIDE OF

(3) GROUND ROD

(TYPICAL)

CONNECTED WITHIN 5' OF ENTRANCE TO BUILDING IF ACCESSIBLE, CONNECT

METAL WATER PIPE SHALL BE

O STREET SIDE OF METER

**GROUND ELECTRODE** 

DETAIL BUILDING

**NOT TO SCALE** 

3/4" x 10'0" COPPER

TYPICAL FOR

STEEL BLDG.

STRUCTURAL

**ELECTRICAL SYMBOLS** 

GFI Duplex Receptacle - 125V, 2P, 3W

Unfused Disconnect Switch

**Remote Condition Light** 

Fused Disconnect Switch

Circuit Breaker

**Current Transformer** 

Disconnect Switch

[ Detector Control Function ]

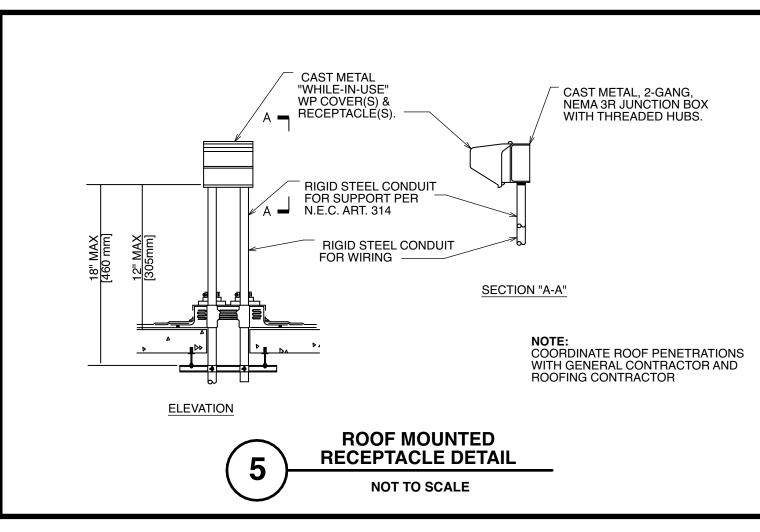
D - Duct Mounted, Smoke Ionization

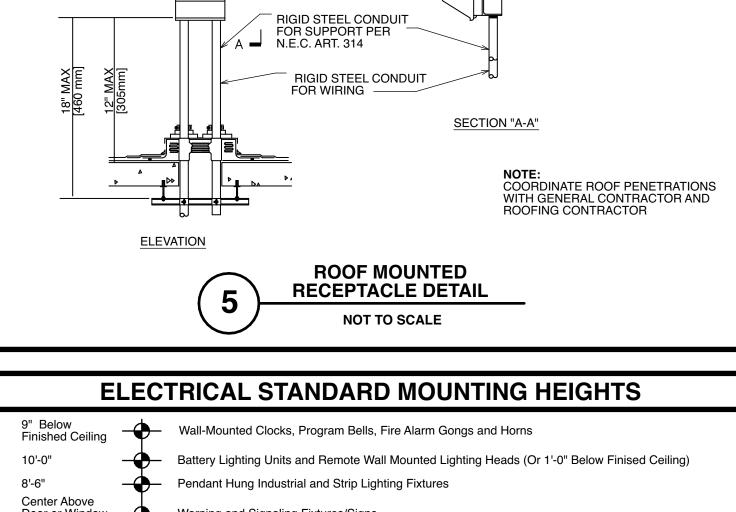
METER

- 21. Provide all labor, materials and equipment required to provide electric power to meet the requirements for heating, ventilating, airconditioning and plumbing systems. Fully coordinate installation of electrical wiring and equipment with installation of electrically operated mechanical equipment provided by the Mechanical and Plumbing Contractors. Install disconnect switches, motor starters, and control transformers furnished by Mechanical and Plumbing Contractors. Provide final equipment electrical terminations. All internal equipment wiring shall be by manufacturer.
- Test equipment, including panel boards and all other equipment and wiring for unintended grounds, short circuits, open circuits, continuity, current leakage, and that equipment will operate as specified. Test feeders for insulation resistance; for load balance of the final installation, and for overall operation of systems. Furnish labor and material required for making such tests and make corrections necessary to balance the load and to obtain proper operation.
- 23. Where existing facilities are being altered, disconnect and remove or relocate all existing electrical work that interferes with or is necessary because of new construction as specified, shown or required.
- 24. Perform alterations and additions to present electrical systems with a minimum interruption in the operation of these systems. Obtain written clearance from Owner for such interruptions and schedule same at whatever time specified in writing by Owner.
- 25. Circuit breakers made spare due to demolition shall be set in off position and labeled 'SPARE'. 26. Where specified or required, extend existing systems or tie into same to provide a complete coordinated electrical system to
- 27. All existing work to remain, but disturbed or disconnected because of alterations and new construction shall be replaced and put in operating condition unless instructed otherwise in writing by Owner or Architect.
- Perform all work necessary to permit operation of all existing systems during the construction period. Provide and maintain applicable
- approved temporary wiring to meet this requirement. 29. Existing branch circuits not shown shall remain intact to extent practicable, and shall be extended as required.
- 30. Demolish and remove existing electrical equipment, feeders and conduit no longer required by new construction.
- Electrical equipment shall not interfere in any way with other material or equipment and shall provide adequate working space; see Requirements for Electrical Installations, Article 110 and other related articles of the National Electrical Code.
- 32. Provide materials, equipment, supplies and labor necessary as required to adequately support, brace and strengthen all equipment and materials furnished as part of this work.
- 34. Locations are subject to changes that may be necessary to avoid obstacles in building construction. Verify all dimensions and conditions at site. Check layout for sizes and clearances, and provide so that the apparatus and material may be installed and operated satisfactorily in space provided. Install equipment and raceways to preserve headroom and to keep openings and

Provide typed updated panel directory at the completion of the project.

