CONTRACT DOCUMENTS

FOR

BUCKS COUNTY FREE LIBRARY HVAC REPLACEMENT
PERKASIE BRANCH LIBRARY

PERKASIE BRANCH LIBRARY
491 ARTHUR AVENUE
PERKASIE, PA 18944

SPEC #2026PK-01

JUNE 17, 2026

PREPARED FOR:
Bucks County Free Library
150 S Pine Street
Doylestown, PA 18901

PREPARED BY:
Holstein White Engineers
3800 Horizon Blvd., Suite 503
Trevose, PA 19053

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FOR
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LEGAL NOTICE

Bucks County Free Library will receive bid responses until 11:00am on July 28, 2026. Bids are to be mailed or hand delivered to:

Bucks County Free Library
Attn: John J. Doran III, Chief Financial Officer
150 South Pine Street
Doylestown, PA 18901

BUCKS COUNTY FREE LIBRARY
PERKASIE BRANCH HVAC REPLACEMENT

A **Mandatory** Pre-Bid Meeting will be held at 9:00 AM on July 9, 2026 at the Perkasie Library Branch, 491 Arthur Avenue, Perkasie, PA 18944.

All questions must be emailed to Jamie Boles at jboles@holsteinwhite.com by 12pm on July 14, 2026. The questions will be answered, via email, by 5pm on July 21, 2026.

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. A Contractor Responsibility Certification Form must be provided by July 14, 2026.

A link to the solicitation may be found on the Bid page of the library website at www.buckslib.org/bids

Bids are opened publicly in the second-floor conference room of the Doylestown Library 150 S Pine St, Doylestown PA, 18901 at 11:00am the day they are due, July 28, 2026.

INSTRUCTIONS TO BIDDERS

1. RECEIPT AND OPENING OF BIDS

   a. All sections of the Bid, including downloads and Requests for Information (RFI's) shall be submitted with the bid and acknowledges the Bidder affirms, understands, and will abide by the requirements of the Bid. Failure to do so may cause the Bid to be rejected as non-responsive.
   b. The submission of a bid will be considered as conclusive evidence of complete examination of specifications and samples.
   c. The Bucks County Free Library (BCFL) reserves the right to accept and award an Agreement to the lowest responsive, responsible bidder. BCFL reserves the right to reject any or all bids or any part thereof. BCFL reserves the right to award an Agreement based on evaluation of specific criteria found in these specifications.
   d. No verbal instructions or information to bidders will be binding. The specifications will be considered clear and complete unless written attention is called to any apparent discrepancies or incompleteness thereof before the opening of bids. Should any written inquiries be received by the BCFL, these inquiries will be answered in the form of addenda and issued to all providers. These addenda shall then be considered a part of these specifications.
   e. Each bid must be submitted by 11:00am on the day of the bid opening.
   f. The bids will be opened and read publicly on the second-floor conference room of the Doylestown Library located at 150 S Pine St, Doylestown PA, by the BCFL Chief Financial Officer or their Representative at 11am on the day the bid is due.
   g. BCFL reserves the right to reject any or all bids or parts thereof, as deemed to be in the best interest of BCFL.
   h. If information is not included with your bid, and you receive a request from BCFL to provide it, you MUST deliver the information to the person making the request within 48 hours (excluding weekends). Any information not received within 48 hours may result in your bid being excluded from the evaluation and award process
   i. BCFL is the sole authority to provide this bid package to interested companies or individuals. Bidders who are working from a bid package obtained from any other source may be working from an incomplete set of documents. BCFL assumes no responsibility for a bid's errors, omissions, or misinterpretations resulting from a Bidder's use of an incomplete bid package.
   j. Bidders who have received the bid package from a source other than BCFL are not an official vendor of record for the bid.

2. MODIFICATION AND WITHDRAWAL OF BIDS

   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. BCFL will not be responsible for the failure of the successful bidder 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 our Engineer Contractor, Holstein White Inc (HW). It shall be understood that the bidder has satisfied themself as to the full requirements of the Contract and has based their 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 Agreement.

5. ADDENDA AND INTERPRETATIONS

All questions about the meaning or intent of the Bidding Documents are to be submitted by 12pm on July 14, 2026 via e-mail to jboles@holsteinwhite.com. Interpretations or clarifications considered necessary in response to such questions will be issued through an Addendum via e-mail and the BCFL website by 5pm on July 21, 2026. 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 BCFL or HW.

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 become the property of the library and may be returned only at the BCFL's option. Information contained in the proposals/bids will not be disclosed during the evaluation process.

7. CONDITIONS OF WORK

Each bidder must inform themself 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 their 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 their 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 their bid.

8. TIME FOR COMPLETING WORK AND LIQUIDATED DAMAGES

The time for completion of the work under this Contract shall be one hundred and twenty (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 BCFL because of said delay. BCFL may retain the amount thereof from any money 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 workers with designated foreman at work on-site at all times. The successful bidder's personnel shall remain on-site throughout the duration of the successful bidder's work. At no time shall successful bidder pull off project without the express consent of HW or BCFL. In addition, no change in foreman shall be permitted without approval from the HW or BCFL. The successful bidder will be required to submit a detailed schedule for completion of work which will be subject to the review and approval of HW and BCFL.

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. The 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 HW or BCFL, 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 BCFL to 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 BCFL. The time for such submittal may be extended at the election of BCFL and for the sole benefit of BCFL. 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 BCFL in an amount not to exceed the difference between the amount specified in said bid and such larger amount for which BCFL 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 BCFL to the Bidders are effective only after the execution of a contract signed by all parties. It is further expressly understood and agreed that the mere issuance of a contract between BCFL and a Bidder will not oblige BCFL in any fashion.

12. BONDS AND INSURANCE

The successful bidder must deliver to BCFL executed certificates of insurance as stipulated in end of these instructions 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 BCFL.

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 BCFL 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. BCFL reserves the right to award locations individually or combine locations as determined to be in our best interest.

14. REJECTION OF BIDS

BCFL reserves the right to reject any or all bids, or to accept any bid should it deem it to be in 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 BCFL, and shall create no right, entitlement, or expectation in any bidder.

15. PROGRESS PAYMENTS

Refer to the agreement 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 BCFL. The successful bidder shall submit manufacturers' specifications, etc., sufficient for HW 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 bidder 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 bidder is solely and exclusively responsible for adherence to any existing historical, local, state, and federal codes and regulations, and all required permits, including permit costs.

19. PROGRESS SCHEDULE

Within seven (7) consecutive calendar days after the award of the Contract to them, the successful bidder shall submit a proposed program of operation, showing clearly how they propose to conduct the work to bring about the completion of their work within the time limit specified. This program shall outline the proposed sequence of operations, the rates of progress and the dates when their 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 BCFL and shall be updated by the successful bidder at any time during performance of the Contract, should BCFL determine that the successful bidder'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 BCFL or HW BE HELD RESPONSIBLE TO THE SUCCESSFUL BIDDER FOR DELAYS OR EXTRA WORK OCCASIONED BY INTERFERENCE OF OTHER CONTRACTORS.

21. SAFETY

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

22. 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 the successful bidder if acceptable to HW and BCFL, application for such acceptance will be documented on a Substitution Request Form.

BCFL 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 successful bidder shall meet the requirements of the Specifications and shall, in all respects, be equal to the products specified by name herein. BCFL shall be the sole judge as to the equality of the proposed alternate product.

23. EMPLOYMENT VERIFICATION ACT

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.

24. STEEL PRODUCTS PROCUREMENT ACT

The successful bidder agrees to comply with the provisions of the Steel Products Procurement Act of March 3, 1978, P.L. 6, as amended (73 P.S. §1881 et seq.) where applicable. Information regarding the

Act's requirements, including a list of exempt products, is available on the Department of General Services web site. See https://www.pa.gov/agencies/dgs/programs-and-services/design-and-construction-info/steel-products-procurement-act for further guidance.

25. PROJECT WAGES

The successful bidder shall comply with the provisions, duties, obligations, remedies, and penalties of the Pennsylvania Prevailing Wage Act, 43 P.S. §§ 165-1 et seq., which is incorporated herein by reference.

26. NONDISCRIMINATION/SEXUAL HARASSMENT

The successful bidder shall comply with all applicable provisions of state and federal constitutions, laws, regulations, and judicial orders pertaining to nondiscrimination, sexual harassment, and equal employment opportunity.

27. PAST PERFORMANCE

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

28. ACCESS TO ACCOUNTING RECORDS

The Successful bidder 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 BCFL. BCFL or HW shall be afforded access to all the successful bidder's records, books, correspondence, instructions, drawings, receipts vouchers, memoranda, and similar data relating to this contract, and the Successful bidder 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.

29. ASSIGNMENT OF REFUND RIGHTS

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

30. CONTRACTS WITH SUBCONTRACTORS

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

31. CONTRACTOR RESPONSIBILITY CERTIFICATION

Bucks County Free Library (BCFL) recognizes there is a need to ensure that all work on public construction and maintenance contracts is performed by responsible, qualified forms that maintain the capacity, expertise, personnel and other qualifications and resources necessary to successfully perform public contracts in a timely, reliable and cost-effective manner.

The purpose of selecting responsible contractors for public contracts and to protect the Library's proprietary investments in such contracts, prospective contractors and subcontractors, should be required to meet pre-established, clearly defined minimum standards relating to contractor responsibility, particularly requirements concerning technical qualifications, competency, experience, adequacy of resources, including equipment, financial and personnel, and satisfactory records of past performance in terms of safety, law compliance and business integrity.

It is also recognized that due to the substantial impact that skilled craft labor has on public works projects, and due to the limited availability of skilled construction craft labor and imminent craft labor skill shortages, it is necessary to require contractors and subcontractors to participate in established, formal apprenticeship training programs as a condition of bidding and performing work, for the purpose of both promoting successful project delivery and ensuring future workforce development needed for future projects.

We require compliance with these provisions by business entities seeking to provide services to BCFL as specified herein. These requirements are intended to supplement, not replace, existing contractor qualification and performance standards or criteria currently required by law, public policy or contracting documents.

As a condition of performing work on a public works contract, a general contractor, construction manager or other lead or prime contractor seeking award of contractor shall submit a Contractor Responsibility Certification. Subcontractors used on the contract are likewise required to provide similar Subcontractor Certifications

REQUIRED ATTACHMENTS TO BID

The following documents must be delivered wither in person or by mail as attachments to the bid:

- 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
- Contractor Responsibility Certification Form (please email the completed form to jboles@holsteinwhite.com by July 14, 2026. Failure to do so by this deadline will automatically disqualify any firm from submitting a bid or proposal for a contract.

INSURANCE REQUIREMENTS

Commercial General Liability - (policy to include premises and operations, products/completed operations and blanket contractual liability - the contractual section of the coverage must cover this agreement)

General Aggregate Limit	$5,000,000.
Products and Completed Operations Aggregate Limit	$2,000,000.
Each Occurrence Limit	$1,000,000.

Automobile Liability - to include owned, non-owned and hired vehicles:

Combined Single Limit	$ 500,000.
or Bodily Injury	$ 250,000. each person
Bodily Injury	$ 500,000. each accident
And Property Damage	$ 100,000.

Workers Compensation

Statutory and Employer's Liability Bodily Injury by Accident	$ 100,000. each accident
Bodily Injury by Disease	$ 100,000. each employee
Bodily Injury by Disease	$ 500,000. policy limit

All insurance policies required under this Agreement shall, with the exception of the Worker's Compensation Insurance, designate "The Bucks County Free Library, its Board of Directors, and their respective officers, administrators, employees, professionals, and agents" as additional insureds with respect to liability arising out of the Supplier's performance of its obligations under this Agreement. The Supplier shall deliver to the Library certificates of insurance as evidence of the insurance and limits stipulated herein including the Additional Insured requirements. The Supplier shall subsequently provide the Library with certificates of insurance for renewals of such policies, and all insurance required hereunder shall be primary, and not in excess over or contributing with any insurance maintained by the Library.

Certificate Holder - "Bucks County Free Library", Attn: Administration offices of the Bucks County Free Library, 150 South Pine Street Doylestown PA 18901

Additional Insured – The County of Bucks must be included as additional insured with respect to the work performed for this project.

BID BOND

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

_____ as Principal, and

_____as Surety, are hereby held and firmly bound unto Bucks County Free Library as Owner, in the penal sum of

_____($_____)

for the payment of which, well and truly to be made, we hereby jointly and severally bind ourselves, our heirs, executors, administrators, successors, and assigns.

Signed this _____ day of _____, 20___.

The Condition of the above obligation is such that whereas the Principal has submitted to _____ a certain Bid, attached hereto and hereby made a part hereof, to enter into a contract in writing for:

BUCKS COUNTY FREE LIBRARY PERKASIE HVAC REPLACEMENT

With this addition:

Contract #2026PK-01

NOW, THEREFORE,

A.) If said Bid shall be rejected, or in the alternate,

B.) If said Bid shall be accepted and the Principal shall furnish bonds for his faithful performance of said Contract, for the payment of all persons performing labor or furnishing materials in connection therewith, for the maintenance of said project as contemplated in said Contract, and shall in all respects perform the agreement created by the acceptance of 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.

NON-COLLUSION AFFIDAVIT

BUCKS COUNTY FREE LIBRARY

PERKASIE HVAC REPLACEMENT

With this addition:

Contract #2026PK-01

State of Pennsylvania

County of Bucks

I state I am _____of _____
(Title) (Name of Firm)

and I am authorized to make this affidavit on behalf of my firm and its owners, directors, and officers. I am the person responsible in my firm for the price(s) and the amount of this bid.

I state:

1. The price(s) and amount of this bid have been arrived at independently and without consultation, communication, or agreement with any other contractor, bidder, or potential bidder.
2. Neither the price(s) nor the amount of this bid, and neither the approximate price(s) nor approximate amount of this bid have been disclosed to any other firm or person who is a bidder or potential bidder, and they will not be disclosed before bid opening.
3. No attempt has been made or will be made to induce any firm or person to refrain from bidding on this contract, or to submit a bid higher than this bid, or to submit any intentionally high or non-competitive bid or other form of complementary bid.
4. The bid of my firm is made in good faith and not pursuant to any agreement or discussion with, or inducement from, any firm or person to submit a complementary or other non-competitive bid.
5. _____, its affiliates, subsidiaries, officers,
(Name of My Firm)
directors, and employees are not currently under investigation by any governmental agency and have not in the last four years been convicted or found liable for any act prohibited by state or federal law in any jurisdiction, involving conspiracy or collusion with respect to bidding on any public contract, except as follows:

I state _____ understands and acknowledges the above
(Name of My Firm)
representations are material and important and will be relied on by the Bucks County Free Library Board of Directors in awarding the contract(s) for which this bid is submitted.

I understand and my firm understands any misstatement in this affidavit is and shall be treated as fraudulent concealment from Bucks County Free Library of the true facts relating to the submission of bids for this contract.

_____
(Name and Company Position)

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

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

PERKASIE HVAC REPLACEMENT

With this addition:

Contract # 2026PK-1

THIS AGREEMENT made this _____day of _____, 20___ by and between Bucks County Free BCFL, 150 S Pine Street, Doylestown, PA 18901, hereinafter "BCFL", and

_____

hereinafter "Contractor" or "Bidder." BCFL and the Contractor in consideration of the mutual promises contained in this Agreement, and intending to be legally bound, agree as follow:

GENERAL PROVISIONS:
The Contractor shall:

(a) have charge of and be responsible for the entire work for which they have contracted until its final completion and acceptance by BCFL.

(b) be held liable for any defects which may appear in the material they have furnished or in their work for a period of one (1) year after final acceptance by BCFL.

(c) be solely liable for any damage occasioned by their work to the property of BCFL 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 BCFL, HW, 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.

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 BCFL out of, or by reason of, the work done, and materials furnished under this Contract.

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

BONDS AND INSURANCE CERTIFICATES

The Contract Documents are not complete until BCFL has received satisfactory performance, material payment bonds executed by responsible surety companies listed to do business in the Commonwealth of Pennsylvania and acceptable to BCFL; 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 BCFL.

FAILURE TO SUPPLY PROOF OF INSURANCE SHALL CONSTITUTE MATERIAL BREACH OF THIS AGREEMENT. Remedies for such material breach include termination of agreement by BCFL and / or the withholding of payments by BCFL 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 HW) 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.