- 35. Protect all conduit, fittings, panel boards, switchgear, transformers and other equipment before and during installation and keep clean.
- 36. Identify each switchboard, panel, panel board, and other electrical equipment as to nature, service and purpose, by means of permanently attached, approved size, laminated phenolic nameplates.
- 37. Where sleeves containing a single conduit penetrate FIRE RATED walls, floors, partitions or slabs, fill and seal conduit to the sleeve with a 1-part intumescent caulk/putty sealant creating a fire stop equal to or exceeding fire rating of construction material being penetrated. Fire sealant shall prevent spread of flame, smoke, air and water through the sleeve and shall pass 3 hour test per ASTM E814 and UL 1479. Fire sealant shall be installed in accordance with manufacturer's written instructions. Where sleeves containing multiple conduits or multiple cables penetrate FIRE RATED walls, floors, partitions, or slabs, fill and seal spaces between the conduits or cables and the sleeve with 2-part intumescent foam sealant creating a fire stop equal to or exceeding fire rating of construction material being penetrated. Fire sealant shall prevent spread of flame, smoke, air and water through the sleeve and shall pass 3 hour test per ASTMA E814 and UL 1479. Fire sealant shall be installed in accordance with manufacturer's written instructions. Where sleeves penetrate exterior walls, fill and seal ends around conduits and/or cables with duct sealant compound equal to Solorite KN--1146, or Link Seal. Install seals in accordance with the manufacturer's recommendations to provide air tightness above ground and hydrostatic sealing below grade. Caulking or other type mastic is not acceptable. Where wiring devices are placed in fire rated construction, fire rating of installed assembly shall meet or exceed the rating of the construction.
- 38. Motor and circuit disconnect means shall be a horsepower rated safety switch or a circuit breaker, each sized for the applied load and system voltage having an interrupting capacity not less than maximum available short-circuit current of circuit on which applied. Disconnects shall be sized in accordance with NEC and NEMA requirements. Safety switches shall be cartridge fuse type or unfused, as required. Manual toggle type motor switches with overload protection may be used as motor disconnects for fractional horsepower motors provided they meet NEC requirements including padlock provision. Safety switches shall be quick-make, quick-break and NEMA Heavy Duty, Type HD. Disconnect enclosures: NEMA 1, NEMA 3R, NEMA 4 to suit application.
- 39. Extend the existing Base Building Fire Alarm System as indicated and required. The system shall include, but not limited to: alarm initiating and indicating peripheral devices, conduit, wire and accessories required to furnish a complete operational system. Provide expansion of existing panel as required to accommodate installation of new devices. The equipment and installation shall comply with the current provision of the National Fire Protection Association Standards, 70, 72, and all local codes. All equipment shall be UL listed. New Fire Alarm devices shall be type and style to match base building standards. New Flashing lights shall be ADA approved, candela as required by location. Contractor shall use Building fire alarm vendor / service provider for all system tie-ins, testing and
- 40. FIRE ALARM SUBMITTAL REQUIREMENTS: In addition, the contractor shall prepare a Fire Alarm system submittal to fulfill the requirements of the local Fire Marshall. Submit (3) sets of Signed and Sealed plans prepared by a certified Fire Protection Engineer for Fire Marshall review. The submittal shall include the following: Scaled plans indicating Fire Alarm work, Project Name and Address, Square footage of affected space, Fire Alarm symbols list, Device matrix showing description and quantity of devices, Equipment Cut sheets, Wiring information including size, type, and all point to point wire runs, Fire Alarm Riser diagram including initiating and annunciating devices, Battery calculations indicating existing batteries are of adequate capacity and/or sizing of new batteries, and voltage drop calculations.





E	LEC	TRICAL STANDARD MOUNTING HEIGHTS
9" Below Finished Ceiling	<del>-</del>	Wall-Mounted Clocks, Program Bells, Fire Alarm Gongs and Horns
10'-0"	<b>—</b>	Battery Lighting Units and Remote Wall Mounted Lighting Heads (Or 1'-0" Below Finised Ceiling)
8'-6"	<b>—</b>	Pendant Hung Industrial and Strip Lighting Fixtures
Center Above Door or Window Opening	<b>—</b>	Warning and Signaling Fixtures/Signs
6'-8" or 6" Below Finished Ceiling	<b>+</b>	Fire Alarm Illuminated Flashing Lights (Lowest of the two Heights). <b>Mounting Height to the Bottom of Device.</b>
6'-8"	<del>-</del>	Top of Back-Mounted Wall Exit Signs (Not Mounted Above Doors)
6'-6"	<b>—</b>	Top of Flush and Surface Mounted Electrical Panelboards and Communication System Cabinets
6'-0"	<b>—</b>	Top of Highest Electrical Safety Disconnect Switches, Magnetic Motor Starters and Contactors
4'-6"	<b>—</b>	Wall Mounted Telephones and Pay Stations (3'-6" at Handicap Locations)
4'-0"	<del>-</del>	Top of Highest Circuit Breaker in Accessible Load Centers
3'-6"	<b>—</b>	Fire Alarm Pull Stations
3'-4"	<b>—</b>	Wall Mounted Electrical Device Lighting Switches
2'-0"	<b>—</b>	Electrical Receptacles in Mechanical Spaces, Electrical and Elevator Rooms
1'-6"	<b>—</b>	Electrical Receptacles, Television Outlets, Telephone Outlets, and Computer Outlets
0'-0"	<b>—</b>	Finished Floor
reference to the n	earest blo	of outlets unless otherwise noted. In masonry construction the mounting heights shall be used for ock or brick coursing.

The above mounting heights shall be adhered to unless specifically noted or detailed on the Architectural drawings or



Scott A. White, P.E.

License No. PA: PE075392

REPL EA BR Y FREI BBB Drawing Issues

E ARCHITECTURAL WALLS, ROOM NAMES, REFLECTED FILING PLANS FTC. HAVE BEEN CREATED FROM RECORD FILES FURNISHED BY THE PROJECT ARCHITECT OR OWNER. THE CONTRACTOR AND ALL TRADES SHALL BE RESPONSIBLE FOR CHECKING AND VERIFYING ALL OF THE

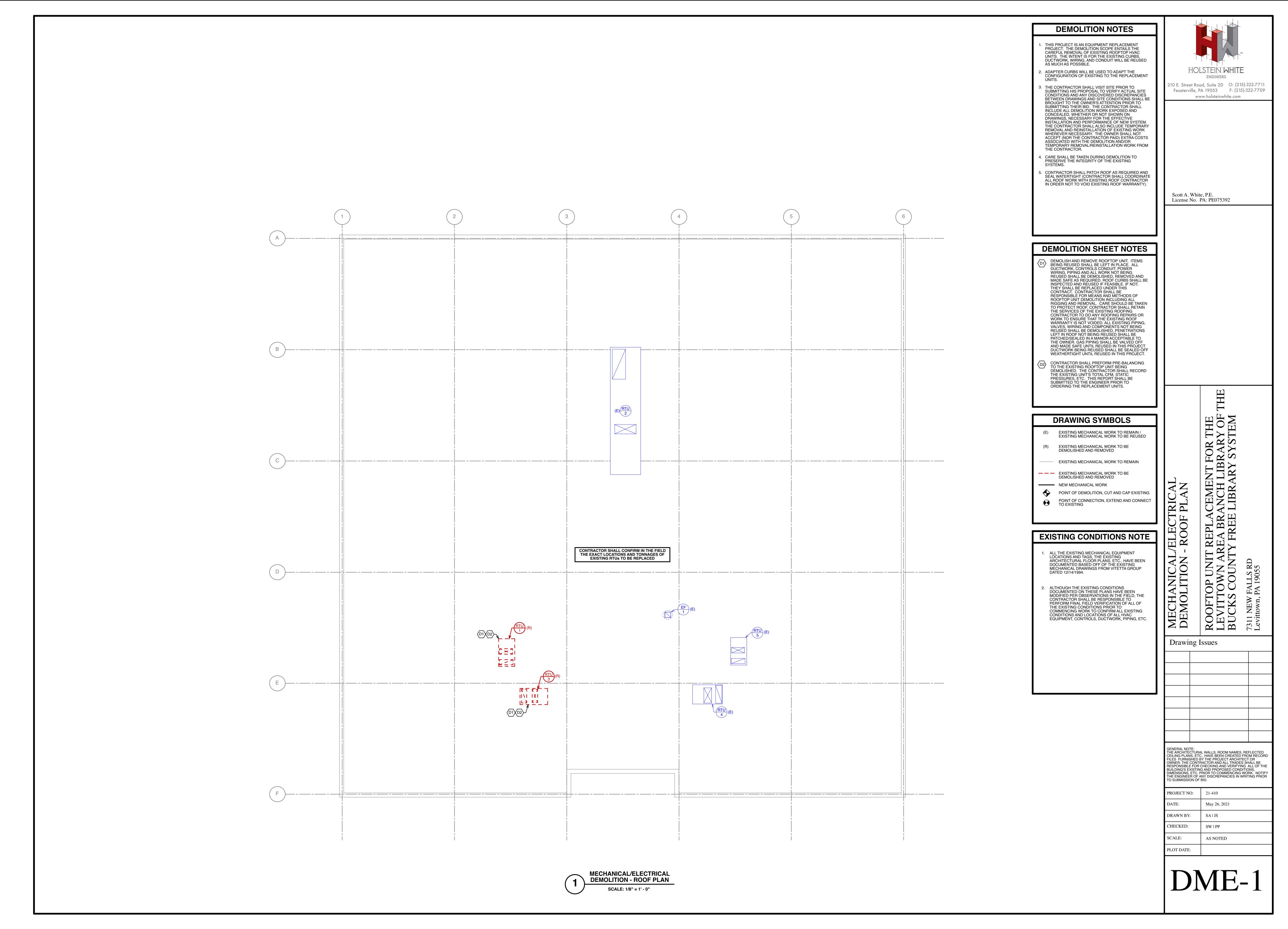
BUILDING'S EXISTING AND PROPOSED CONDITIONS. THE ENGINEER OF ANY DISCREPANCIES IN WRITING PRIOR TO SUBMISSION OF BID. PROJECT NO: May 26, 2021 DRAWN BY:

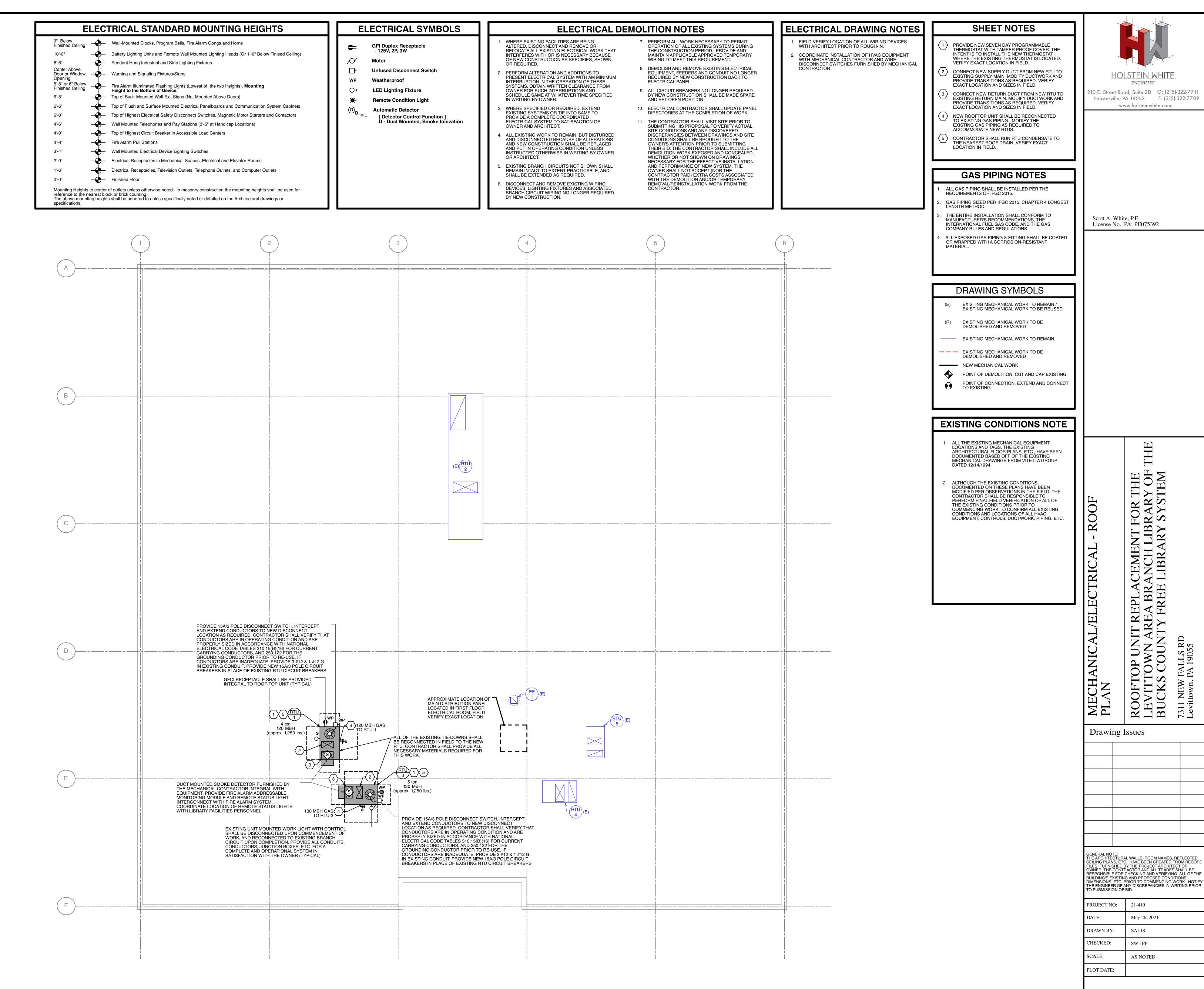
CHECKED:

PLOT DATE:

SCALE:

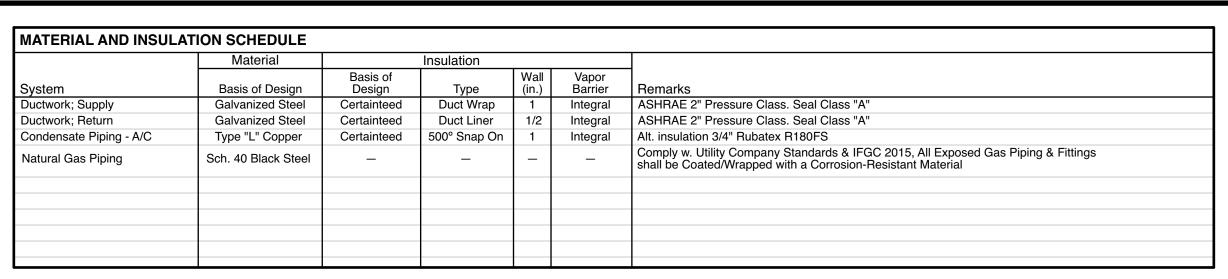
AS NOTED

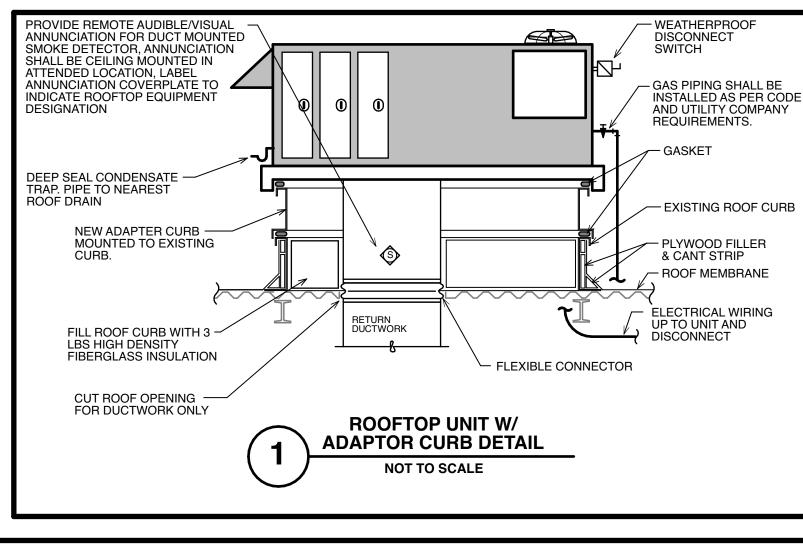


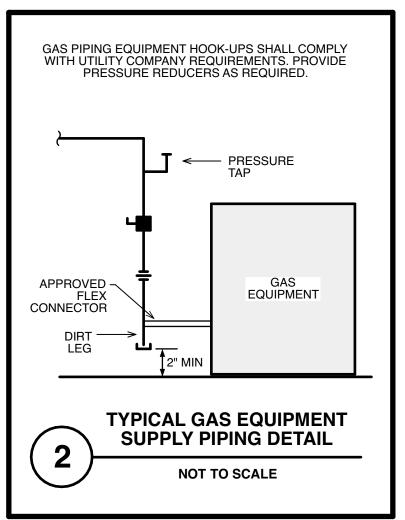


**MECHANICAL/ELECTRICAL -**

ME-1







#### **ELECTRICAL SPECIFICATIONS**

- Contractor shall provide all labor, materials, tools, apparatus and equipment required to complete his work in accordance with the contract documents, codes, laws and ordinances, and accepted trade procedures The contractor by his acceptance of the contract guarantees that all work installed shall be free from all defects in workmanship and materials and that all apparatus furnished by him shall develop the capacities and characteristics specified. He further guarantees that if, during a period of one (1) year from the date of the certificate of completion and acceptance of the work, any such defects in workmanship, material or performance appear, such defects shall be remedied by him without cost to the owner. If the contractor fails to remedy the defects as outlined within a reasonable length of time, to be specified in a notice from the owner's authorized
- The contractor shall visit the site before he submits his proposal. He shall examine all existing conditions which affect the work. The submission of the proposal shall be considered evidence that this requirement has been fulfilled. No extra payment will be allowed for additional work made necessary by the failure to visit the site.
- Electrical equipment shall be installed in a neat and workmanlike manner in accordance with latest and best practices of the trade. Only mechanics skilled in this type of Work shall be employed and utilized by Contractor for this Division in the execution of this Work. The contract drawings are diagrammatic and indicate the general arrangement of all systems and work included in the contract. The contract drawings are not to be scaled. The architectural contract drawings and details together with the other contract documents

shall be examined for all dimensional information.

representative to the contractor, the owner will have such work done, and he will charge the cost to the contractor.