MATERIALS TO BE FURNISHED BY THE BCFL:

No materials shall be furnished by BCFL.

WORK DONE BY THE BCFL:

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

PAYMENTS:

In consideration of the Contractor faithfully complying with the terms and stipulations of the Contract, BCFL covenants and agrees to pay said Contractor the sum set forth 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 Contractor 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 Contractor 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.

INTEGRATION:

The Agreement, including all referenced documents and attachments, constitutes the entire agreement between the parties. No agent, representative, employee or officer of either BCFL or Contractor 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 BCFL form.

CONTROLLING TERMS AND CONDITIONS:

The terms and conditions of this Agreement, including the Contract Documents set forth above, shall be the exclusive terms of agreement between the Contractor and BCFL. Other terms and conditions or additional terms and conditions included or referenced in the Contractor'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 Contractor and not binding on BCFL.

TOTAL AMOUNT OF BID:

$ _____
(Written)

$ _____

(Numbers)

OBLIGATION OF BID

A. This proposal includes the requirements as set forth in the bulletins issued during the bidding period, if any, as follows:

Bulletin Number	Date Issued

IN WITNESS WHEREOF: The parties hereto have caused the signature of their proper officers and seals to be affixed thereto:

ATTEST:

_____ BY: _____

ATTEST:

_____ BY: _____
Contractor

DATE: _____

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

Bucks County Free Library
Contractor Responsibility Certification Form

Contractor Name:_____ Date:_____, 20___

Contractor Address: _____

_____,_____ Zip Code_____

Contact Name:_____ E-mail_____

Contact Direct Phone No.:_____ Fax No.: _____

Project Name _____, Project Bid # _____

To be certified, Contractor is required to check all the following boxes:	Yes	No
1. Does the Contractor and its employees have all valid, effective licenses, registrations or certificates required by federal, state, county, or local law, including, but not limited to, licenses, registrations or certificates required to: (a) do business in the designated locale; and (b) perform the contract work it seeks to perform? These shall include, but not limited to, licenses, registrations or certificates for any type of construction or maintenance trade work or specialty work which the firm proposes to self-perform.	☐	☐
2. Does the Contractor meet the bonding requirements for the contract, as required by applicable law or contract specifications and any insurance requirements, as required by applicable law or contract specifications, including general liability insurance, workers compensation insurance and unemployment insurance?	☐	☐
3. Has the Contractor been debarred by any federal, state or local government agency or authority in the past three (3) years?	☐	☐
4. Has the Contractor defaulted on any project in the past three (3) years?	☐	☐
5. Has the Contractor had any type of business, contracting or trade license revoked or suspended by any government agency or authority in the past three (3) years?	☐	☐
6. Has the Contractor or its principals/owners been convicted of any crime relating to the contracting business in the past ten (10) years?	☐	☐
7. Has the Contractor within the past three (3) years been found in violation of any law applicable to its contracting business, including, but not limited to, licenses laws, tax laws, prompt payment laws, wage and hour laws, prevailing wage laws, environmental laws or others, where the result of such violation was the payment of a fine, back pay damages or any other type of penalty in the amount of $1,000 or more?	☐	☐
8. The Contractor will pay all craft employees that it employs on the project the current wage rates and fringe benefits as required under applicable federal, state or local wage laws.	☐	☐
9. All craft labor that will be employed by the Contractor for the project have completed at least the OSHA 10-hour training course for safety established by the U.S. Department of Labor, Occupational Safety & Health Administration.	☐	☐

Bucks County Free Library
Contractor Responsibility Certification Form

	Yes	No
10. The Contractor will employ craft employees in all classifications and individual trades required to successfully perform the work related to this project.	☐	☐
11. The Contractor participates in a Class A Apprenticeship Training Program, as defined below, for each separate trade or classification in which it employs craft employees. This apprenticeship requirement assures that workers in each trade or craft employed are graduates of an apprenticeship training program in each trade or craft in which their services are utilized.	☐	☐
A. For purposes of this section, a Class A Apprenticeship Program is an apprenticeship program that is currently registered with and approved by the U.S. Department of Labor or a state apprenticeship agency and has graduated apprentices to journeyperson status for at least three of the past five years. This may be an apprenticeship program that is subject to the Employee Retirement Income Security Act of 1974, 29 U.S.C. § 1001 *et seq*. ("ERISA"), or a non-ERISA program.	☐	☐
B. To demonstrate compliance with this section, the firm shall provide, with this certification, a list of all trades or classifications of craft employees it will employ on the project and documentation verifying it participates in a Class A Apprenticeship Program for each trade or classification listed.	☐	☐
12. The Contractor has all other technical qualifications and resources, including equipment, personnel and financial resources, to perform the referenced contract, or will obtain same through the use of qualified, responsible Contractors.	☐	☐
13. The Contractor will maintain all qualifications, resources and capabilities referenced in this certification throughout the duration of the project	☐	☐
14. The Contractor shall notify the County within seven days of any material changes to all matters attested to in this certification.	☐	☐
15. The firm understands that the Contractor Responsibility Certification required by this section shall be executed by a person who has sufficient knowledge to address all matters in the certification and shall include an attestation stating, under the penalty of perjury, that the information submitted is true, complete and accurate.	☐	☐

Upon receipt of a Notice of Intent to Award Contract, the Contractor will provide the Owner with subcontractor list and subcontractor information as specified in the Responsible Contractor Resolution

ATTACH ADDITIONAL SHEETS IF NECESSARY.

Contractors Authorized Representative:

Signature: _____

Title: _____ Date: _____

PAYMENT BOND

KNOWN ALL MEN, we _____, as Principal, and _____ as Surety, are held and firmly bound unto Bucks County Free Library, 150 S Pine Street, Doylestown, PA 18901 and its successors and assigns (hereinafter called the Obligee), in the just sum of:

_____ ($_____)

Written Figures

Lawful money of the United States of America, for the payment of which sum truly to be made we bind ourselves and each of our respective heirs, personal representatives, successors and assigns joints and severally by these presents, this _____ day of _____, 20____.

WHEREAS, the Principal has entered into a written Agreement with the Obligee, dated _____, _____, 20_____ for performance of the Contract work in connection with the **"BUCKS COUNTY FREE LIBRARY HVAC REPLACEMENT PERKASIE BRANCH.**

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 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 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

_____

By: _____
Attorney-in-Fact, Surety

PERFORMANCE BOND

KNOWN ALL MEN, we _____, as Principal, and _____ as Surety, are held and firmly bound unto Bucks County Free Library, 150 S Pine Street, Doylestown, PA 18901 and its successors and assigns (hereinafter called the Obligee), in the just sum of:

_____ ($_____)

Written Figures

for faithful performance of the Contract as specified below, in lawful money of the United States of America, for the payment of which sum truly to be made, we bind ourselves and each of our respective heirs, personal representatives, successors and assigns, joints and severally, firmly by these presents, this _____ day of _____, 20____.

WHEREAS, the Principal has entered into a written Agreement with the Obligee, dated _____, _____, 20_____ for performance of the Contract work in connection with the **"BUCKS COUNTY FREE LIBRARY HVAC REPLACEMENT PERKASIE BRANCH.**

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 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 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 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 force.

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: _____
Attorney-in-Fact, Surety

MAINTENANCE BOND

KNOWN ALL MEN, we _____, as Principal, and _____, as Surety, are held and firmly bound unto Bucks County 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:

in lawful money of the United States of America, for the payment of which sum truly to be made, we bind ourselves and each of our respective heirs, personal representatives, successors and assigns joints and severally, firmly by these presents, this _____ day of _____, 20____.

WHEREAS, the Principal has entered into a written Agreement with the Obligee, dated as of _____, _____, 20_____ for performance of the Contract work in connection with the "Contract for the **"BUCKS COUNTY FREE LIBRARY HVAC REPLACEMENT PERKASIE BRANCH.**

With this addition:

Contract #_____-_____ Contract

together with the plans and specifications, therefore, (including all related drawings and documents) and such alterations as may be made in such plans and 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 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 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 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**

PERKASIE BRANCH LIBRARY

Before me, the undersigned, a _____(Notary Public, Justice of 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 _____, 20___ Contract of Bucks County Free 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 this _____day 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 Street, Doylestown, PA 18901 (Owner).

The _____(Name of Surety),

Surety on the Bond of _____(Contractor)

After careful examination of the books and records of said Contractor, and after receipt of Affidavit and Releases, satisfies this Company all claims for labor and materials have been satisfactorily settled, hereby approved of the final payment of said Contractor, and by these presents witnesseth payment to the Contractor of the final estimates shall not relieve the Surety Company of any of its obligations to the Bucks County Board of Commissioners for Contract of **"BUCKS COUNTY FREE LIBRARY HVAC REPLACEMENT PERKASIE BRANCH LIBRARY.**

With this addition:

Contract #_____-_____ Contract

as set fourth in the said Surety Company's Bond No. _____.

IN WITNESS WHEREOF, the said Surety Company has hereunto set its hand and seal this _____day of _____, 20____.

WITNESS:

_____ _____

(Name of Surety)

BY:_____

(Attorney-in-Fact)

CONTRACTOR'S AFFIDAVIT OF RELEASE OF LIENS

PROJECT: **BUCKS COUNTY FREE LIBRARY HVAC REPLACEMENTPERKASIE BRANCH LIBRARY**

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

Contract For: _____

Contract Date: _____

State of: _____

County of: _____

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: _____

Address: _____

By: _____

Subscribed and Sworn to me this _____day of _____, 20___.

Notary Public: _____

My Commission Expires: _____

CONTRACTOR'S RELEASE OF LIENS

The undersigned, _____, hereinafter known as CONTRACTOR, for itself, its subcontractors, and all parties acting through or under it, has furnished labor, equipment and materials, for the erection and construction of certain improvements consisting of the **"BUCKS COUNTY FREE LIBRARY HVAC REPLACEMENT PERKASIE BRANCH LIBRARY.**

With this addition:

Contract #_____-_____ Contract

for Bucks County Free Library, 150 S Pine Street, Doylestown, PA 18901, hereinafter known as OWNER, and has agreed to release all liens which he or any of them have or might have on the improvement and the property by reason of materials furnished or work performed for erecting and constructing the improvement; and

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 OWNER, his heirs and assigns all liens, claims and demands which he or any of them now have or might or could have on or against the interest of OWNER in the improvement and the property for labor or materials previously or subsequently furnished for erecting and constructing the improvement; so OWNER, his heirs and assigns shall hold and enjoy the improvement and the property free and clear from all liens, claims or demands for labor or materials furnished by the undersigned CONTRACTOR, which are hereby released and 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).

PRODUCER	CONTACT NAME:
	PHONE (A/C, No, Ext): / FAX (A/C, No):
	E-MAIL ADDRESS:
	PRODUCER CUSTOMER ID #:
INSURED S A M P L E	INSURER(S) AFFORDING COVERAGE / NAIC #
	INSURER A :
	INSURER B :
	INSURER C :
	INSURER D :
	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.

INSR LTR	TYPE OF INSURANCE	ADDL INSR	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
	GENERAL LIABILITY						EACH OCCURRENCE	$ 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.
							GENERAL AGGREGATE	$ Gen.Cond.
	GEN'L AGGREGATE LIMIT APPLIES PER:						PRODUCTS - COMP/OP AGG	$ Gen.Cond.
	[ ] POLICY [ ] PRO-JECT [ ] LOC							$
	AUTOMOBILE LIABILITY						COMBINED SINGLE LIMIT (Ea accident)	$ Gen.Cond.
	[X] ANY AUTO						BODILY INJURY (Per person)	$ Gen.Cond.
	[ ] ALL OWNED AUTOS						BODILY INJURY (Per accident)	$ Gen.Cond.
	[ ] SCHEDULED AUTOS						PROPERTY DAMAGE (Per accident)	$ Gen.Cond.
	[ ] HIRED AUTOS							$
	[ ] NON-OWNED AUTOS							$
	[X] UMBRELLA LIAB [ ] OCCUR						EACH OCCURRENCE	$ Gen.Cond.
	[ ] EXCESS LIAB [ ] CLAIMS-MADE						AGGREGATE	$ Gen.Cond.
	[ ] DEDUCTIBLE							$
	[ ] RETENTION $							$
	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y/N						[X] WC STATU-TORY LIMITS [ ] OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? [ ] (Mandatory in NH)	N/A					E.L. EACH ACCIDENT	$ Gen.Cond.
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$ Gen.Cond.
							E.L. DISEASE - POLICY LIMIT	$ Gen.Cond.

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

When it applies, the County of Bucks; its Board of Commissioners, Employees, Directors, Officers, Departments and Divisions, and Carroll Engineering Corporation shall be included as additional insureds with respect to the following Contract:

Repairs to BC Bridge No. 263 and Bridge No. 352, Quakertown Borough (263) and East Rockhill Township (352)

CERTIFICATE HOLDER

County of Bucks Board of Commissioners
Attn: Office of the Controller
55 East Court Street
Doylestown, PA 18901

CANCELLATION

SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.

AUTHORIZED REPRESENTATIVE

WEEKLY PAYROLL CERTIFICATION FOR PUBLIC WORKS PROJECTS

☐ Contractor or ☐ Subcontractor (Please check one) **ALL INFORMATION MUST BE COMPLETED**

CONTRACTOR ADDRESS	SUBCONTRACTOR ADDRESS	DEPARTMENT OF LABOR & INDUSTRY COMMONWEALTH OF PENNSYLVANIA BUREAU OF LABOR LAW COMPLIANCE PREVAILING WAGE DIVISION 7TH & FORSTER STREETS HARRISBURG, PA 17120 1-800-932-0665

PAYROLL NUMBER	WEEK ENDING DATE	PROJECT AND LOCATION Repairs to BC Bridge No. 263 and Bridge No. 353, Quakertown Borough (263) and East Rockhill Township (352) PROJECT SERIAL # PROJECT # 16-1151.045 16-1151.047

EMPLOYEE NAME	APPR. RATE (%)	WORK CLASSIFICATION	DAY AND DATE / HOURS WORKED EACH DAY	S-TIME O-TIME	BASE HOURLY RATE	TOTAL FRINGE BENEFITS (C=Cash) (FB=Contributions)*	TOTAL DEDUCTIONS	GROSS PAY FOR PREVAILING RATE JOB(S)	CHECK #
						C: FB:			
						C: FB:			
						C: FB:			
						C: FB:			
						C: FB:			

*SEE REVERSE SIDE

THE NOTARIZATION MUST BE COMPLETED ON FIRST AND LAST SUBMISSIONS ONLY. ALL OTHER INFORMATION MUST BE COMPLETED WEEKLY.

*FRINGE BENEFITS EXPLANATION (FB): Bona fide benefits contribution, except those required by Federal or State Law (unemployment tax, workers' compensation, income taxes, etc.)

Please specify the type of benefits provided and contributions per hour:

1) Medical or hospital care _____
2) Pension or retirement _____
3) Life insurance _____
4) Disability _____
5) Vacation, holiday _____
6) Other (please specify) _____

CERTIFIED STATEMENT OF COMPLIANCE

1. The undersigned, having executed a contract with _____
(AWARDING AGENCY, CONTRACTOR OR SUBCONTRACTOR)

_____ for the construction of the above-identified project, acknowledges that:

(a) The prevailing wage requirements and the predetermined rates are included in the aforesaid contract.

(b) Correction of any infractions of the aforesaid conditions is the contractor's or subcontractor's responsibility.

(c) It is the contractor's responsibility to include the Prevailing Wage requirements and the predetermined rates in any subcontract or lower tier subcontract for this project.

2. The undersigned certifies that:
   (a) Neither he nor his firm, nor any firm, corporation or partnership in which he or his firm has an interest is debarred by the Secretary of Labor and Industry pursuant to Section 11(e) of the PA Prevailing Wage Act, Act of August 15, 1961, P.L. 987 as amended, 43 P.S.§ 165-11(e).

   (b) No part of this contract has been or will be subcontracted to any subcontractor if such subcontractor or any firm, corporation or partnership in which such subcontractor has an interest is debarred pursuant to the aforementioned statute.

3. The undersigned certifies that:
   (a) the legal name and the business address of the contractor or subcontractor are: _____
   _____

   (b) The undersigned is: ☐ a single proprietorship ☐ a corporation organized in the state of _____
   ☐ a partnership ☐ other organization (describe) _____

   (c) The name, title and address of the owner, partners or officers of the contractor/subcontractor are:

NAME	TITLE	ADDRESS

The willful falsification of any of the above statements may subject the contractor to civil or criminal prosecution, provided in the PA Prevailing Wage Act of August 15, 1961, P.L. 987, as amended, August 9, 1963, 43 P.S. § 165.1 through 165.17.