- The contractor shall, without additional costs to the owner, make reasonable modifications in the layout of his work in order to prevent conflicts with the work of other trades or for the proper execution of his work.
- The contractor shall provide and maintain in good order a complete set of blueline prints of the contract drawings. As the work progresses, the actual location of all work shall be clearly recorded, including all changes to the contract and equipment size and type. These prints shall be available at the site for inspection at all times. At the conclusion of the work, the contractor shall, at his own expense, obtain a set of reproducibles of the original contract drawings, and utilizing the symbols on the contract drawings, shall incorporate all "as built" data in a clearly legible and reproducible manner. All schedules shall be corrected to indicate "as built" conditions. All revisions shall be incorporated on these reproducibles including all sketches and written directives. All concealed equipment, mainfeeders, pull and junction boxes, etc. shall be dimensionally located from the building structure. As a condition for acceptance of the work, the "as built" reproducibles and one (1) set of prints shall be signed, dated and delivered to the engineer.
- The contractor shall supply all labor required to perform all work which may be claimed by trade organizations within his jurisdiction. All work shall be performed without any additional cost to the owner irregardless of which section of the contract documents the work is described. The contractor shall be responsible to verify with all local organizations the extent of any collective bargaining agreements and/or any jurisdictional decisions rendered regarding disputes between the respective trades, and provide and install his work in accordance with the accepted trade practice in the area.
- The entire installation shall conform with all pertinent codes and regulations of the local, municipal, county, state, and federal authorities, The National Board of Fire Underwriters, the codes of the International Codes Council, the codes of the National Fire Protective Association, and all other regulatory bodies having jurisdiction. All materials and equipment shall bear the stamps or seals of the NFPA, ASME, NEMA, IEEE, UL and other recognized industry regulatory groups.
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- Before starting any work under this Contract, file for inspection with the Middle Department Inspection Agency or other certified Agency. Upon completion of the work, furnish Electrical Certificates from said Agency for all Electrical equipment and systems installed or furnished and installed as part of the work.
- The contractor shall at all times keep the premises free from the accumulation of waste materials or rubbish caused by his employees or work. At the completion of the work, he shall remove all superfluous materials, equipment and debris resulting from the work.
- All feeder wiring shall be soft drawn copper of 98% conductivity, installed in code conforming metallic raceways or cable assemblies. All wiring shall be copper, thermoplastic covered insulated Type 75° C. THW or 90° C. Type THHN, 600 volt rating. Wire No. 8 AWG and smaller shall be solid. Wire larger than No. 8 shall be stranded. All wiring shall be run concealed wherever possible. All exposed conduit shall be EMT or rigid steel as required. Flexible conduit shall
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Unit Designation	RTU-1	RTU-3
Basis of Design		TRANE
Model No.		THC060E4RZA
Supply Fan CFM		2,000
Minimum O.A. CFM		400
E.S.P. Supply Fan (IN. W.G.)	0_0	1.0
Weight (lbs)	1,250	1,250
Dimensions (L x W x H) (in.)		88-5/8 x 53-1/4 x 40-7/8
Service		Refer to Plans
Cooling		
Nominal Tons	4.0	5.0
Gross Total Cooling Capacity (MBH)		63.49
Gross Total Cooling Capacity (MBH)		47.33
Gross Sensible Capacity (MBH)  ARI EER		
ARI LER		11.9
		14.2
EAT db/wb(°F)		80.0/67.0
LAT db/wb(°F) Heating Performance	58.57/56.91	58.09/56.71
Heating Performance EAT	70	70
LAT	_	118.4
Heating	IZU.I	110.4
Heating Fuel	Natural Gas	Natural Gas
Input Capacity (MBH)		130
Output Capacity (MBH)		106.6
Thermal Efficiency		82%
Electrical	460 - 3Ø - 60	460 - 3Ø - 60
Compressor Power (kW)		4.01
Indoor motor bhp (HP)		1.15
Power Supply MCA		12.0
Power Supply MOCP		15.0
Options		12.2
410A Refrigerant	Yes	Yes
Powered Convenience Outlet		Yes
OA Hood w/ M.O.D.	Yes	Yes
Insulated Roof Curb		Yes
Filters		Yes
Mfg. Start-up & Checkout Service		Yes
Drain Pan		Yes
Duel Enthalpy Economizer		Yes
Factory Installed Smoke Detector		Yes
Adapter Curb		
Stages Gas Heat		Single
2" Pleated Filters (MERV 13)	<u> </u>	Yes
Microchannel Condenser Coil		Yes
Removable Access Panels		Yes
BACNET controls compatible for future tie-	Voc	Yes
into a building automation system	1 33	Ţ
	Yes	Yes

#### Run 1" condenstate drain line to nearest roof drain, splash block or approved interior location as required, wrap interior pipe with

- . Contractor shall coordinate with General Contractor to provide provisions for and location of thermostat and controls.
- . RTU shall be mounted on standard insulated roof curb. Refer to manufacturers recommendations for further information. Mechanical Contractor shall furnish equipment disconnect switch and Electrical Contractor shall install equipment disconnect
- Contractor shall preform pre-balancing to the existing Rooftop units being replaced. The contractor shall record the existing unit's total cfm, internal and external static pressures, etc. This report shall be submitted to the engineer prior to ordering the replacement units. The contractor shall include all added pressures from the new roof curbs in their internal static pressure calculations for the

#### **SEQUENCE OF OPERATIONS: ROOFTOP UNITS**

#### A. OCCUPANCY:

A USER ADJUSTABLE OCCUPANCY SCHEDULE WILL BE ESTABLISHED AND MAINTAINED BY THE BUILDING OWNER/OPERATOR. OCCUPIED AND UNOCCUPIED HEATING AND COOLING SETPOINTS WILL BE ESTABLISHED. THE FAN SYSTEM WILL MAINTAIN SPACE CONDITIONS TO THE OCCUPIED AND UNOCCUPIED SETPOINTS BASED ON THIS OPERATING SCHEDULE. **INITIAL SETPOINTS:** 

#### OCCUPIED HEATING OCCUPIED COOLING UNOCCUPIED HEATING 65°F = UNOCCUPIED COOLING 82°F

AN OPTIMAL START ROUTINE WILL CALCULATE AN EARLY START TIME TO BRING SPACE CONDITIONS TO WITHIN OCCUPIED SETPOINTS BY THE BEGINNING OF THE SCHEDULED OCCUPANCY TIME PERIOD. THE OPTIMAL START ROUTINE FACTORS SPACE TEMPERATURE(S) AND OUTDOOR CONDITIONS TO CALCULATE AND LEARN THE START-UP RECOVERY TIME FROM THE UN-OCCUPIED MODE.

#### FIRE / SMOKE - SAFETY DEVICE:

UPON ACTIVATION OF THE FIRE/SMOKE SAFETY DEVICE. THE FAN SYSTEM WILL SHUTDOWN AND CEASE ALL FUNCTION, EXCEPT WHERE SPECIFIED OTHÉRWISE. A MANUAL RESET OF THE DEVICE WILL BE REQUIRED TO ALLOW THE SYSTEM RE-START IN ITS APPROPRIATE MODE OF OPERATION. AN ALARM WILL BE ACTIVATED AT THE OPERATOR'S TERMINAL.

DURING OCCUPIED COOLING MODE OF OPERATION, THE ECONOMIZER (IF AVAILABLE) AND PRIMARY COOLING ARE USED TO CONTROL THE SUPPLY AIR TEMPERATURE. THE SUPPLY AIR TEMPERATURE ETPOINT IS USER-DEFINED AT THE UNIT MOUNTED VAV SETPOINT POTENTIOMETER OR AT THE REMOTE PANEL. IF THE ENTHALPY OF THE OUTSIDE AIR IS APPROPRIATE TO USE "FREE COOLING" THE ECONOMIZER WILL BE USED FIRST TO ATTEMPT TO SATISFY THE SUPPLY SETPOINT. ON UNITS WITH ECONOMIZER, A CALL FOR COOLING WILL MODULATE THE FRESH AIR DAMPERS OPEN. THE RATE OF ECONOMIZER MODULATION IS BASED ON DEVIATION OF THE DISCHARGE TEMPERATUR FROM SETPOINT, I.E., THE FURTHER AWAY FROM SETPOINT, THE FASTER THE FRESH AIR DAMPER WILL OPEN. NOTE THAT THE ECONOMIZER IS ONLY ALLOWED TO FUNCTION FREELY IF AMBIENT CONDITIONS ARE BELOW THE ENTHALPY CONTROL SETTING OR BELOW THE RETURN AIR ENTHALPY IF UNIT HAS COMPARATIVE ENTHALPY INSTALLED. IF OUTSIDE AIR IS NOT SUITABLE FOR "ECONOMIZING", THE FRESH AIR DAMPERS DRIVE TO THE MINIMUM OPEN POSITION. A FIELD ADJUSTABLE POTENTIOMETER ON THE ECONOMIZER ACTUATOR, OR A REMOTE POTENTIOMETER CAN PROVIDE THE INPUT TO ESTABLISH THE MINIMUM DAMPER POSITION. AT OUTDOOR AIR CONDITIONS ABOVE THE ENTHALPY CONTROL SETTING, PRIMARY COOLING ONLY IS USED AND THE FRESH AIR DAMPERS REMAIN AT MINIMUM POSITION. IF THE UNIT DOES NOT INCLUDE AN ECONOMIZER, PRIMARY COOLING ONLY IS USED TO SATISFY COOLING REQUIREMENTS.

#### **HEATING:**

WHEN THE THERMOSTAT CALLS FOR HEATING, POWER IS SENT TO W ON THE INTEGRATED GAS CONTROLLER (IGC) BOARD. AN LED ON THE IGC BOARD TURNS ON AND REMAINS ON DURING NORMAL OPERATION. A CHECK IS MADE TO ENSURE THAT THE ROLLOUT SWITCH AND LIMIT SWITCH ARE CLOSED. IF THE CHECK WAS SUCCESSFUL, THE INDUCED-DRAFT MOTOR IS ENERGIZED AND WHEN ITS SPEED IS SATISFACTORY, AS PROVEN BY THE "HALL EFFECT" SENSOR, THE IGNITION ACTIVATION PERIOD BEGINS. THE BURNERS WILL IGNITE WITHIN 5 SECONDS. IF THE BURNERS DO NOT LIGHT. THERE IS A 22-SECOND DELAY BEFORE ANOTHER 5-SECOND ATTEMPT. THIS SEQUENCE IS REPEATED FOR 15 MINUTES OR UNTIL THE BURNERS LIGHT. IF, AFTER THE 15 MINUTES, THE BURNERS STILL HAVE NOT LIT, HEATING IS LOCKED OUT. TO RESET THE CONTROL, BREAK 24V POWER TO THE

WHEN IGNITION OCCURS, THE IGC BOARD WILL CONTINUE TO MONITOR THE CONDITION OF THE ROLLOUT SWITCH. THE LIMIT SWITCHES. THE "HALL EFFECT" SENSOR, AS WELL AS THE FLAME SENSOR. 45-SECONDS AFTER IGNITION OCCURS, ASSUMING THE UNIT IS CONTROLLED THROUGH A ROOM THERMOSTAT SET FOR FAN AUTO, THE INDOOR FAN MOTOR WILL ENERGIZE (AND THE OUTDOOR AIR DAMPERS WILL OPEN TO THEIR MINIMUM POSITION). IF, FOR SOME REASON, THE OVER-TEMPERATURE LIMIT OPENS PRIOR TO THE START OF THE INDOOR FAN BLOWER, THE UNIT WILL SHORTEN THE 45-SECOND DELAY TO 5-SECONDS LESS THAN THE TIME FROM INITIATION OF HEAT TO WHEN THE LIMIT TRIPPED. GAS WILL NOT BE INTERRUPTED TO THE BURNERS AND HEATING WILL CONTINUE. ONCE THE FAN-ON DELAY HAS BEEN MODIFIED, IT WILL NOT CHANGE BACK TO 45-SECONDS UNTIL POWER IS RESET TO THE CONTROL.

ON UNITS WITH 2 STAGES OF HEAT WHEN ADDITIONAL HEAT IS REQUIRED. W2 CLOSES AND INITIATES ON UNITS WITH 2 STAGES OF HEAT, WHEN ADDITIONAL HEAT IS REQUIRED, W2 CLOSES AND INITIATES POWER TO THE SECOND STAGE OF THE MAIN GAS VALVE. WHEN THE THERMOSTAT IS SATISFIED, W1 AND W2 OPEN AND THE GAS VALVE CLOSES, INTERRUPTING THE FLOW OF GAS TO

IF THE CALL FOR WILLASTED LESS THAN 1 MINUTE, THE HEATING CYCLE WILL NOT TERMINATE UNTIL 1 MINUTE AFTER W1 BECAME ACTIVE. IF THE UNIT IS CONTROLLED THROUGH A ROOM THERMOSTAT SET FOR FAN AUTO, THE INDOOR FAN MOTOR WILL CONTINUE TO OPERATE FOR AN ADDITIONAL 45-CONDS THEN STOP. IF THE OVER-TEMPERATURE LIMIT OPENS AFTER THE INDOOR MOTOR IS STOPPED, BUT WITHIN 10 MINUTES OF W1 BECOMING INACTIVE, ON THE NEXT CYCLE THE TIME WILL BE EXTENDED BY 15-SECONDS. THE MAXIMUM DELAY IS 3 MINUTES. ONCE MODIFIED. THE FAN OFF DELAY WILL NOT CHANGE BACK TO 45-SECONDS UNLESS POWER IS RESET TO THE CONTROL. AN LED INDICATOR IS PROVIDED ON THE IGC TO MONITOR OPERATION.

#### ReliaTel<sup>™</sup> CONTROL DEHUMIDIFICATION:

COMPRESSOR OPERATION.