_____ (DATE)

_____ (SIGNATURE)

_____ (TITLE)

_____ SEAL

Taken, sworn and subscribed before me this _____ Day of _____ A.D., _____

CONTRACTOR'S QUALIFICATION STATEMENT
(NOTE: Attach separate sheets as required.)

BUCKS COUNTY FREE LIBRARY HVAC REPLACEMENT

PERKASIE BRANCH LIBRARY

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

TO:

Submitted By: _____ Corporation: _____

Name: _____ Partnership: _____

Address: _____ Individual: _____

Principle Office: _____ Joint Venture: _____

Other: _____

1.0 How many years has your organization been in business as a contractor? _____

2.0 How many years has your organization been in business under its present business name?

_____

3.0 If a corporation, answer the following:

- 3.1 Date of incorporation: _____
- 3.2 State of incorporation: _____
- 3.3 President's name: _____
- 3.4 Vice President's name(s): _____
- 3.5 Secretary or Clerk's name: _____
- 3.6 Treasurer's name: _____
- 3.7 List name and address of all parties holding greater than ten percent (10%) interest in the corporation: _____

_____

_____

_____

4.0 If individual or partnership, answer the following:

- 4.1 Date of organization: _____
- 4.2 BUCKS COUNTY FREE LIBRARY Name and address of all Partners: (State whether general or limited partnership):

_____

_____

_____

_____

_____

_____

_____

_____

5.0 If other than corporation or partnership, describe organization and name principals:

_____

_____

_____

_____

_____

_____

6.0 We normally perform _____ % of the work with our own forces. List trades below:

_____

_____

_____

_____

7.0 Have you ever failed to complete any work awarded to you? If so, note when, and why.

_____

_____

_____

_____

_____

_____

8.0 Has any officer or partner of your organization ever been an officer or partner of another organization that failed to complete a construction project? If so, state circumstances.

_____

_____

_____

_____

_____

_____

9.0 List name of project, owner, architect, contract amount, percent complete and scheduled completion of the comparable construction projects your organization has in progress on this date:

_____

_____

_____

_____

_____

_____

10.0 List the names of project, owner, architect, contract amount, date of completion, percent of work with own forces of the projects your organization has completed in the past two (2) years which equal at least fifty percent (50%) of the total amount Bid for the project under consideration:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

11.0 List the construction experience of the principal individuals of your organization:

_____

_____

_____

_____

_____

_____

12.0 List the categories in which your organization is legally qualified to do business in Pennsylvania:

13.0 Trade References:

14.0 Bank References:

15.0 Name of Bonding Company and name and address of agent:

_____

_____

16.0 Dated at _____this _____ day of _____, 20__.

Name of Organization: _____

_____

_____

_____

By: _____

Title: _____

17.0 M_____, being duly sworn, deposes and says he/she is the _____ of Contractor(s), and answers to the foregoing questions and all statements herein contained are true and correct.

Subscribed and Sworn before me this _____day of _____, 20__.

Notary Public: _____

My Commission Expires: _____

GENERAL CONDITIONS

BUCKS COUNTY FREE LIBRARY HVAC REPLACEMENT

PERKASIE BRANCH LIBRARY

SPEC #2026PK-01

PERKASIE BRANCH LIBRARY
491 ARTHUR AVENUE
PERKASIE, PA 18944

1. "OWNER" DEFINED

Wherever the word "Owner" is used in these Specifications, it shall be understood to mean:

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

2. "ENGINEER" DEFINED

Wherever the word "Engineer" is used in these Specifications, it shall be understood to mean:

Holstein White Engineers
3800 Horizon Blvd., Suite 503
Trevose, PA 19053

3. "CONTRACTOR" DEFINED

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 Owner.

4. SPECIFICATIONS AND DRAWINGS -COMPREHENSIVE

All of the contemplated installation and each and every part thereof, shall be subject to all of the requirements throughout these specifications - which the Engineer may deem pertinent. All of the installations to be furnished and all of the work to be done by the Contractor shall strictly conform to these specifications, to the general and detailed drawings made for the work and forming part thereof, and to such further drawings as may be furnished to the Contractor by the Engineer at any time during the progress of the work and prior to its entire completion.

5. PRECEDENCE

The Drawings and Specifications are intended to be consistent with each other, but should there be any discrepancy, the Specifications shall take precedence. Technical specifications shall take precedence over general specifications or conditions. The Contractor shall closely examine the Specifications and Drawings prior to commencing work under this Agreement and shall inform the Engineer of discrepancies therein. Except in the case of apparent clerical error or inaccuracy, the figures and notes on the Drawings shall take precedence over measurements by scale. Should the Contractor observe any apparent discrepancy between any point, line or elevation and these Specifications or the Drawings, it shall be the duty of the Contractor to immediately report same to the Engineer.

6. SPECIFICATIONS AND DRAWINGS ON THE JOB

The Contractor or the representatives of the Contractor shall always have on hand on the job site a copy of the Specifications, Drawings, and approved shop drawings for ready reference of the Engineer.

7. SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

Within seven (7) days after the effective date of the Agreement, the Contractor shall submit for review a preliminary schedule of shop drawing submissions.

The Contractor shall review, approve and submit, with reasonable promptness and in such sequence as to cause no delay in the work of the constructor or any separate contractor, all Shop Drawings, Product Data and Samples required by the Contract Documents.

By approving and submitting Shop Drawings, Product Data and Samples, the Contractor represents that he has determined and verified all materials, field measurements, and field construction criteria related thereto, or will do so, and that he has checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

The Contractor shall not be relieved of responsibility for any deviation from the requirements of the Contract Documents by the Engineer's review of Shop Drawings, Product Data or Samples, unless the Contractor has specifically informed the Engineer in writing of such deviation at the time of submission and the Engineer has reviewed the specific deviation. The Contractor shall not be relieved from responsibility for errors or omissions in the Shop Drawings, Product Data or Samples by the Engineer's review thereof.

The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data or Samples, to revisions other than those requested by the Engineer on previous submittals.

No portion of the Work requiring submission of a Shop Drawing, Product Data or Sample shall be commenced until the submittal has been reviewed by the Engineer.

8. ENGINEER'S REVIEW

The review of the Engineer of drawings or other data furnished by the Contractor shall in no way relieve the Contractor from responsibility for the correctness thereof, or for the accurate and satisfactory execution of the Contract.

9. LOCATION

The entire installation during its progress shall be accurately located in plan and elevation as shown on the Drawings, or specified or as located, staked out, marked, or otherwise directed by the Engineer. When directed to do so by the Engineer, the Contractor shall provide and have at hand on the job site, all necessary stakes, straight edges, levels, chalk lines, sounding rods, augers, and all other implements and materials which the Engineer or his representative may desire to use in the location or measurement of the work by the Contractor and in making any tests thereof. The Contractor shall furnish such man or men as the Engineer or his representative may desire to assist in laying out or measuring up all or any portions of the work of the Contractor, and in making any tests thereof.

10. STAKES AND MARKS

The Contractor shall place distinct marks at or near all points where any and all buried or concealed appliances or fittings are located, or at such other points where it may be important to preserve or which might be difficult to find without such marks. Any stakes or other marks set by the Engineer, shall be under the care of the Contractor and if any stake or any mark shall be disturbed or removed, except when authorized by the Engineer, the cost of replacing the said stake or mark shall be paid by the Contractor.

11. LEGAL REQUIREMENTS

The Contractor shall conform to all general, state and local legal requirements having to do with the installation, and shall protect and defend the Owner against any claim for any accident or damage resulting from any violation thereof by the Contractor. The Contractor shall, without additional expense to the Owner, obtain all required licenses and permits.

12. LIENS

The Contractor, for itself, its subcontractors and all parties acting through or under it, covenants and agrees that no mechanics' claims or liens shall be filed or maintained by it, them or any of them against the work and the lot of ground appurtenant thereto for or on account of the work done or materials furnished by it, them or any of them, under this Contract or otherwise, for, towards, in or about the work; and the Contractor, for itself, its subcontractors, and others under it, hereby expressly waives and relinquishes the right to have, file or maintain any mechanics' liens or claim against the work, and the lot of ground appurtenant thereto, and further agrees that this waiver of the right of lien shall be an independent covenant and shall operate and be effective as well with respect to work and labor done and materials furnished under any supplemental Contract, verbal or written, or Contract for extra work, as to work and labor done and materials furnished under this Contract. Before the final payment is made to the Contractor, he shall, if required by the Owner, furnish the Owner with a complete Release of Liens, or other acceptable evidence that all payments have been made in full for all labor and materials used in the work. In case any lien, stop notice or claim for work, labor or materials done, performed, or delivered and used in the prosecution of the work herein provided for shall be filed (whether in strictly legal form or otherwise) then, in that case, the Owner may retain from any moneys due the Contractor a sum equal to the amount of said claim or notice, until such time as the Contractor shall furnish a receipt or release there from or thereof.

13. PATENT INFRINGEMENTS

The Contractor shall protect and defend the Owner against any claim for royalty, bonus, license or other expense or cost or damage, by reason of the introduction or use of any patented invention, arrangement or appliance, whether or not included in the requirements of these Specifications or shown on the Drawings herein referred to, which invention, arrangement or appliance may enter into or form part of the permanent work, or be used in connection with the construction thereof.

14. GENERAL RISKS

The Contractor shall assume all risks whatsoever as to all damages from the natural elements, fire, flood, trespass, and from any and all other causes, and shall protect accordingly all materials both before and after installation.

15. NON-INTERFERENCE

The Contractor shall, in such manner as the Engineer may require, so arrange the execution of the work as not to unnecessarily interfere with the execution of any other work which may be in progress or with the existing system. If any part of Contractor's work depends for proper execution or results upon the work of any such other contractor or utility owner (or Owner), Contractor shall inspect and promptly report to Engineer in writing any delays, defects or deficiencies in such work that render it unavailable or unsuitable for such proper execution and results. Contractor's failure so to report will constitute an acceptance of the work as fit and proper for integration with Contractor's work except for latent or non-apparent defects and deficiencies in the other work.

If Owner contracts with others for the performance of other work on the project at the site, the person or organization who will have authority and responsibility for coordination of the activities among the

various prime contractors will be identified herein and the specific matters to be covered by such authority and responsibility will be itemized, and the extent of such authority and responsibilities will be provided herein. Unless otherwise provided herein, neither Owner nor Engineer shall have any authority or responsibility in respect of such coordination.

16. STORAGE LOCATIONS

All materials delivered for the work, or excavated or otherwise disturbed, and which are not subject to immediate removal, shall be stored or placed where and as the Engineer may direct or approve, and so as to interfere as little as possible with public or other safety and convenience, and with the simultaneous prosecution of any other work.

17. TEMPORARY PASSAGEWAYS

The Contractor shall provide and maintain such safe and adequate temporary passageways as the Engineer or other authorities may direct or approve.

18. PROTECTION OF WORK AND PROPERTY

The Contractor shall provide adequate signs, lights, barricades and other devices necessary or appropriate to warn the public of the work being performed hereunder, and shall undertake such measures necessary to prevent any injury to the public or to the property of the Owner or others. The Contractor shall not interfere with or interrupt the Owner's current operations and shall coordinate with the Owner's employees in connection therewith. The Contractor shall protect existing facilities within and/or adjacent to his work.

19. PROTECTION OF THE PUBLIC

In all cases where any of the operations of the Contractor, including the temporary storage or placing the material, appliances or plant, might endanger travel or traffic on any public highway or any other thoroughfare, or persons, animals, and vehicles, sufficient barricades shall be placed and maintained during daylight. The area so affected shall be equipped with warning devices of the types, in the numbers, and at intervals required by all applicable laws and regulations.

20. NO TRESPASS

Before entering upon or in any way disturbing any public, corporation or private property, the Contractor shall give sufficient notice to the responsible official or to the Owner thereof, and shall conform to all of the reasonable requirements of such official or Owner.

21. THE PROPERTY OF THE OWNER

In obtaining free of charge and making use of any materials which the Owner may permit the Contractor to so obtain from the property of the Owner, by excavation or otherwise, the Contractor shall not only conform to all requirements herein but also to all of the wishes of the Owner.

22. PROTECTION OF THE SUSPENDED WORK

During all hours of the day and night when active work is suspended, including Sundays, the Contractor shall provide such watchmen, or take such other precautions as may be necessary to prevent injurious

trespass upon, and the entire safety of all of the materials and finished work, for the protection of all of which the Contractor shall be responsible until it is finally accepted.

23. REPAIR AND RESTORATION

The Contractor shall care for, repair, restore and make good any structure or surface or things on or in any private, corporation or public property, which may in any way be disturbed, injured, or destroyed by, or in consequence of, the work of the Contractor.

24. REFUSE MATERIAL AND FINISH

The Contractor shall promptly remove, during the progress of the work, to the satisfaction of the Engineer, all false works, rubbish, and waste materials which may accumulate on any private or public property on account of the work, and the whole work and its vicinity shall be neatly finished and made clean and tidy in every particular before it will be accepted by the Owner.

25. GENERAL RESPONSIBILITY OF CONTRACTOR

To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner and Engineer and their agents and employees from and against all claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from the performance of the work, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself) including the loss of use resulting there from, and (2) is caused in whole or in part by any negligent act or omission of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them or whether or not it is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this paragraph.

In any and all claims against the Owner or the Engineer or any of their agents or employees by any employee of the Contractor, any Subcontractor, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation under this paragraph shall not be limited in any way by any limitation on the amount or type of damages, compensation or benefits payable by or for the Contractor or any Subcontractor under workers' or workmen's compensation acts, disability benefits acts or other employee benefit acts.

26. MATERIALS, PLANT AND LABOR

The Contractor shall furnish all of the materials, in the rough or finished, of whatsoever kind, which may be required or desirable to completely execute the Contract. The Contractor shall furnish all of the tools, and other working plant and construction materials and appliances, of whatsoever kind, which may be required or desirable to completely execute the Contract. The Contractor shall furnish all of the skilled and other labor which may be required or desirable to completely execute the Contract.

27. SKILLED AND LOCAL LABOR

All work shall be done by tradesmen specialty skilled in the parts of the work to which they may be assigned.

In the employment of labor, the Contractor shall give a just preference to the residents of the general neighborhood of the proposed installations, but shall not be required to continue the employment of such local labor when more efficient labor can be obtained from elsewhere. This paragraph shall not alter or abridge the Contractor's responsibility to comply with federal, state or local laws or regulations concerning the employment of resident labor or affirmative action requirements or any authority.

28. INFORMATION NOT GUARANTEED

All information relating to existing subsurface structures and/or underground facilities, pipes or other utilities is from the best sources at present available to the Owner and the Engineer. All such information and the drawings of existing construction are furnished only for the information and convenience of Contractors.

It is agreed and understood that the Owner and the Engineer do not warrant or guarantee that the subsurface structures and/or underground facilities, pipes or other utilities encountered during construction will be the same as those indicated by the information given on the Drawings or in the Specifications.

The Contractor is responsible for ascertaining the character, location, quantities, and conditions of the various materials and the work to be done. Test pits to locate utilities may be dug at the Contractor's discretion and at the Contractor's expense.

It is further agreed and understood that the Contractor will not use any of the information made available to him or obtained in any examination made by him in any manner as a basis or ground of claim or demand of any nature, against the Owner or the Engineer, arising from or by reason of any variance which may exist between the information offered and the actual materials or structures encountered during the construction work, except as may otherwise be provided for in the Contract Documents.

The Contractor shall notify the Engineer of any and all variances from the Drawings which are discovered from test pits which the Contractor chooses to dig.

29. HAULING

The Contractor shall furnish all vehicles, and drivers and other helpers which may be required for all transportation incidental to the entire work, and the Contractor shall make any roadways which may be required, and shall restore the lines of said roadways to their original condition, upon the completion of the work.

30. REJECTION OF MATERIALS OR WORKMANSHIP

All materials and workmanship may be rejected by the Engineer if, in his opinion, they do not conform, in general and in detail, to these specifications and to the drawings, or to any drawings, descriptions and samples which the Contractor may furnish, when bidding or thereafter.