ON A CALL FOR DEHUMIDIFICATION. THE REHEAT VALVE IS ENERGIZED AND THE COMPRESSOR IS TURNED ON WHEN THE HUMIDITY CONTROL SETPOINT IS SATISFIED. THE VALVE IS DEENERGIZED AND THE COMPRESSOR IS TURNED OFF. IF THERE IS A CALL FOR COOLING OR HEATING FROM THE SPACE TEMPERATURE CONTROLLER, I.E. ZONE SENSOR OR THERMOSTAT, WHILE IN REHEAT, THE REHEAT VALVE IS DE-ENERGIZED AND THE COMPRESSOR CONTINUES TO RUN, OR THE HEAT IS TURNED ON. THE 3 MINUTE COMPRESSOR ON AND OFF TIMES ARE STILL ACTIVE DURING

#### **MECHANICAL SPECIFICATIONS**

- Contractor shall provide all labor, materials, tools, apparatus and equipment required to complete his work in accordance with the contract documents, codes, laws and ordinances and accepted trade procedures
  - The Contractor shall review all of the contract documents including those of the other trades in order to acquaint himself with the existing and related conditions that may, will or could affect his work. He shall be experienced, skilled and knowledgeable with this type of construction and shall be expert and proficient in the preparation of estimates and the comprehension, implementation and interpretation of contract documents such as those prepared for this project.
  - The Contractor shall visit the site before he submits his proposal. He shall examine all existing conditions which affect the work. Submission of the proposal shall be considered evidence that this requirement has been fulfilled. No extra payment will be allowed for additional work made necessary by the failure to visit the site.
  - The Contractor by his acceptance of the contract guarantees that all work installed shall be free from all defects in workmanship and materials and that all apparatus furnished by him shall develop the capacities and characteristics specified. He further guarantees that if during a period of one (1) year from the date of the certificate of completion and acceptance of the work, any such defects in workmanship material or performance appear, such defects shall be remedied by him without cost to the Owner. If the Contractor fails to remedy the defects as outlined within a reasonable length of time, to be specified in a notice from the Owner's Authorized Representative to the Contractor, the Owner will have such work done and he will charge the cost to the Contractor.
- Mechanical equipment shall be installed in a neat and workmanlike manner in accordance with the latest and best practices of the trade. Only mechanics skilled in this type of work shall be employed and utilized by the Contractor for this division in the execution of this work. The contract drawings are diagrammatic and indicate the general arrangement of systems. The Contractor shall provide all work required for a complete installation. The contract drawings are not to be scaled. The architectural contract drawings and details together with the
- other contract documents shall be examined for all dimensional information.
- The Contractor shall follow the contract drawings in laying out his work and he shall also check the contract drawings of the other trades to verify spaces in which his work shall be provided. Equipment locations shall be coordinated with the Architect and the General Contractor. The Contractor shall, without additional costs to the Owner, make reasonable modifications in the layout of his work in order to prevent
- conflicts with the work of other trades or for the proper execution of his work. The Contractor shall provide and maintain in good order a complete set of blueline prints of the contract drawings. As the work progresses the actual location of all work shall be clearly recorded, including all changes to the contract and equipment size and type. These prints shall be available at the site for inspection at all times. At the conclusion of the work, the Contractor shall, at his own expense, obtain a set

a clearly legible and reproducible manner. All schedules shall be corrected to indicate "As-Built" conditions. All revisions shall be

boxes, etc. shall be dimensionally located from the building structure. As a condition for acceptance of the work, the "As-Built" reproducibles and one (1) set of prints shall be signed, dated and delivered to the Engineer. The Contractor shall supply all labor required to perform all work which may be claimed by trade organizations within his jurisdiction. All work shall be performed without any additional cost to the Owner irregardless of which section of the contract documents the work is described. The Contractor shall be responsible to verify with all local organizations the extent of any collective bargaining agreements

of reproducibles of the original contract drawings and utilizing the symbols on the contract drawings, shall incorporate all "As-Built" data in

ncorporated on these reproducibles including all sketches and written directives. All concealed equipment, mainfeeders, pull and junction

- accordance with the accepted trade practice in the area. The entire installation shall conform with all pertinent codes and regulations of the local, municipal, county, state and federal authorities, The National Board of Fire Underwriters, the codes of the International Codes Council, the National Fire Protective Association and all other regulatory bodies having jurisdiction. All materials and equipment shall bear the stamps or seals of the NFPA, ASME, NEMA, IEEE,
- UL and other recognized industry regulatory groups. The Contractor shall give all necessary notices, obtain all permits, pay all governmental taxes, fees and other costs in connection with his work. He shall file all necessary plans, and prepare all other documents including additional detailed plans that are required for compliance

and/or any jurisdictional decisions rendered regarding disputes between the respective trades and provide and install his work in

- with all applicable laws, ordinances, rules and regulations.
- . The Contractor shall be responsible for all working conditions and shall maintain a safe working environment at the job site for all
- 4. All work shall be installed in strict accordance with the equipment Manufacturer's recommendations and requirements. Openings around ductwork and piping passing through the construction shall be sealed with fire barrier caulking.
- 6. All systems are to be tested, adjusted and balanced to provide performance as indicated on the drawings. Test and adjust all safety
- Coordinate to assure that all work of all trades will be concealed within the wall and ceiling construction and without the need to reduce ceiling heights. Report exceptions to the Architect prior to construction and erection of the work.
- 3. All work shall be supported from the building structural system. Work shall not be supported from the ceiling suspension system, from plumbing work, sprinkler piping, electrical work, nor from other mechanical work.
- The HVAC and Plumbing trades shall coordinate all work with the General Contractor prior to installation.
- ). All work shall be located to avoid conflicts with other work and provide adequate clearances for architectural design, proper operation, adjustments, filter replacement, component service and provide a minimum 2" clearance between all piping, ductwork, conduit and other
- The Contractor shall maintain as-built drawings and deliver them to the Owner upon completion of the project.
- Provide supports, hangers, flexible pipe connections, vibration isolation, supplementary supports, controls and wiring, cleaning, painting, specialties and all other labor, materials, devices and services required for a complete, quality installation. Unless otherwise indicated, run all piping, ductwork and conduit as high as possible. Provide starters for all motor driven equipment.
- The HVAC trades shall coordinate all electrical loads with the Electrical Contractor.
- Contractor shall perform all system commissioning with an approved agency per section C408 of the 2015 International Energy Conservation Code (if required).
- The Contractor shall coordinate with the General Contractor. Locate all required cutting and patching and the like required by the installation of the Mechanical work.
- Provide all specialties, accessories, controls and the like to provide a complete, quiet, properly operating automatically controlled systems. The HVAC trade shall provide all safety and operating controls, transformers, motor starters, devices and control wiring required for the
- systems to operate in a safe and satisfactory manner Do not operate the air conditioning systems during construction except for testing and provide new filters for all units and immediately prior to substantial completion.
- Ductwork shall be constructed of galvanized sheet metal fabricated and erected in accordance with ASHRAE and SMACNA standards. Provide turning vanes in all elbows, manual volume dampers in all branches, air equalizers and similar devices as required to properly
- palance the systems and produce quiet, draftless operation. Ductwork sizes shown on the plans are sheet metal I.D. free area. Ductwork shall be constructed to the sizes shown and made airtight during erection with caulked, taped or hardcast joints to restrict
- All ductwork shall be closely coordinated prior to fabrication. The architectural contract drawings and details together with the other contract documents shall be examined for all dimensional information. Full sheet metal shop drawings drawings shall be developed with all spacial requirements worked out and shown on drawings. These drawing must show: locations of openings to be cut through the building's exterior, floors, etc. and any problems. These drawing shall be submitted for review by the Architect and Engineer prior to fabrication.
- Provide UL labeled and inspected fire dampers for all ducts and openings passing through floors, fire rated walls and ceilings, where shown on the drawings and in locations required by codes.
- Balance all air quantities to within 5% of the CFM shown on the drawings. Finally balance individual outlets to the occupants' satisfaction. Install all devices required for balancing in the system during construction. Provide balancing reports by a certified testing and balancing agency for review by the Engineer. 10. Provide written operating and maintenance instructions including all warranty certificates, in duplicate, to the Architect.

National Electrical Code sections 110.24, 430.98, 430.99, 440.10, 700.5 and all applicable local codes. Coordinate exact available fault

current and labeling with the Electrical Contractor. The Electrical Contractor shall provide all fault current labels.

Contractor shall coordinate all diffuser, grille and register locations with architectural ceiling plans and lighting layouts. All HVAC equipment shall be rated in excess of the available fault current and shall be permanently labeled in accordance with the

# MECHANICAL SYMBOLS, INDICATIONS & ABBREVIATIONS

FLEXIBLE DUCTWORK **EQUIPMENT DESIGNATION TAG** ----DUCT W/ ACOUSTICAL LINING SUPPLY AIR DIFFUSER (CEILING) RETURN/EXHAUST AIR DUCT UP RETURN/EXHAUST AIR DUCT DN SUPPLY AIR DIFFUSER (SIDEWALL) SUPPLY/MAKE-UP AIR DUCT UP SUPPLY AIR DIFFUSER (LINEAR, CEILING) SUPPLY/MAKE-UP AIR DUCT DN SUPPLY AIR DIFFUSER (LINEAR, WALL) ----CD----CONDENSATE DRAIN RETURN AIR DIFFUSER (CEILING)  $\longrightarrow$ **DIRECTION OF FLOW** PIPE TURNING DOWN EXHAUST AIR DIFFUSER (CEILING) PIPE TURNING UP RETURN/EXHAUST AIR DIFFUSER (SIDEWALL) CAPPED FLANGE BRANCH DAMPER ABOVE FINISHED FLOOR CFM CUBIC FEET OF AIR PER MINUTE VOLUME DAMPER FXHAUST AIR 2" DOOR UNDERCUT EXHAUST FAN FAN FORCED HEATER THERMOSTAT MOTORIZED DAMPER UTSIDE AIR DUCT MOUNTED SMOKE DETECTOR FTURN AIR ROOFTOP UNIT

#### PIPING AND DUCT CRITERIA ALL DUCTWORK SHALL BE SIZED USING A STANDARD

DUCT SIZE TRANSITION

EXHAUST FAN

- DUCTULATOR. THE FOLLOWING CRITERIA SHALL BE USED TO CALCULATE DUCT SIZES:
- a. SUPPLY DUCTS SHALL BE NO MORE THAN 0.10 IN. PER 100 FEET OF PRESSURE DROP. b. RETURN AND EXHAUST DUCTS SHALL BE NO MORE THAN 0.05 IN. PER 100 FEET OF
- PRESSURE DROP VENTILATION DUCTS SHALL BE NO MORE THAN 0.075 IN. PER 100 FEET OF PRESSURE d. FLEXIBLE DUCTWORK SHALL NOT BE
- CONDENSATE SHALL BE COLLECTED AND RUN WITH ADEQUATE PITCH TO THE CLOSEST SAFE-WASTE. PROVIDE CONDENSATE PUMPS IF PITCH CAN NOT BE ACHIEVED. CONDENSATE PIPING SHALL BE SIZED AS

CONDENSATE PIPE SIZING CHART

PERMITTED IN RESIDENTIAL UNITS.

ALL CONDENSATE TRAPS SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.

40-90

#### . IT SHALL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR TO COORDINATE THE

**ELECTRICAL COORDINATION** 

SUPPLY AIR

UNDERCUT

UNIT HEATER

- LOCATIONS OF DUCTWORK AND REGRIGERANT PIPING WITH THE ELECTRICAL CONTRACTOR DUCTWORK SHALL NOT BE INSTALLED WITHIN THE DEDICATED EQUIPMENT SPACE REQUIRED FOR EXISTING OR NEW ELECTRICAL EQUIPMENT.
- 2. COORDINATION OF DUCTWORK LOCATIONS SHALL BE SOLELY THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR, APPROVAL OF SHEET METAL SUBMITTAL DRAWINGS DOES NOT RELEASE HE CONTRACTOR FROM COORDINATION RESPONSIBILITY, FINAL COORDINATION SHALL CCUR IN FIELD WITH ELECTRICAL CONTRACTOR FAILURE TO COMPLY WITH THIS REQUIREMENT MAY RESULT IN RELOCATION OF SUPPRESSION
- SYSTEM PIPING AT CONTRACTOR'S EXPENSE. PER NFPA 70. ARTICLE 110.26(F): DEDICATED EQUIPMENT SPACE SHALL APPLY TO SWITCHBOARDS, DISTRIBUTION PANELS AND MOTOR CONTROL CENTERS. THE SPACE EQUAL O THE WIDTH AND DEPTH OF THE EQUIPMENT AND EXTENDING FROM THE FLOOR TO A HEIGHT OF 6' ABOVE THE EQUIPMENT OR TO THE TRUCTURAL CEILING, WHICHEVER IS LOWER. SHALL BE DEDICATED TO THE ELECTRICAL INSTALLATION, NO PIPING, DUCTS, LEAK PROTECTION APPARATUS OR OTHER EQUIPMENT FOREIGN TO THE ELECTRICAL INSTALLATION SHALL BE LOCATED IN THIS ZONE.



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Drawing Issues

E ARCHITECTURAL WALLS, ROOM NAMES, REFLECTED EILING PLANS. ETC.. HAVE BEEN CREATED FROM RECORI FILES FURNISHED BY THE PROJECT ARCHITECT OR OWNER. THE CONTRACTOR AND ALL TRADES SHALL BE RESPONSIBLE FOR CHECKING AND VERIFYING ALL OF THE BUILDING'S EXISTING AND PROPOSED CONDITIONS, ENSIONS, ETC. PRIOR TO COMMENCING WORK. NOTIFY THE ENGINEER OF ANY DISCREPANCIES IN WRITING PRIOR

PROJECT NO: 21-410 May 26, 2021 DRAWN BY: SAIJS CHECKED: SW | PP SCALE: AS NOTED PLOT DATE:

TO SUBMISSION OF BID.