31. ORDER OF EXECUTION

All of the materials shall be delivered, and all of the different parts of the work shall be executed, at the time and in the order and sequence which may be designated or approved by the Engineer.

32. CONTRACTOR TO PROMPTLY UNLOAD AND CARE FOR SHIPMENTS

As soon as any shipment, which the Contractor is required to unload, arrives at the railroad station, or elsewhere, it shall be under the care of the Contractor, who shall henceforward be responsible for its safety, and who shall be liable for any demurrage or other costs on account of failure to immediately remove from the railroad station, or other point of delivery, any shipments which may be acceptable under these Specifications.

33. EMERGENCY WORK

Should any emergency occur, which, in the opinion of the Engineer, should demand it, the execution of the Contract shall be prosecuted with extraordinary vigor, additional shifts of men shall be employed, and the work shall be accelerated as the Engineer shall require. If such acceleration causes an increase in the Contractor's cost of performance of this work the Contractor may request a Change Order in accordance with the "Changes Clause" of the Contract.

34. IN CASE OF TARDINESS

Upon the refusal, neglect or failure of the Contractor to deliver any portion of the material, or to do or complete any part of the work, when, within the time named in the Contract, the Engineer shall order the same to be delivered or completed, the Engineer may order such portion or portions of the material elsewhere, and employ such labor as he may require to do the said work, and charge the cost thereof to the account of the Contractor.

35. MATERIALS AND WORKMANSHIP

All materials, patterns, shapes, dimensions, workmanship, methods and finish, in general and in detail, shall be such as shall be ordered or approved by the Engineer, and the Engineer shall be the sole and final judge of the quality and fitness thereof.

36. INSPECTIONS AND TESTS

Contractor shall give Engineer timely notice or readiness of the work for all required inspections, tests or approvals. If laws or regulations of any public body having jurisdiction require any work (or part thereof) to specifically be inspected, tested or approved, Contractor shall assume full responsibility therefore, pay all costs in connection therewith, and furnish Engineer the required certificates of inspection, testing or approval. Contractor shall also be responsible for and shall pay all costs in connection with any inspection or testing required in connection with Owner's or Engineer's acceptance of a supplier of materials or equipment proposed to be incorporated in the work, or of materials or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the work. All inspections, tests, or approvals other than those required by laws or regulations of any public body having jurisdiction shall be performed by organizations acceptable to Owner and Contractor (or by Engineer if so specified).

If any work (including the work of others) that is to be inspected, tested or approved is covered without written concurrence it must, if requested by the Engineer, be uncovered for observation. Such uncovering shall be at Contractor's expense unless Contractor has given the Engineer timely notice of Contractor's intention to cover the same and the Engineer has not acted with reasonable promptness in response to such notice.

If Engineer considers it necessary or advisable that covered work be observed by the Engineer or inspected or tested by others, the Contractor, at the Engineer's request, shall uncover, expose or otherwise make available for inspection or testing as Engineer may require, that portion of the work in question, furnishing all necessary labor, material and equipment. If it is found that such work is defective, the Contractor shall bear all direct, indirect and consequential costs of such uncovering, exposure, observation, inspection and testing and of satisfactory reconstruction (including, but not limited to fees and charges of engineers, architects, attorneys and other professionals), and Owner shall be entitled to an appropriate decrease in the contract price. If, however, such work is not found to be defective, the Contractor shall be allowed an increase in the contract price or an extension of the contract completion time, or both, directly attributable to such uncovering, exposure, observation, inspection, testing and reconstruction.

The Engineer, or his representative, shall be afforded all opportunities, and all convenient facilities that may be requested to inspect and test all materials and appliances, in the shops, on the ground, or elsewhere, and the Contractor shall subject each and all of the installations to such tests as shall satisfy the Engineer that all of these specifications have been complied with, before the installations shall be eligible for final acceptance. Any or all such inspections or tests shall be for the sole benefit of the Owner and shall be for the purpose of ascertaining whether the work complies with Contract requirements as set forth herein. Such observations shall not create or constitute a duty on the part of the Engineer to the Contractor, its agents, employees or guests to perform such observations. The Contractor shall at all times be solely responsible for compliance with job safety requirements as set forth herein.

37. INSPECTION NOT ACCEPTANCE

No materials or workmanship will be considered as accepted, which may be found to be defective in manufacture, construction or execution, or deficient in any of the requirements of these specifications, in consequence of any negligence of any inspector or subordinate engineer to point out said defect or deficiency, during or subsequent to manufacture, and during the entire progress of the work; and the Contractor will be required to correct any imperfect work, remedy, and make good or replace any defective material, whenever discovered, before the final acceptance of the work and before the release of the Surety of the Contractor.

38. CONTRACTOR TO PAY FOR REPAIRS

All materials used and all plant and labor furnished for the replacing or making good of any defective materials or workmanship shall be at the expense of the Contractor, with no extra allowance therefore by the Owner.

39. REMOVAL AND REPLACEMENT OF DEFECTNE MATERIAL

Should the Contractor fail to promptly make good, to the satisfaction of the Engineer, any defect, or fail to remove from the work any material which the Engineer shall pronounce imperfect, the Engineer may employ workmen to remedy such defect or to remove such materials, and may order such other material elsewhere as may be required to replace that which is removed, and the cost of all such labor and material shall be charged to the account of the Contractor.

40. CONTRACTOR RESPONSIBILITY FOR EMPLOYEES

The Contractor shall at all times enforce strict discipline and good order among his employees, and shall not employ any unfit person or anyone not skilled in the task assigned to him.

41. ONE YEAR'S RESPONSIBILITY

It shall be understood that the Contractor agrees to furnish such material and appliances, and to construct the whole work in such substantial and workmanlike manner that it shall be continuously stable and efficient, and the Contractor shall promptly make good, or replace, any or all parts of the materials or installation, including all details, which may be found to be unstable or defective in any particular, ordinary wear and tear excepted, for a period of guarantee of one (1) year after the whole installation has been entirely completed, tested and accepted by the Owner.

42. ONE YEAR'S RESPONSIBILITY NOTWITHSTANDING INSPECTION

The acceptance, after inspection by the Engineer, or his representative, of any portion of the work or material, shall be subject to its freedom from the exhibition of any inherent or developed defect, or any failure to conform to these Specifications, between the time of its acceptance, and the expiration of the above-named period of one (1) year.

43. ONE YEAR'S RESPONSIBILITY FOR DIMENSIONS

The acceptance by the Engineer of any of the dimensions proposed by the Contractor shall always be understood to be with the proviso, whether stated at the time of acceptance or not, that the said dimensions shall be proved to be adequate and proper at all times until the expiration of the above-named period of one (1) year.

44. EXCELLENCE OF WHOLE -WHETHER OR NOT HEREIN SPECIFIED

It is understood that these Specifications are intended to provide that all necessary and desirable materials and appliances shall be furnished by the Contractor, and that all of the same shall be of the best quality and kind, and that the whole work shall be done and entirely completed in a workmanlike and satisfactory manner, in all details, whether herein particularly specified or not.

45. EXTRA WORK

No claim shall be allowed, and no bill shall be paid for any extra work, unless said extra work shall have been done by special written agreement with the Owner entered into prior to the commencement of said work.

If prices for such extra work are not included in the unit price bid, the Contractor shall agree to furnish the necessary materials and perform such labor as extra work, and shall agree to accept in full payment therefore the actual field cost of the material and labor plus fifteen (15) percent.

46. SUBLETTING OF WORK

Assignment or subletting of the furnishing of any materials or of the execution of any part of the work shall be subject to approval by the Engineer. Unauthorized assignment or subletting of any or all the Contract by the Contractor shall constitute a material breach of this Contract.

47. AUTHORITY OF ENGINEER'S ASSISTANTS

In the absence of the Engineer, any person whom he may designate as having charge of the work, or any part thereof, shall have and exercise all the powers of the said Engineer in all matters relating to the execution of the work herein specified, and the orders of said person shall be fully observed and obeyed.

48. TERMS OF PAYMENT FOR MACHINERY UNITS

The Contractor shall receive payment in three installments of the contract price for furnishing and installing any machinery, as follows:

A. Thirty-five (35) percent thereof upon delivery of all of the machinery at the construction site.

B. Thirty-five (35) percent thereof when the erection, setting and connections thereof shall be entirely completed and the whole installation be finished in every particular.

C. Thirty (30) percent thereof when the whole installation shall have been tested and is in successful operation and is ready, as herein required, for approval and acceptance by the Engineer and by the Owner.

The term machinery shall be defined for this article as meaning any equipment with rotating or reciprocating parts.

49. MONTHLY ESTIMATE

Unless otherwise expressly provided in the Contract, monthly payment will be made for all work and materials other than machinery, by the Owner to the Contractor, during the progress of the installation according to the following:

B. Up to fifty (50) percent completion - Ninety (90) percent of the contract value rendered by the Contractor to the Owner.

B. Fifty (50) percent completion to beneficial occupancy - Ninety-five (95) percent of the contract value rendered by the Contractor to the Owner.

Value rendered shall be determined by monthly estimates made by the Contractor and approved by the Engineer and Owner. Increasing the percentage paid at the 50% completion point will be subject to the Engineer's determination of satisfactory and diligent performance by the Contractor.

NOTE: Applications for Payment shall be submitted for review. Sample document provided in these Specifications is for reference purposes only.

When the Contract provides for the furnishing of materials only, the said estimates shall be based upon the quantity thereof which has been delivered during the preceding month.

When the Contract provides for the furnishing of labor and the furnishing and installation of materials, the said monthly estimates shall be based upon the amount of labor performed and the quantity of materials delivered to the job site (including transportation costs) during the preceding month.

50. FINAL ESTIMATES

The balance will be paid by the Owner to the Contractor upon the satisfactory completion of the Contract obligation, the filing with the Owner by the Contractor of such satisfactory Release of Liens, or other assurance as is provided for in the following paragraph, and the approval and acceptance of all materials and work contracted for, by the Engineer and by the Owner.

51. RELEASE OF LIENS

Before the work shall be finally accepted and final payment be made, the Contractor shall furnish the Owner with a complete Release of Liens, or with such other evidence as shall be entirely satisfactory to the Owner that the finished work, including all materials therein incorporated and thereunto appertaining is, and will be, entirely free from any then present or future liens or claims.

52. SPECIFICATIONS NOT PROHIBITIVE

These Specifications are issued to bidders as a guide as to what is to be required, and it is not intended to ignore manufacturers' standards and patterns, and should any bidder wish to submit a proposal for an equivalent installation, other than that generally contemplated herein, which will be guaranteed under all of the general conditions and requirements herein specified, such a proposal will receive due consideration. The Contractor shall submit manufacturer's data, etc., as required by the Engineer to permit a thorough evaluation of the proposed equivalent installation.

53. CHANGES CLAUSE

The Owner may, at any time, by written order, and without notice to the sureties, make changes in the general scope of this Contract. If such changes cause an increase or decrease in the Contractor's cost of, or time required for, performance of the Contract, an adjustment shall be made and the Contract

modified in writing accordingly. No claim by the Contractor for payment on account of any extra work shall be enforceable unless such extra work is covered by a written order signed by a duly-authorized representative of the Owner. However, nothing in this Contract shall be construed to excuse the Contractor from executing the Contract as amended.

54. TIME EXTENSIONS

The Contractor may at any time during the performance of the contract request in writing an extension of time in performance based upon delays caused by factors beyond the control of the Contractor, such factors include labor stoppages (strikes), acts of God (natural disasters, unusually unseasonable weather), delays in delivery of materials caused by factors beyond the control of material suppliers and manufacturers. Written notice of expected delay and explanation therefore shall be made within ten (10) calendar days from the time the contractor is aware of the cause for delay, even though the expected duration or effect of delay is not yet known. As soon as possible after the impact of the delay is determined, the Contractor will submit in writing a request for extension of time for a specific number of calendar days with fully substantiated justification therefore. Such a request may entitle the Contractor to an extension of time as recommended by the Engineer and as agreed to in writing by the Owner. Time extensions granted under these provisions are solely to relieve the Contractor's liability for liquidated damages, and will not justify an increase in the cost of the work.

55. NO DAMAGES FOR DELAY

The Contractor shall not be entitled to any claim for damages on account of hindrances or delays in performance of this contract from any cause whatsoever, including acts or failures to act on the part of the Owner or Engineer or their agents, employees or servants. The Contractor acknowledges and agrees that its sole remedy for any such delay in performance shall be an extension of contract completion time in accordance with the terms of Article 54, TIME EXTENSIONS.

56. TERMINATION BY OWNER FOR CAUSE

Without prejudice to any other legal or equitable right to remedy which it would otherwise possess hereunder, or as a matter of law, the Owner shall be entitled, by giving the Contractor five (5) days prior written notice, to terminate this Contract in its entirety at any time:

A. if the Contractor shall fail to prosecute the work, or any part thereof, with the diligence necessary to insure its progress and completion as set forth in this contract and addenda or change orders thereto, and shall fail to take such steps to remedy such default within ten (10) days after written notice thereof from Owner as Owner shall direct; or,

B. if the Contractor shall commit a substantial default under any of the terms, provisions, conditions or covenants contained in this contract and shall fail to take such steps to remedy such default within ten (10) days after written notice thereof from the Owner as Owner shall direct.

57. TERMINATION FOR OWNER'S CONVENIENCE

The performance of the work may be terminated at any time in whole or from time to time in part, by the Owner for its convenience. Any such termination shall be affected by delivery to the Contractor of a written notice ("Notice of Termination") specifying the extent to which performance of the work is terminated and the date upon which termination becomes effective. After receipt of a Notice of Termination, and except as otherwise directed by the Owner, the Contractor shall, in good faith, and to the best of its ability, do all things necessary, in light of such notice and of such requests in implementation thereof as the Owner may make to assure the efficient, proper closeout of the terminated work (including the protection of Owner's property).

Among other things, the Contractor shall, except as otherwise directed or approved by the Owner:

A. stop the work on the date and to the extent specified in the Notice of Termination;

B. place no further orders or subcontracts for services, equipment or materials except as may be necessary for completion of such portion of the work as is not terminated;

C. terminate all orders and subcontracts to the extent they relate to the performance of work terminated by the Notice of Termination;

D. assign to Owner, in the manner and to the extent directed by it, all of the right, title and interest of the Contractor under the orders of subcontracts so terminated, in which case the Owner shall have the right to settle or pay any or all claims arising out of the termination of such orders and subcontracts;

E. with the approval of the Owner, settle all outstanding liabilities and all claims arising out of such termination or orders and subcontracts; and

F. deliver to the Owner, when and as directed by the Owner, all documents and all property which, if the work had been completed, the Contractor would be required to account for or deliver to the Owner, and transfer title to such property to the Owner to the extent not already transferred.

In the event of such termination, there shall be a reduction of the amount of this Contract to reflect the reduction in the work. No cost incurred after the effective date of the Notice of Termination shall be treated as a reimbursable cost unless it relates to carrying out the unterminated portion of the work or taking closeout measures.

58. WORKER'S COMPENSATION INSURANCE

The Contractor shall carry Worker's Compensation Insurance during the life of the Contract to insure his statutory liability to his employees in the State of Pennsylvania. Coverage shall include employer's liability at minimum limits as stated in the Supplemental Conditions.

59. COMPREHENSIVE GENERAL LIABILITY INSURANCE

The Contractor shall carry the Comprehensive Form of Commercial General Liability Insurance during the life of the Contract covering the risks itemized in the form of "Certificate of Insurance" provided for in this Contract. The limits shall be as stated in the Supplemental Conditions. The Certificate of Insurance shall include coverage for, but not limited to, explosion, collapse and underground hazards. Comprehensive General Liability Insurance shall be written on an "occurrence" basis. Claims made will not be accepted. The Contractor shall carry a general umbrella liability as shown in the Supplemental Conditions. The umbrella coverage shall include Commercial General Liability, Automobile Liability and Employer's Liability. Policies shall be written in the name of the Contractor, Owner and Engineer "as their respective interests may appear." The policies shall provide coverage against any loss caused by the negligence of the Owner, its officers, employers and agents, except where the loss is caused by the sole negligence of the Owner or its aforesaid representatives.

60. COMPREHENSIVE AUTOMOBILE LIABILITY INSURANCE

The Contractor shall carry the Comprehensive Form of Automobile Liability Insurance during the life of the Contract covering the risks itemized in the form of "Certificate of insurance" provided for in this Contract. The limits shall be as stated in the Supplemental Conditions and shall be combined single limit with symbol for any automobile including hired and non-owned.

61. UNEMPLOYMENT INSURANCE

The Contractor hereby agrees to accept exclusive liability for and shall hold the Owner harmless for all payroll taxes for contributions to unemployment insurance, old age pensions, or annuities, as measured by wages, salaries or other remuneration paid to employees of said Contractor.

62. BUILDER'S RISK INSURANCE

The Contractor shall insure the structures and improvements against loss or damage by Builders Risk Insurance using "all risk" form or "special form" of coverage during the progress of the work, and until final acceptance of the work by the Owner. Such insurance shall be written in completed value form for 100% of the completed value of the Contract including stored materials connected therewith, with the amount to be certified to the Contractor by the Engineer.

63. CERTIFICATE OF INSURANCE

All policies will be subject to the approval of the Owner and Engineer.

Certificates of Insurance must be executed in quintuplicate and submitted to the Engineer prior to the execution of the Agreement. Certificates of Insurance will be required of all subcontractors documenting Worker's Compensation Insurance coverage prior to performance of work on the site by subcontractors. Prime Contractors are responsible to make sure all subcontractors have adequate General Liability Insurance. The Owner shall be the certificate holder of all Certificates of Insurance and all Certificates of Insurance shall name the Owner and Engineer as named insured or additional insured. Each certificate shall contain therein or have contained in a rider attached thereto and made a part thereof, a clause to the effect that the insurer will notify the Owner in writing thirty (30) days prior to cancellation of the policy.

The Surety on all bonds and insurance shall be rated "A" or better by A.M. Best Co. and shall be licensed to conduct business in the Commonwealth of Pennsylvania.

64. SITE ACCESSIBILITY

The Contractor must provide that the representatives of the Owner, Federal Government and the State will have access to the work wherever it is in preparation or progress and that the Contractor will provide proper facilities for such access and inspection.

65. UTILITY SERVICES

Except as otherwise provided for in the specifications, reasonable amounts of water and electricity will be made available if practicable, to the Contractor from existing system outlets on the property of the Owner. Provision of all other utility requirements, including sanitary facilities, shall be the responsibility of the Contractor. If temporary service connections are necessary, they shall be the responsibility of the Contractor.

66. DOMESTIC CONSTRUCTION MATERIALS

In obtaining materials for the execution of this Contract, preference shall be given to domestic construction material by the Contractor, subcontractors, materialmen and suppliers. An unmanufactured material shall be construed as a domestic construction material if it has been mined or produced in the United States. A manufactured construction material shall be construed as a domestic construction material if it has been manufactured in the United States substantially from articles, materials or supplies mined, produced or manufactured in the United States.

In accordance with the Buy American provision in Public Law 95-217 (section 215 of public Law 92- 500 as amended) regulations and guidelines, the Contractor agrees that preference will be given to domestic construction material by the Contractor, subcontractor, materialmen, and suppliers in the performance of this Contract.

The Owner may waive the Buy American provision based upon those factors that are deemed relevant:

A. Such use is not in the public interest or the cost is unreasonable.

B. The available resources of the project are not sufficient to implement this provision.

C. The articles, materials, or supplies of the class or kind to be used or the articles, materials, or supplies from which they are manufactured are not mined, produced, or manufactured, as the case may be, in the United States in sufficient and reasonably available commercial quantities and of a satisfactory quality for the particular project.

The amount of cost differential by which domestic construction material may be given preference shall generally be the sum determined by computing; up to six percent of the bid or offered price of materials of foreign origin including all cost of delivery to the construction site, including any applicable duty, whether or not accessed. Computations will normally be based on costs on the date of opening of bids or proposals.

67. STEEL PRODUCTS PROCUREMENT ACT

The Contractor shall comply with the Steel Product Procurement Act, Pennsylvania Act No. 3, 1978, including any revisions. Only steel products as defined below shall be used in performance of this Contract.

Steel products shall be defined as products rolled, formed, shaped, drawn, extruded, forged, coast, fabricated or otherwise similarly processed, or processed by a combination of two or more operations from steel made in the United States by the open hearth, basic oxygen, electric furnace, Bessemer or other steel making process.

68. LABOR EMPLOYMENT REQUIREMENTS

Contractor and all subcontractors shall observe and comply with all Federal and State laws and local ordinances that affect those engaged or employed on the project; they shall note carefully, specific legal requirements as follows, relative to the employment of all labor and mechanics required in the execution of the work on this Program.

A. Non-Discrimination - No Contractor, subcontractor, nor any persons acting on behalf of such contractor shall by reason of age, sex, race, creed or color, discriminate against any citizen of the Commonwealth of Pennsylvania who is qualified and available to perform the work to which the Program relates. No Contractor, subcontractor nor any person on his behalf, shall in any manner discriminate against or intimidate any employee hired for the performance of work under this Contract on account of age, sex, race, creed, or color.

B. Affirmative Action

(I)) The Contractor shall take Affirmative Action to ensure that applicants are employed, and that employees are treated during employment without regard to their age, race, color, religion, sex, or national origin. Such action shall include, but not be limited to the following: employment, upgrading, demotion or transfer: recruitment or recruitment advertising: layoff or termination, rates of pay or other forms of compensation: and

selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notice to be provided by the Contracting Officer setting forth the provisions of this non-discrimination clause.

(2) The Contractor agrees to hire local disadvantaged youth to perform unskilled tasks wherever possible. The Contractor will provide constant supervision and training so as to enable training participants to be upgraded from unskilled to skilled in all cases where there is a positive reaction to said training.

(3) The Contractor shall comply with Federal and State Equal Opportunity Construction Contract Regulations (Executive Order 11246) in all respects. Contractors attention is specifically drawn to the equal opportunity clause and the goals and time tables for minority and female participation set forth in the rules and regulations of the Department of Labor relative there to CER 60-41.

(4) This Contract may be canceled or terminated by the Owner and all money due or become due hereunder, shall be forfeited for a second or any subsequent violation of the terms or conditions of this portion of the Contract.

69. RE-USE OF DOCUMENTS

Neither Contractor nor any subcontractor or supplier or other person or organization performing or furnishing any of the work under a direct or indirect contract with Owner shall have or acquire any title to or ownership rights in any of the Drawings, Specifications or other documents (or copies of any thereof) prepared by or bearing the seal of Engineer; and they shall not re-use any of them on extensions of the project or any other project without written consent of Owner and Engineer, and specific written verification or adaptation by Engineer.

70. REQUIREMENTS OF PREVAILING WAGE ACT

The Contractor shall pay no less than the minimum wage rates determined by Secretary of Labor and Industry and attached herein, and shall comply with all conditions of the Pennsylvania Prevailing Wage Act 442 and as amended by Act 342, all Regulations issued pursuant thereto. These requirements shall be included in all sub contractual relations of the Contractor.

Each contractor and each subcontractor shall file a statement each week and a final statement at the conclusion of the work on the Contract with the contracting agency, under oath, and in form satisfactory to the Secretary, certifying that all workmen have been paid wages in strict conformity with the provisions if any wages remain unpaid to set for the amount of wages due and owing to each workman respectively.

Before final payment is made, the Contractor must submit final wage certifications from all contractors and subcontractors.
If notified by Secretary of Labor and Industry of the filing of wage claims by workmen, the Owner shall withhold from the monies due to the Contractor or subcontractor sufficient funds to pay all claims determined to be valid and when so directed by the Secretary of Labor and Industry, shall pay these monies directly to the workmen.

71. SUBSTANTIAL COMPLETION

Substantial Completion means that point at which the construction of the project is sufficiently completed, in the opinion of the Engineer and in accordance with the Contract Documents, so that the project, or specified part, can be utilized for the purposes for which it was intended.

Prior to final payment, Contractor may, in writing to Owner and Engineer, certify that the entire project or part thereof is Substantially Complete and request that Engineer issue a notice of Substantial Completion. Within a reasonable time thereafter, Owner, Contractor and Engineer shall make an inspection of the project to determine the status of completion. If Engineer does not consider the project substantially complete, he will notify Contractor in writing giving his reasons therefore. If Engineer considers the project substantially complete, he will prepare and deliver to the Owner a tentative notice of Substantial Completion which shall fix the date of Substantial Completion and the responsibilities between Owner and Contractor for maintenance, heat and utilities. There shall be attached to the notice a tentative list of items to be completed or corrected before final payment, and the notice shall fix the time within which such items shall be completed or corrected, said time to be within the contract completion time. Owner shall have seven (7) days after receipt of the tentative notice during which he may take written objection to Engineer as to any provisions of the notice or attached list. If, after considering such objections, Engineer concludes that the project is not Substantially Complete, he will within fourteen (14) days after submission of the tentative notice to Owner notify Contractor in writing stating his reasons therefore. If after consideration of Owner's objections, Engineer considers the project substantially complete, he will within said fourteen (14) days execute and deliver to Owner and Contractor a definitive notice of Substantial Completion (with a revised punch list of items to be completed or corrected) reflecting such changes from the tentative notice as he believes justified after consideration of any objections from Owner. Owner shall have the right to exclude Contractor from the project after the date of Substantial Completion, but Owner shall allow Contractor reasonable access to complete or correct items on the punch list.

Prior to final payment, Owner may request Contractor in writing to permit Owner to use a specified part of the project which he believes he may use without significant interference with construction of the other parts of the project. If Contractor agrees, he will certify to Owner and Engineer that said part of the project is Substantially Complete and request Engineer to issue a notice of Substantial Completion for that part of the project. Within a reasonable time thereafter Owner, Contractor, and Engineer shall make an inspection of that part of the project to determine its status of completion. If Engineer does not consider that it is Substantially Complete, he will notify Owner and Contractor in writing giving his reasons therefore. If Engineer, Owner and Contractor consider that part of the project to be Substantially Complete, the Engineer will execute and deliver to Owner and Contractor a notice to that effect, fixing the date of Substantial Completion as to that part of the project, attaching thereto a tentative list of items to be completed or corrected before final payment and fixing the responsibility between Owner and Contractor for maintenance, heat and utilities as to that part of the project. Owner shall have the right to exclude Contractor from any part of the project which Engineer has so ce1iified to be Substantially Complete, but Owner shall allow Contractor reasonable access to complete or correct items on the tentative list.

END OF GENERAL CONDITIONS

BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES

Project Name:	Bucks County Free Library/Perkasie Branch HVAC Replacement
General Description:	a. Demolish and removal of one (1) existing packaged rooftop unit (on grade) and one (1) 200 amp. duct mounted heater and all its associated controls. b. Installation of one (10 new packaged rooftop unit with electric heat (on grade) and new thermostat. c. New Exterior ductwork to connect to the existing supply and return mains including all connections, supports and insulation. d. Modification to the (1) split systems condensate and refrigerate piping. e. Test and certify equipment per specifications and manufacturer requirements and provide reports of such testing.
Project Locality	Perkasie Borough
Awarding Agency:	Bucks County Free Library
Contract Award Date:	8/15/2026
Serial Number:	26-05831
Project Classification:	Building
Determination Date:	6/17/2026
Assigned Field Office:	Philadelphia
Field Office Phone Number:	(215)560-1858
Toll Free Phone Number:	
Project County:	Bucks County

BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES

Project: 26-05831 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Asbestos & Insulation Workers	5/1/2025		$60.84	$48.71	$109.55
Asbestos & Insulation Workers	5/1/2026		$64.51	$50.26	$114.77
Boilermaker (Commercial, Institutional, and Minor Repair Work)	3/1/2024		$36.71	$19.13	$55.84
Boilermaker (Commercial, Institutional, and Minor Repair Work)	3/1/2026		$41.34	$19.23	$60.57
Boilermakers	1/1/2024		$52.10	$35.72	$87.82
Boilermakers	1/1/2026		$58.00	$36.57	$94.57
Bricklayer	5/1/2025		$50.00	$32.57	$82.57
Bricklayer	5/1/2026		$51.15	$34.92	$86.07
Carpenter - Chief of Party (Surveying & Layout)	5/1/2025		$54.59	$29.02	$83.61
Carpenter - Instrument Person (Surveying & Layout)	5/1/2025		$47.47	$29.02	$76.49
Carpenter - Rodman (Surveying & Layout)	5/1/2025		$23.74	$20.62	$44.36
Carpenters	5/1/2025		$47.47	$29.02	$76.49
Carpenters	5/1/2026		$48.55	$30.39	$78.94
Carpenters	5/1/2027		$50.46	$30.74	$81.20
Carpenters	5/1/2028		$52.43	$31.09	$83.52
Carpenters	5/1/2029		$54.46	$31.44	$85.90
Carpenters	5/1/2030		$56.55	$31.79	$88.34
Cement Masons	5/1/2024		$46.70	$32.46	$79.16
Cement Masons	5/1/2025		$48.70	$32.46	$81.16
Dockbuilder, Pile Drivers	5/1/2025		$55.23	$37.99	$93.22
Dockbuilder, Pile Drivers	5/1/2026		$56.98	$37.99	$94.97
Dockbuilder/Pile Driver Diver	5/1/2025		$64.35	$41.74	$106.09
Dockbuilder/Pile Driver Diver	5/1/2026		$66.54	$41.74	$108.28
Dockbuilder/pile driver tender	5/1/2025		$55.23	$37.99	$93.22
Dockbuilder/pile driver tender	5/1/2026		$56.98	$37.99	$94.97
Drywall Finisher	5/1/2025		$40.14	$32.35	$72.49
Drywall Finisher	5/1/2026		$41.10	$32.99	$74.09
Electricians	5/1/2025		$70.97	$47.27	$118.24
Electricians	5/4/2026		$75.05	$48.19	$123.24
Electricians	5/3/2027		$78.33	$51.16	$129.49
Electricians	5/1/2028		$81.99	$54.00	$135.99
Elevator Constructor	1/1/2025		$71.85	$45.77	$117.62
Elevator Constructor	1/1/2026		$74.86	$46.86	$121.72
Floor Coverer	5/1/2025		$51.67	$31.69	$83.36
Floor Coverer	5/1/2026		$52.84	$32.86	$85.70
Glazier	5/1/2024		$48.00	$37.50	$85.50
Glazier	5/1/2025		$49.96	$38.34	$88.30
Glazier	5/1/2026		$51.30	$39.37	$90.67
Interior Finish	5/1/2023		$34.60	$25.80	$60.40
Iron Workers (Bridge, Structural, Ornamental, Precast)	7/1/2024		$53.20	$45.01	$98.21
Iron Workers (Riggers)	7/1/2024		$44.64	$34.39	$79.03
Iron Workers (Riggers)	7/1/2025		$44.77	$36.27	$81.04
Iron Workers (Rodman/Reinforcing)	7/1/2024		$47.70	$34.77	$82.47

BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES

Project: 26-05831 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Iron Workers (Rodman/Reinforcing)	7/1/2025		$47.80	$36.65	$84.45
Laborers (Class 01 - See notes)	5/1/2025		$37.25	$26.10	$63.35
Laborers (Class 02 - See notes)	5/1/2025		$41.00	$27.70	$68.70
Laborers (Class 03 - See notes)	5/1/2025		$37.67	$26.28	$63.95
Laborers (Class 04 - See notes)	5/1/2025		$37.67	$26.28	$63.95
Laborers (Class 05 - See notes)	5/1/2025		$37.25	$26.10	$63.35
Landscape Laborer	5/1/2024		$30.70	$24.23	$54.93
Landscape Laborer	5/1/2025		$32.15	$24.30	$56.45
Marble Finisher	5/1/2025		$41.17	$30.75	$71.92
Marble Finisher	5/1/2026		$42.07	$31.85	$73.92
Marble Mason	5/1/2023		$47.20	$31.95	$79.15
Marble Setter	5/1/2026		$51.50	$33.80	$85.30
Mason Tender, Cement	5/1/2023		$35.02	$25.98	$61.00
Millwright	5/1/2025		$57.39	$35.81	$93.20
Millwright	5/1/2026		$60.20	$35.81	$96.01
Operators (Building, Class 01 - See Notes)	5/1/2025		$54.52	$34.49	$89.01
Operators (Building, Class 01 - See Notes)	5/1/2026		$55.67	$35.34	$91.01
Operators (Building, Class 01A - See Notes)	5/1/2025		$57.52	$35.38	$92.90
Operators (Building, Class 01A - See Notes)	5/1/2026		$58.68	$36.22	$94.90
Operators (Building, Class 02 - See Notes)	5/1/2025		$54.27	$34.42	$88.69
Operators (Building, Class 02 - See Notes)	5/1/2026		$55.43	$35.26	$90.69
Operators (Building, Class 02A - See Notes)	5/1/2025		$57.29	$35.29	$92.58
Operators (Building, Class 02A - See Notes)	5/1/2026		$58.44	$36.14	$94.58
Operators (Building, Class 03 - See Notes)	5/1/2025		$50.18	$33.22	$83.40
Operators (Building, Class 03 - See Notes)	5/1/2026		$51.34	$34.06	$85.40
Operators (Building, Class 04 - See Notes)	5/1/2025		$49.88	$33.13	$83.01
Operators (Building, Class 04 - See Notes)	5/1/2026		$51.04	$33.97	$85.01
Operators (Building, Class 05 - See Notes)	5/1/2025		$48.16	$32.62	$80.78
Operators (Building, Class 05 - See Notes)	5/1/2026		$49.32	$33.46	$82.78
Operators (Building, Class 06 - See Notes)	5/1/2025		$47.17	$32.33	$79.50
Operators (Building, Class 06 - See Notes)	5/1/2026		$48.34	$33.16	$81.50
Operators (Building, Class 07A- See Notes)	5/1/2025		$66.26	$39.55	$105.81
Operators (Building, Class 07A- See Notes)	5/1/2026		$67.73	$40.48	$108.21
Operators (Building, Class 07B- See Notes)	5/1/2025		$65.97	$39.46	$105.43
Operators (Building, Class 07B- See Notes)	5/1/2026		$67.44	$40.39	$107.83
Painters Class 1 (see notes)	5/1/2024		$42.97	$34.11	$77.08
Painters Class 1 (see notes)	5/1/2025		$44.38	$34.55	$78.93
Painters Class 1 (see notes)	5/1/2026		$45.71	$35.22	$80.93
Painters - Line Stripping	12/1/2024		$44.12	$27.91	$72.03
Painters - Line Stripping	12/1/2025		$45.12	$29.41	$74.53
Painters Class 4 (see notes)	5/1/2024		$45.06	$34.11	$79.17
Painters Class 4 (see notes)	5/1/2025		$46.47	$34.55	$81.02
Painters Class 4 (see notes)	5/1/2026		$48.45	$35.22	$83.67
Plasterers	5/1/2024		$39.88	$33.08	$72.96

BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES

Project: 26-05831 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
plumber	5/1/2025		$70.53	$39.46	$109.99
plumber	5/1/2026		$73.73	$40.36	$114.09
Pointers, Caulkers, Cleaners	5/1/2025		$51.35	$31.80	$83.15
Pointers, Caulkers, Cleaners	5/1/2026		$53.35	$32.30	$85.65
Roofers (Composition)	5/1/2024		$44.13	$34.77	$78.90
Roofers (Composition)	5/1/2025		$46.03	$34.77	$80.80
Roofers (Composition)	5/1/2026		$47.53	$35.22	$82.75
Roofers (Shingle)	5/1/2024		$34.35	$22.20	$56.55
Roofers (Slate & Tile)	5/1/2024		$37.35	$22.20	$59.55
Sheet Metal Workers	5/1/2024		$59.22	$50.56	$109.78
Sheet Metal Workers	5/1/2025		$62.62	$52.17	$114.79
Sheet Metal Workers	5/1/2026		$65.06	$54.48	$119.54
Sign Makers and Hangars	7/15/2024		$32.32	$25.82	$58.14
Sign Makers and Hangars	7/15/2025		$33.48	$26.41	$59.89
Sprinklerfitters	1/1/2023		$62.23	$31.99	$94.22
Sprinklerfitters	5/1/2025		$70.37	$34.85	$105.22
Steamfitters	5/1/2024		$70.32	$43.09	$113.41
Steamfitters	5/1/2025		$72.52	$44.89	$117.41
Stone Masons	5/1/2025		$50.00	$32.80	$82.80
Stone Masons	5/1/2026		$51.50	$33.80	$85.30
Terrazzo Finisher	5/1/2025		$45.61	$29.41	$75.02
Terrazzo Finisher	5/1/2026		$47.78	$29.61	$77.39
Terrazzo Grinder	5/1/2025		$45.88	$29.41	$75.29
Terrazzo Grinder	5/1/2026		$47.78	$29.61	$77.39
Terrazzo Mechanics	5/1/2025		$52.21	$31.26	$83.47
Terrazzo Mechanics	5/1/2026		$53.36	$32.61	$85.97
Tile Finisher	5/1/2025		$41.17	$30.75	$71.92
Tile Finisher	5/1/2026		$42.07	$31.85	$73.92
Tile Setter	5/1/2025		$52.21	$31.26	$83.47
Tile Setter	5/1/2026		$53.36	$32.61	$85.97
Truckdriver class 1(see notes)	5/1/2024		$36.79	$22.54	$59.33
Truckdriver class 1(see notes)	5/1/2026		$38.57	$23.87	$62.44
Truckdriver class 2 (see notes)	5/1/2024		$36.89	$22.54	$59.43
Truckdriver class 2 (see notes)	5/1/2026		$38.67	$23.87	$62.54
Truckdriver class 3 (see notes)	5/1/2026		$38.92	$23.87	$62.79
Window Film / Tint Installer	6/1/2024		$26.37	$14.83	$41.20
Window Film / Tint Installer	6/1/2025		$27.42	$15.13	$42.55

BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES

Project: 26-05831 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Bricklayer	5/1/2025		$50.00	$32.57	$82.57
Bricklayer	5/1/2026		$51.15	$34.92	$86.07
Carpenter - Chief of Party (Surveying & Layout)	5/1/2025		$65.96	$30.09	$96.05
Carpenter - Chief of Party (Surveying & Layout)	5/1/2026		$67.52	$30.44	$97.96
Carpenter - Instrument Person (Surveying & Layout)	5/1/2025		$58.39	$29.06	$87.45
Carpenter - Instrument Person (Surveying & Layout)	5/1/2026		$60.09	$29.06	$89.15
Carpenter - Rodman (Surveying & Layout)	5/1/2025		$45.88	$23.19	$69.07
Carpenter - Rodman (Surveying & Layout)	5/1/2026		$46.97	$23.54	$70.51
Carpenter	5/1/2025		$57.36	$30.09	$87.45
Carpenter	5/1/2026		$58.71	$30.44	$89.15
Cement Masons	5/1/2023		$43.20	$32.91	$76.11
Cement Masons	5/1/2025		$46.55	$32.66	$79.21
Dockbuilder, Pile Drivers	5/1/2025		$55.23	$37.99	$93.22
Dockbuilder, Pile Drivers	5/1/2026		$56.98	$37.99	$94.97
Dockbuilder/Pile Driver Diver	5/1/2025		$60.31	$44.97	$105.28
Dockbuilder/Pile Driver Diver	5/1/2026		$61.88	$45.47	$107.35
Dockbuilder/pile driver tender	5/1/2025		$55.23	$37.99	$93.22
Dockbuilder/pile driver tender	5/1/2026		$56.98	$37.99	$94.97
Electric Lineman	6/3/2024		$62.07	$33.96	$96.03
Electric Lineman	6/2/2025		$65.10	$34.45	$99.55
Iron Workers (Bridge, Structural, Ornamental, Precast)	7/1/2024		$53.20	$45.01	$98.21
Iron Workers (Riggers)	7/1/2023		$42.53	$34.14	$76.67
Iron Workers (Rodman/Reinforcing)	7/1/2023		$45.70	$34.77	$80.47
Laborers (Class 01 - See notes)	5/1/2025		$40.20	$27.80	$68.00
Laborers (Class 01 - See notes)	5/1/2026		$41.65	$27.90	$69.55
Laborers (Class 02 - See notes)	5/1/2025		$40.40	$27.80	$68.20
Laborers (Class 02 - See notes)	5/1/2026		$41.85	$27.90	$69.75
Laborers (Class 03 - See notes)	5/1/2025		$40.40	$27.80	$68.20
Laborers (Class 03 - See notes)	5/1/2026		$41.85	$27.90	$69.75
Laborers (Class 04 - See notes)	5/1/2025		$35.00	$27.80	$62.80
Laborers (Class 04 - See notes)	5/1/2026		$36.45	$27.90	$64.35
Laborers (Class 05 - See notes)	5/1/2025		$41.05	$27.80	$68.85
Laborers (Class 05 - See notes)	5/1/2026		$42.50	$27.90	$70.40
Laborers (Class 06 - See notes)	5/1/2025		$41.10	$27.80	$68.90
Laborers (Class 06 - See notes)	5/1/2026		$42.55	$27.90	$70.45
Laborers (Class 07 - See notes)	5/1/2025		$40.95	$27.80	$68.75
Laborers (Class 07 - See notes)	5/1/2026		$42.40	$27.90	$70.30
Laborers (Class 08 - See notes)	5/1/2025		$40.70	$27.80	$68.50
Laborers (Class 08 - See notes)	5/1/2026		$42.15	$27.90	$70.05
Laborers (Class 09 - See notes)	5/1/2025		$40.55	$27.80	$68.35
Laborers (Class 09 - See notes)	5/1/2026		$42.00	$27.90	$69.90
Laborers (Class 10- See notes)	5/1/2025		$40.70	$27.80	$68.50
Laborers (Class 10- See notes)	5/1/2026		$42.15	$27.90	$70.05
Laborers (Class 11 -See Notes)	5/1/2025		$40.60	$27.80	$68.40

BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES

Project: 26-05831 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Laborers (Class 11 -See Notes)	5/1/2026		$42.05	$27.90	$69.95
Laborers (Class 12 -See Notes)	5/1/2025		$42.30	$27.80	$70.10
Laborers (Class 12 -See Notes)	5/1/2026		$42.85	$27.90	$70.75
Laborers (Class 13 -See Notes)	5/1/2025		$44.33	$27.80	$72.13
Laborers (Class 13 -See Notes)	5/1/2026		$45.78	$27.90	$73.68
Laborers (Class 14 -See Notes)	5/1/2025		$40.90	$27.80	$68.70
Laborers (Class 14 -See Notes)	5/1/2026		$41.90	$27.90	$69.80
Laborers Utility (PGW ONLY) (Flagperson)	5/1/2025		$34.07	$19.73	$53.80
Laborers Utility (PGW ONLY) (Flagperson)	5/1/2026		$35.52	$19.83	$55.35
Laborers Utility (PGW ONLY)	5/1/2025		$41.10	$19.73	$60.83
Laborers Utility (PGW ONLY)	5/1/2026		$42.55	$19.83	$62.38
Landscape Laborer	5/1/2024		$30.28	$24.05	$54.33
Landscape Laborer	5/1/2025		$31.73	$24.15	$55.88
Millwright	5/1/2025		$57.39	$35.81	$93.20
Millwright	5/1/2026		$60.20	$35.81	$96.01
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2025		$54.52	$34.49	$89.01
Operators Class 01 - See Notes (Building, Heavy, Highway)	5/1/2026		$55.67	$35.34	$91.01
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2025		$57.52	$35.38	$92.90
Operators Class 01a - See Notes (Building, Heavy, Highway)	5/1/2026		$58.68	$36.22	$94.90
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2025		$54.27	$34.42	$88.69
Operators Class 02 - See Notes (Building, Heavy, Highway)	5/1/2026		$55.43	$35.26	$90.69
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2025		$57.29	$35.29	$92.58
Operators Class 02a - See Notes (Building, Heavy, Highway)	5/1/2026		$58.44	$36.14	$94.58
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2025		$50.18	$33.22	$83.40
Operators Class 03 - See Notes (Building, Heavy, Highway)	5/1/2026		$51.34	$34.06	$85.40
Operators Class 04 - See Notes (Building, Heavy, Highway)	5/1/2025		$49.88	$33.13	$83.01
Operators Class 04 - See Notes (Building, Heavy, Highway)	5/1/2026		$51.04	$33.97	$85.01
Operators Class 05 - See Notes (Building, Heavy, Highway)	5/1/2025		$48.16	$32.62	$80.78
Operators Class 05 - See Notes (Building, Heavy, Highway)	5/1/2026		$49.32	$33.46	$82.78
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2025		$47.17	$32.33	$79.50
Operators Class 06 - See Notes (Building, Heavy, Highway)	5/1/2026		$48.34	$33.16	$81.50
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2025		$66.26	$39.55	$105.81
Operators Class 07 (A) - See Notes (Building, Heavy, Highway)	5/1/2026		$67.73	$40.48	$108.21

BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES

Project: 26-05831 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2025		$65.97	$39.46	$105.43
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2026		$67.44	$40.39	$107.83
Painters - Line Stripping	12/1/2024		$44.12	$27.91	$72.03
Painters - Line Stripping	12/1/2025		$45.12	$29.41	$74.53
Painters Class 2 (see notes)	2/1/2025		$50.85	$33.91	$84.76
Painters Class 2 (see notes)	2/1/2026		$51.61	$35.00	$86.61
Painters Class 3 (see notes)	2/1/2025		$61.81	$33.95	$95.76
Painters Class 3 (see notes)	2/1/2026		$62.57	$35.04	$97.61
Pointers, Caulkers, Cleaners	5/1/2025		$51.35	$31.80	$83.15
Steamfitters (Heavy and Highway - Gas Distribution)	5/1/2024		$66.80	$42.93	$109.73
Steamfitters (Heavy and Highway - Gas Distribution)	5/1/2025		$68.89	$44.73	$113.62
Truckdriver class 1(see notes)	5/1/2024		$36.64	$22.54	$59.18
Truckdriver class 1(see notes)	5/1/2026		$38.42	$23.87	$62.29
Truckdriver class 2 (see notes)	5/1/2024		$36.74	$22.54	$59.28
Truckdriver class 2 (see notes)	5/1/2026		$38.52	$23.87	$62.39
Truckdriver class 3 (see notes)	5/1/2026		$38.77	$23.87	$62.64

DOCUMENT 00413 - BID FORM

1.1 BID INFORMATION

A. Bidder: _____.

B. Project Name: Bucks County Free Library HVAC Replacement Perkasie Branch Library

C. Project Location: Perkasie Branch – 491 Arthur Avenue, Perkasie, PA 18944

D. Owner: Bucks County Free Library

E. Library Spec #2026PK-01

F. A mandatory Pre-Bid Meeting will be at 9:00 AM on July 9, 2026.

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

1.3 BID GUARANTEE

A. The undersigned Bidder shall furnish surety as specified within 10 days after a written Notice of Award, if offered within 60 days after receipt of bids, and on failure to do so agrees to forfeit to Library the attached cash, cashier's check, certified check, U.S. money order, or bid bond, in the following amount constituting five percent (5%) of the Base Bid amount above:

_____ Dollars ($_____).
(Written amount) (Numbers)

B. In the event Library does not offer Notice of Award within the time limits stated above, Library will return to the undersigned the cash, cashier's check, certified check, U.S. money order, or bid bond.

1.4 SUBCONTRACTORS AND SUPPLIERS

A. List all subcontractors expected to perform work as part of this project:

1. Company:_____ Trade:_____
2. Company:_____ Trade:_____
3. Company:_____ Trade:_____
4. Company:_____ Trade:_____
5. Company:_____ Trade:_____
6. Company:_____ Trade:_____

1.5 TIME OF COMPLETION

A. The undersigned Bidder proposes and agrees hereby to commence the Work of the Contract Documents on a date specified in a written Notice to Proceed to be issued by Engineer, and shall fully complete the Work within 120 calendar days.

1.6 ACKNOWLEDGEMENT OF ADDENDA

A. The undersigned Bidder acknowledges receipt of and use of the following Addenda in the preparation of this Bid:

1. Addendum No. _____ Dated _____.
2. Addendum No. _____ Dated _____.

1.7 BID SUPPLEMENTS

A. The following supplements are a part of this Bid Form and are attached hereto.
1. Bid Bond Form
2. Non-Collusion Affidavit
3. Contractor's Qualification Statement
4. Proposed Schedule of Values Form
5. Verification of Performance Bond and Labor and Material Bond
6. Verification of Certificates of Insurance
7. Public Works Employment Verification Form.

1.8 CONTRACTOR'S LICENSE

A. The undersigned further states that it is a duly licensed contractor, for the type of work 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)

Witness By: _____
(Handwritten signature)

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)

Note: Bids submitted with a bid bond that is not properly signed and sealed by the bidder and surety company will be rejected.

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.

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.

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 County.

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.

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 Perkasie Branch Library HVAC Replacement

B. Project Address:

1. Perkasie Branch – 491 Arthur Avenue, Perkasie, PA 18944

C. Owner: Bucks County.

D. Owner's Representative: Leigh Sheldron – Facilities Director

E. Project Engineer:

1. Holstein Engineering, 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
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 Engineers
3800 Horizon Boulevard, Suite 503
Trevose, PA 19053

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 County.

D. "He" or "Him" as used in the Specifications is intended to identify the responsible party implied in each section of this Specification.

1.5 WORK COVERED BY CONTRACT DOCUMENTS

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

1. Perkasie Branch:
   a. Demolish and removal of one (1) existing packaged rooftop unit (on grade) and (1) 200 AMP duct-mounted heater and all its associated controls.
   b. Installation of (1) new packaged rooftop unit with electric heat (on grade) and new thermostat.
   c. Provide new exterior ductwork to connect to the existing supply and return mains including all connections, supports and insulation.
   d. Modification to the (1) split systems condensate and refrigerate piping.
   e. New system shall be tested and certified per these specifications and manufacturers requirements. Reports shall be provided indicating the results of all testing and certification.
   f. 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 County.

B. Type of Contract.

1. Project will be constructed under a single prime contract.

1.6 PROJECT COMPLETION DATE

A. Project Completion Date: Project must be complete and fully operational with-in 120 days of notice to proceed. The intent is to replace the unit prior to the end of the year 2026.

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.

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 County, County'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 County prior to commencing work in any areas of building.

1.8 COORDINATION WITH OCCUPANTS

A. Full County Occupancy: County will occupy site, existing and adjacent building(s) during entire construction period. Cooperate with County during construction operations to minimize conflicts and facilitate County usage. Perform the Work so as not to interfere with County's day-to-day operations. Maintain existing exits unless otherwise indicated.

1. 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 County and approval of authorities having jurisdiction.
2. Notify County not less than (2) weeks prior to planned activity and confirm work 72 hours in advance of activities that will affect County'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 County's Representative.

C. All Hazardous material remediation in occupied areas of the building shall occur on the weekends and be coordinated with County'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.

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 County, unless otherwise indicated.

D. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by County or others unless permitted under the following conditions and then only after providing temporary utility services according to requirements indicated:

1. Notify County 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 County'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 County occupancy with County.

1. Notify County not less than two (2) days in advance of proposed disruptive operations.
2. Obtain County'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. County-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.

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 County's approval of a Work Changes Proposal Request, Engineer will issue a Change Order for signatures of County 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 County. 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. Subschedules for Phased Work: Where the Work is separated into phases requiring separately phased payments, provide subschedules 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. County of Bucks.
c. Contractor's name and address.
d. 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 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 County.

    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 County 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 County 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 County 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 County 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 County, 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 County 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 County 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 County and Engineer, but no later than 15 days after Notice to Proceed.

1. Attendees: Authorized representatives of County 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:

a. 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.
l. Use of the premises and existing building.
m. Work restrictions.
n. Working hours.
o. County'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 County 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 County.

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.
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, County, 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.

    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.
    l. 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.

PART 2 - PRODUCTS

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 Countys, 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.

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	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	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	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 up-to-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

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 County'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 County'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: Space will be provided by the County for Office and Material Storage. Location shall be approved by County 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 County's existing power source, as directed by County.

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 County.

B. Waste Disposal Facilities: Contractor shall be responsible for removal of trash from site daily.

C. Waste Disposal Facilities: Coordinate waste removal with County. Waste shall not be allowed to accumulate in any areas. Waste shall be removed from site daily.

D. Existing Elevator use: Existing elevators shall be available for use during construction. Coordinate use of elevators with County two (2) days in advance of moving large equipment. Provide protection on walls, floors, and door openings as needed to avoid damage to existing elevators.

E. 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 County 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 polyethylene sheet on each side. Cover floor with two layers of 6-mil polyethylene sheet, extending sheets 18 inches 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 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. County 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 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 County.

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. County 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 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 County 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 Counties.
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.
l. 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:

    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

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.

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.

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.

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.

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.

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.

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.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction permitting County 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 County'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 County of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to County. Advise County'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 County'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 County of changeover in heat and other utilities.
7. Participate with County 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 County'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 County'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 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.

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.

PART 2 - PRODUCTS

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.

PART 2 - PRODUCTS

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 County.
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, 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 County's operating personnel for types of emergencies indicated.

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 County'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. Preinstruction Conference: Conduct conference at Project site review methods and procedures related to demonstration and training.

1.5 COORDINATION

A. Coordinate instruction schedule with County's operations. Adjust schedule as required to minimize disrupting County'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.
    h. 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.
l. 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.
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 County for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct County'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 County's operational philosophy.
3. County 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 County, 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 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

1.2 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.

1.3 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.

1.4 SUBMITTALS

A. Submit three (3) copies of documents conforming compliance with the NEBB provisions and standards.

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.

1.5 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.

1.6 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:

1. 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.

1.7 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 233113 - METAL DUCTS

PART 1 - GENERAL

1.01 SUMMARY

A. This Section includes rectangular metal ducts and plenums for heating, ventilating, and air-conditioning systems in pressure classes from minus 2- to plus 2-inch wg.

A. Related Sections – Division 23.

1.02 DEFINITIONS

A. Thermal Conductivity and Apparent Thermal Conductivity (k-Value): As defined in ASTM C 168. In this Section, these values are the result of the formula Btu x in. /h x sq. ft. x deg F or W/m x K at the temperature differences specified. Values are expressed as Btu or W.

1. Example: Apparent Thermal Conductivity (k-Value): 0.26 or 0.037.

1.03 SYSTEM DESCRIPTION

A. Duct system design, as indicated, has been used to select and size air-moving and -distribution equipment and other components of air system. Changes to layout or configuration of duct system must be specifically approved in writing by Architect. Accompany requests for layout modifications with calculations showing that proposed layout will provide original design results without increasing system total pressure.

1.04 SUBMITTALS

A. Product Data: For duct insulation and sealing materials.

B. Shop Drawings: Show details of the following:

1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
2. Duct layout indicating pressure classifications and sizes on plans.
3. Fittings.
4. Reinforcement and spacing.
5. Seam and joint construction.
6. Penetrations through fire-rated and other partitions.
7. Terminal unit, coil, and humidifier installations.
8. Hangers and supports, including methods for building attachment, vibration isolation, seismic restraints, and duct attachment.
9. Scale shall be 3/8”-1’-0” or larger.

B. Coordination Drawings: Reflected ceiling plans drawn to scale and coordinating penetrations and ceiling-mounted items. Show the following:

1. Ceiling suspension assembly members.
2. Other systems installed in same space as ducts.
3. Ceiling- and wall-mounted access doors and panels required to provide access to dampers and other operating devices.
4. Coordination with ceiling-mounted items, including lighting fixtures, diffusers, grilles, speakers, sprinkler heads, access panels, and special moldings.

C. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.

D. Record Drawings: Indicate actual routing, fitting details, reinforcement, support, and installed accessories and devices.

1.05 QUALITY ASSURANCE

A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," unless otherwise indicated.

B. Comply with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems," unless otherwise indicated.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver sealant and firestopping materials to site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration period for use, pot life, curing time, and mixing instructions for multicomponent materials.

B. Store and handle sealant and firestopping materials according to manufacturer's written recommendations.

C. Deliver and store stainless-steel sheets with mill-applied adhesive protective paper maintained through fabrication and installation.

PART 2 - PRODUCTS

2.01 SHEET METAL MATERIALS

A. Galvanized, Sheet Steel: Lock-forming quality; ASTM A 653/A 653M, G90 coating designation; mill-phosphatized finish for surfaces of ducts exposed to view.

2.03 SEALANT MATERIALS

A. Joint and Seam Sealants, General: The term "sealant" is not limited to materials of adhesive or mastic nature but includes tapes and combinations of open-weave fabric strips and mastics.

1. Joint and Seam Tape: 2 inches wide; glass-fiber fabric reinforced.
2. Tape Sealing System: Woven-fiber tape impregnated with a gypsum mineral compound and a modified acrylic/silicone activator to react exothermically with tape to form a hard, durable, airtight seal.
3. Joint and Seam Sealant: One-part, nonsag, solvent-release-curing, polymerized butyl sealant, formulated with a minimum of 75 percent solids.
4. Flanged Joint Mastics: One-part, acid-curing, silicone, elastomeric joint sealants, complying with ASTM C 920, Type S, Grade NS, Class 25, Use O.

2.04 HANGERS AND SUPPORTS

A. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for building materials.

1. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
2. Exception: Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.

B. Hanger Materials: Galvanized, sheet steel or round, threaded steel rod.

1. Hangers Installed in Corrosive Atmospheres: Electrogalvanized, all-thread rod or galvanized rods with threads painted after installation.
2. Straps and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for sheet steel width and thickness and for steel rod diameters.

B. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.

C. Trapeze and Riser Supports: Steel shapes complying with ASTM A 36/A 36M.

1. Supports for Galvanized-Steel Ducts: Galvanized steel shapes and plates.

2.05 RECTANGULAR DUCT FABRICATION

A. General: Fabricate ducts, elbows, transitions, offsets, branch connections, and other construction with galvanized, sheet steel, according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible." Comply with requirements for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals.

1. Lengths: Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure classification.
2. Materials: Free from visual imperfections such as pitting, seam marks, roller marks, stains, and discolorations.

B. Static-Pressure Classifications: Unless otherwise indicated, construct ducts to the following:

1. Exhaust Ducts: 1-inch wg, negative pressure.

D. Cross Breaking or Cross Beading: Cross break or cross bead duct sides 19 inches and larger and 0.0359 inch or less, with more than 10 sq. ft. of unbraced panel area, unless ducts are lined.

PART 3 - EXECUTION

3.01 DUCT INSTALLATION, GENERAL

A. Duct installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of ducts, fittings, and accessories.

B. Construct and install each duct system for the specific duct pressure classification indicated.

C. Install round and flat-oval ducts in lengths not less than 12 feet, unless interrupted by fittings.

D. Install ducts with fewest possible joints.

E. Install fabricated fittings for changes in directions, changes in size and shape, and connections.

F. Install couplings tight to duct wall surface with a minimum of projections into duct.

G. Install ducts, unless otherwise indicated, vertically and horizontally, parallel and perpendicular to building lines; avoid diagonal runs.

H. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.

I. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.

J. Conceal ducts from view in finished spaces. Do not encase horizontal runs in solid partitions, unless specifically indicated.

K. Coordinate layout with suspended ceiling, fire- and smoke-control dampers, lighting layouts, and similar finished work.

L. Electrical Equipment Spaces: Route ductwork to avoid passing through transformer vaults and electrical equipment spaces and enclosures.

M. Non-Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls, and are exposed to view, conceal space between construction opening and duct or duct insulation with sheet metal flanges of same metal thickness as duct. Overlap opening on four sides by at least 1-1/2 inches.

N. Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls, install appropriately rated fire damper, sleeve, and firestopping sealant. Fire and smoke dampers as required. Firestopping materials and installation methods as required.

3.02 SEAM AND JOINT SEALING

A. General: Seal all duct seams and joints according SMANCA Seal Class B.

B. Pressure Classification Less than 2-Inch wg: Transverse joints.

C. Seal externally insulated ducts before insulation installation.

3.04 HANGING AND SUPPORTING

A. Install rigid round, rectangular, and flat-oval metal duct with support systems indicated in SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

B. Support horizontal ducts within 24 inches of each elbow and within 48 inches of each branch intersection.

C. Support vertical ducts at a maximum interval of 16 feet and at each floor.

D. Install upper attachments to structures with an allowable load not exceeding one-fourth of failure (proof-test) load.

E. Install concrete inserts before placing concrete.

F. Install powder-actuated concrete fasteners after concrete is placed and completely cured.

3.03 CONNECTIONS

A. Connect equipment with flexible connectors as required.

B. For branch, outlet and inlet, and terminal unit connections, comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."

3.04 ADJUSTING

A. Adjust volume-control dampers in ducts, outlets, and inlets to achieve design airflow.

3.05 CLEANING

A. After completing system installation, including outlet fittings and devices, inspect the system. Vacuum ducts before final acceptance to remove dust and debris.

END OF SECTION 233113

SECTION 237413 – PACKAGED ROOFTOP AIR CONDITIONING UNITS

Part 1 — HVAC Guide Specifications

Carrier Model Number: **50K**

Part 1 — Decentralized HVAC Equipment

1.01 Decentralized Unitary HVAC Equipment Schedule:

A. Rooftop unit (RTU) schedule:

1. Refer to mechanical schedule sheet for the project specification requirements.

Part 2 — HVAC equipment insulation

2.01 Decentralized, Rooftop Units:

A. Air handling compartment (standard construction):

1. Interior cabinet panels shall be insulated with a minimum 1/2 in. thick, minimum 1-3/4 lb density, flexible fiberglass insulation.
2. Access doors shall be insulated with a minimum 1/2 in. thick, minimum 1-3/4 lb density, flexible fiberglass insulation covered with galvanized steel liner on the air side (double wall).
3. Access doors shall be hinged with tooled access latches.
4. The heat compartment shall be insulated with a minimum 1/2 in. thick, minimum 1-3/4 lb density, flexible fiberglass insulation.
5. The bottom of the base pan (exterior) shall be insulated with a minimum 1/2 in. thick, minimum 1-3/4 lb density, flexible fiberglass insulation.
6. Air touching doors and panels shall have a minimum nominal thermal efficiency rating of R4.
7. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.

Part 3 — Instrumentation and control devices for HVAC

3.01 Sensors and Transmitters:

A. Thermostats:

1. Thermostat shall:

Have capability to energize up to two stages of cooling, and up to 2 stages of heating.

B. Sensors:

1. Standard sensors shall have outdoor air temperature, return air temperature, evaporator/DX reheat coil leaving air temperature, suction pressure (all circuits), discharge pressure (all circuits), and leaving evaporator refrigerant temperature (all circuits).

Part 4 — Direct Digital Control system for HVAC

1. Contractor shall provide BACnet card for future BAS tie-in for the library.

Part 5 — Electric and Electronic Control System for HVAC

5.01 Decentralized, Rooftop Units:

A. General:

1. Shall be complete with self-contained low-voltage control circuit.
2. Shall utilize color-coded wiring.
3. Shall have wiring diagrams affixed to the interior door panels of each section.

B. Safeties:

1. Compressors.
   a. Over-temperature.
   b. Over-current.
   c. High refrigerant circuit pressure switch.
2. Refrigeration System
   a. Indoor refrigerant leak detection. Sensor with leak dissipation control. Units without leak dissipation control are not acceptable.

Part 6 — Sequence of Operations for HVAC Controls

6.01 Decentralized, Rooftop Units:

A. SEQUENCE OF OPERATION:

Part 7 — Panel Air Filters

7.01 Decentralized, Rooftop Units:

A. Standard Pre-filter Section:

1. Shall consist of factory-installed, disposable 2 in. pleated filters of commercially available sizes with a minimum rating equivalent to MERV 5, unless optional filters are selected.

Part 8 — Self-Contained Air Conditioners

8.01 Large-Capacity Self-Contained Air Conditioners:

A. General:

1. Outdoor, rooftop mounted, electrically controlled, heating and cooling unit utilizing a fully hermetic scroll compressor(s) for cooling duty.
2. Factory-assembled, single-piece heating and cooling unit. Contained within the unit enclosure shall be all factory wiring, piping, refrigerant charge, operating oil charge, microprocessor-based control system and associated hardware.
3. Unit shall include a factory refrigerant charge of Puron Advance™ (R-454B) refrigerant with a global warming potential (GWP) of 467. Units containing refrigerants with a GWP greater than 467 are not acceptable.
4. Unit shall ship as a single piece and shall be installed in accordance with the manufacturer's instructions.
5. Unit must be selected and installed in compliance with local, state, and federal codes.

B. Quality Assurance:

1. Unit meets and exceeds ASHRAE 90.1 (latest edition) minimum efficiency requirements.
2. Unit performance shall be certified in accordance with AHRI Standard 340/360 (latest edition).
3. Unit shall be designed to conform to ASHRAE 15 (latest editions).
4. Insulation and adhesive shall meet NFPA 90A requirements for flame spread and smoke generation.
5. Pre-painted exterior coating shall be capable of withstanding a minimum 500-hour salt spray exposure per ASTM B117 (scribed specimen).
6. Unit shall be manufactured in a facility registered by ISO 9001:2015.
7. Roof curb shall be designed to conform to National Roofing Contractors Association (NRCA) criteria per Guideline B-1986.
8. Unit shall pass an automated factory run test, including validation of refrigerant circuit performance, verification of operation of key components. A run test certificate shall ship with the unit.
9. Unit shall be designed in accordance with UL Standard 1995 or 60335-2-40, including tested to withstand rain. Compliance shall be listed with UL and UL Canada.

C. Delivery, Storage, and Handling:

1. Unit shall be stored and handled per manufacturer's recommendations.
2. Lifting by crane requires spreader bars.
3. Unit shall only be stored or positioned in the upright position.

D. Project Conditions:

1. Contractor shall review all existing conditions prior to starting work.

E. Operating Characteristics:

1. Unit shall be capable of starting and running in mechanical cooling from 65°F (8.3°C) to 115°F (46.1°C) entering condenser air temperature.
2. Unit shall have a minimum of the 3 stages of cooling capacity.
3. Unit shall discharge supply air vertically or horizontally as shown on drawings.
4. Unit shall supply air temperature cooling.

F. Electrical Requirements:

1. Main power supply voltage, phase, and frequency must match those required by the manufacturer.
2. The unit power panel shall have a short circuit current rating (SCCR) of no less than 10 kA.
3. The single point electrical connection shall be at a factory-installed terminal block in the power panel.
4. Power wiring shall be a copper conductor or aluminum and sized for no less than 167°F (75°C).
5. Separate enclosures shall be provided for high and low voltage components.

G. Unit Cabinet:

1. Unit cabinet shall be constructed of galvanized steel (designated G60 per ASTM Standard A653) and shall be bonderized with a pre-painted finish or powder-coat on the outer surface.
2. Unit cabinet exterior shall be capable of withstanding ASTM Standard B117 500-hour salt spray test.
3. Unit cabinet interior top and side panels (supply air touching) shall be lined minimum 1/2 in. thick, 1.5 lb density, fiberglass insulation.
4. Unit cabinet shall have an insulation rating of R4.
5. The unit shall be available in factory dedicated supply and return openings.
6. Basepan:
    a. Unit shall have base rails on a minimum of 2 sides.
    b. Shall include a minimum of four lifting lugs to support rigging shackles for maneuvering and overhead rigging.
    c. Base rail shall be a minimum of 16 gauge thickness.
    d. Shall have a single thru-the-base power coupling and primary and secondary thru-the-base control couplings.
    e. Bottom shall be lined with minimum 1/2 in. thick, 1.5 lb density, fiberglass insulation.
7. Condensate Pan:
    a. Shall be a sloped condensate drain pan made of galvanized steel.
    b. Shall use a single, drain connector through the side of the unit. Connection shall be made per manufacturer's recommendations.
8. Electrical Connections:
    a. All unit power wiring shall enter the power box at the bottom or back.
    b. Thru-the-base capability.
        1) Standard unit shall have a thru-the-base power and control couplings in the basepan.
        2) No basepan penetration, other than those authorized by the manufacturer, is permitted.
9. Access Doors:
    a. Hinged access doors in the air handling section shall be double wall construction with a galvanized steel liner and 0.5 in thick, 1.5-lb density fiberglass insulation.
    b. At a minimum, access doors must be provided on the filter section, indoor fan motor section, compressor, control box, and power box. The air handling door shall seal against a rubber gasket to prevent air and water leakage.
    c. All doors shall require the use of tools to open the door to help prevent unauthorized access.
10. Access Panels:

    Removable panels shall be provided on areas that require infrequent access.

H. Coils:

1. Evaporator:

a. Shall be round tube, plate fin style coil with aluminum fins mechanically bonded to copper tubes (Al/Cu).

b. Tube diameter shall be no less than 3/8 in. OD (outside diameter).

c. Sizes 20-34: Coils shall be fully active during cooling operation.

d. Sizes 40-60: Coils shall be intertwined between circuits.

e. Coils shall be leak tested at 150 psig and pressure tested at 650 psig.

2. Condenser:

a. Shall be an microchannel design, constructed of an aluminum alloy. The coils shall have a series of flat tubes containing a series of multiple, parallel flow microchannels layered between the refrigerant manifolds.

b. Microchannel coils shall consist of a two-pass arrangement.

c. Coils shall be leak tested at 150 psig and pressure tested at 650 psig.

I. Refrigerant Circuit:

1. Refrigerant circuit shall have the following control, safety, and maintenance features:

a. Dual refrigerant circuits.

b. Electronic expansion valve (EXV) metering devices on all models. Thermostatic expansion valves (TXV) are not acceptable.

c. Refrigerant filter drier.

d. Service ports on suction and discharge lines.

e. Sight glass.

f. Fusible plug.

2. Compressors:

a. The unit shall have a maximum of two, unequally sized compressors per refrigerant circuit to ensure proper coil management and maximize cooling stages. Units with more than two compressors per circuit are not acceptable.

b. Compressors shall be mounted on rubber-in-shear vibration isolation.

c. Each compressor shall have crankcase heater that is only on when the compressor is off and the outdoor air temperature is below 80°F (26.6°C).

J. Pre-Filter Section:

1. The standard pre-filter is listed in Part 7.

2. Shall have a minimum 2 in. vertical pre-filter rack.

3. Unit shall ship with a factory provided filter hook.

4. Filters shall be accessible through a hinged access door.

K. Indoor Fan:

1. Motor:

a. Shall be an inverter duty rated, open drip proof (ODP) induction motor. Non-inverter rated motors are not acceptable.

b. Shall include a fixed pitch pulley.

c. Each unit shall have a minimum of three motor horsepower sizes.

d. Shall be capable of operating at 110% of rated horsepower under appropriate conditions.

2. All indoor fan and power exhaust motors 5 hp and larger shall meet the minimum efficiency requirements as established by the Energy Independence and Security Act (EISA) of 2007.

a. Variable Frequency Drive (VFD).

b. All units shall include an variable frequency drive for the indoor fan motor.
NOTE: Single speed or multi-speed motors are not acceptable.

c. The VFD shall be factory installed and wired inside the unit cabinet. The motor shall be controlled by the SmartVu control via modbus communication. Field-installed or stand alone VFDs are not acceptable.

3. Fan:

a. Shall be a belt driven fan assembly with a single, solid fan shaft and two, double width/double-inlet, forward curve fans. Hollow shafts shall not be acceptable.

b. Fan shaft bearings shall be of the pillow-block type with positive locking collar and lubrication provisions with a life of 200,000-hours at design operating conditions in accordance with ANSI B3.15.

c. The fan bearings shall contain a factory grease charge.

d. Shall include a fixed pitch pulley.

e. Fan and motor shall be statically and dynamically.

4. Control:

a. The indoor fan speed shall be controlled by SmartVu controls.

b. The default indoor fan control shall be staged air volume (SAV™) based on cooling or heating capacity.

1) The control shall provide a minimum of four fan speeds in cooling and two fan speeds in heating.

2) The control shall be field configurable for single-zone variable air volume (SAV) demand, constant volume, or third-party modulation.

L. Condenser Fans:

1. Motor:

a. Shall be a three-phase totally enclosed motor. Single-phase motors are not acceptable.

b. Shall use permanently lubricated bearings.

c. Must be statically and dynamically balanced.

2. Fans (Standard):

a. Sizes 20-30,40-60: Shall be a direct-driven propeller type fan constructed of metal.

b. Size 34: Shall be a direct-driven AeroAcoustic™ composite condenser fans with swept fan blades and blade edge optimization to reduce radiated sound.

c. Must be protected by PVC-coated steel wire safety guards.

d. Shall discharge air vertically.

M. Manual Outdoor Air Damper (Standard):

1. Shall have pressure activated (no actuator) damper assembly, sized to allow up to 25% outdoor air at maximum position. The damper is open when the indoor fan is on and closes when the indoor fan is off. Units with no outdoor air intake are not acceptable.
2. Must include an adjustable maximum position stopper.
3. Must include factory-supplied, field-installed, outdoor air intake hoods and screens.
4. Outdoor air screens shall ship inside the unit for field installation.

N. Factory-installed Options:

1. Silicon Rectifier Controlled (SCR) Modulating Electric Heat:
   a. The unit shall have a factory-installed modulating electric heater with SCR control for improved supply air temperature control. Solid state relay (SSR) controlled electric heat is not acceptable.
   b. The heater shall be powered from the unit power feed to reduce installation cost.
   c. The heater shall be available in low or high capacity options.
   d. The heater shall have nickel-chromium resistive heating elements, internal fusing, and manual reset thermal cut-outs.
   e. Shall include a factory-provided, field-installed supply air temperature sensor.
2. Low-Sound Package:
   a. The unit shall have factory-installed low-sound condenser fans and compressor blankets that reduce sound output during cooling or dehumidification operation.
   b. Shall include only AeroAcoustic™ composite condenser fans with swept fan blades and blade edge optimization to reduce radiated sound and allows for lower rpm operation. Metal condenser fans are not acceptable.
   c. Must include vertically extended shrouds on all condenser fans to reduce radiated sound at ground levels.
3. Low Ambient:
   a. All condenser fans shall be modulated by a variable frequency drive using Greenspeed® Intelligence control to optimize performance and allow mechanical cooling down to –10°F (–23.3°C) under appropriate conditions. Staged condenser fans on any circuit are not acceptable.
   b. Shall include extended lubrication lines for the indoor fan shaft bearings that are obstructed by condenser fan VFDs.
4. Humidi-MiZer Adaptive Dehumidification:
   a. The unit shall have a factory-installed dehumidification system that allows dehumidification in cooling, venting, or heating modes using a variable mixture of warm liquid refrigerant and hot

gas refrigerant as a reheat source. NOTE: Reheat systems that use only hot gas or liquid refrigerant in dedicated coils are not acceptable.

b. During dehumidification mode, the compressors shall control to cooling coil temperature (CCT, an approximation of supply air dew point temperature) and the reheat system shall be modulated to supply air temperature (SAT).

c. The dehumidification system shall have an e-coated reheat coil, on/off reheat valve, modulating condenser bypass valve, interconnecting refrigerant piping, and a cooling coil leaving air temperature sensor. Requires the enthalpy and humidity sensing options (OARH and RARH).

d. When the dehumidification system must provide cool, dehumidified air, the reheat coil shall utilize liquid refrigerant as a reheat source (sub-cooling mode). The further cooling of the liquid refrigerant increases the evaporator dehumidification capacity and improves latent capacity.

e. When the dehumidification system must provide warm, dehumidified air, the reheat coil shall utilize hot gas refrigerant as a reheat source (hot gas mode). The use of hot gas refrigerant allows for higher discharge air temperatures to be achieved compared to sub-cooling mode.

f. When the dehumidification system must dehumidify air and supply it between cool and warm, a modulated mix of hot gas and warm liquid refrigerant is supplied to the reheat coil as a reheat source.

g. The control shall provide configurations for dehumidification demands based on space relative humidity, return air relative humidity, or a discrete dehumidification input.

h. The control shall provide configurations to prevent dehumidification demands with low cool, high cool, VAV cool, low heat, high heat, or vent demands for improved space temperature control.

5. Digital Compressor:

   a. The unit shall include a lead, digital compressor that provides an infinite number of capacity steps for improved supply air temperature control and low load capability. Units with a lead fixed speed compressor are not acceptable.

   b. The unit shall comply with ASHRAE 90.1 requirements for a minimum of 4 stages of cooling capacity and minimum capacity of no more than 20% for systems that modulate airflow to maintain space temperature.

6. Stainless Steel Drain Pan:

   The unit shall have a factory-installed condensate drain pan constructed of 409 stainless steel for corrosion protection.

7. E-coated Condenser Coils:

   a. The unit shall have factory-installed E-coated microchannel condenser coil (MCHX) for corrosion protection.

   b. Coating shall be flexible epoxy polymer coating uniformly applied to all coil external surface areas without material bridging between fins or louvers. Coating process shall ensure complete coil encapsulation, including all exposed fin edges.

   c. E-coat thickness of 0.8 to 1.2 mil with topcoat having a uniform dry thickness from 1.0 to 2.0 mil on all external coil surface areas, including fin edges, shall be provided.

d. Coated coils shall have a hardness characteristics of 2H per ASTM D3363-00 and cross-hatch adhesion of 4B-5B per ASTM D3359-02.

e. Coated coils shall have superior impact resistance with no cracking, chipping, or peeling per NSF/ANSI 51-2002 Method 10.2. Impact resistance shall be up to 160 in./lb per ASTM D2794-93.

f. E-coated aluminum microchannel coils shall be capable of withstanding more than 8,000-hour salt spray test in accordance with the ASTM (U.S.A.) B-117 Standard.

8. E-coated Evaporator Coil:

a. The unit shall have factory-installed, e-coated Al/Cu evaporator coil(s) for corrosion protection.

b. Coating shall be flexible epoxy polymer coating uniformly applied to all coil external surface areas without material bridging between fins or louvers. Coating process shall ensure complete coil encapsulation, including all exposed fin edges.

c. E-coat thickness of 0.8 to 1.2 mil with topcoat having a uniform dry thickness from 1.0 to 2.0 mil on all external coil surface areas, including fin edges, shall be provided.

d. Coated coils shall have a hardness characteristics of 2H per ASTM D3363-00 and cross-hatch adhesion of 4B-5B per ASTM D3359-02.

e. Coated coils shall have superior impact resistance with no cracking, chipping, or peeling per NSF/ANSI 51-2002 Method 10.2. Impact resistance shall be up to 160 in./lb per ASTM D2794-93.

f. E-coated aluminum microchannel coils shall be capable of withstanding an 3,000-hour salt spray test in accordance with the ASTM (U.S.A.) B-117 Standard.

9. Shaft Grounding Rings:

The unit shall include shaft grounding rings on the indoor fan motor.

10. Variable Frequency Drive Bypass:

The unit shall include a VFD bypass device to allow indoor fan operation in the event the indoor fan VFD is inoperable.

11. Totally Enclosed Fan Cooled (TEFC) Motor

The unit shall include a TEFC indoor fan motor.

12. Humidity and Enthalpy Sensing:

The unit shall have factory-installed outdoor air relative humidity and return air relative humidity sensors for use with dehumidification (return air relative humidity demand) or free cooling control (enthalpy or differential enthalpy changeover, outdoor air dew point lockout).

13. Ultra-Low Leak Economizer:

a. The unit shall have a factory-installed economizer assembly with modulating outdoor air and return air dampers with damper actuator(s) for ventilation and free cooling operation.

b. The economizer shall be controlled by the unit controller. Separate, standalone economizer control systems are not acceptable.

c. Dampers shall be a gear-driven ultra low leakage type with blade and edge seals. Dampers shall exhibit a maximum leakage rate of 3 cfm per square foot of area at 1 in. wg pressure differential

when tested in accordance with AMCA (Air Movement and Control Association) Standard 500.

d. Actuator shall have a spring-return feature which shuts dampers upon a power interruption or unit shutdown. Actuators are capable of internal diagnostics.

e. The unit controller shall have configuration to control ventilation based on indoor fan speed, outdoor air cfm, indoor air quality mapping, third-party minimum position control, or third-party full control.

f. The economizer shall be controlled by the unit controller and shall meet California Title 24, ASHRAE 90.1 and IECC Fault Detection and Diagnostic (FDD) requirements.

g. The unit controller shall have configurations to allow free cooling based on outdoor air temperature and differential outdoor air and return air temperature as standard.

1) Configurations shall also be available for outdoor air enthalpy, differential outdoor air and return air enthalpy, outdoor air enthalpy switch, or outdoor air dew point (humidity and enthalpy sensor option required).

h. Must include factory-supplied, field-installed outdoor air intake hoods and screens.

14. Barometric Relief:

a. The unit shall have a factory-installed barometric relief system with relief hoods and two pressure-activated damper assemblies in the unit return air section for relieving building pressure during free cooling operation.

b. The damper shall start to open when back pressure exceeds approximately 0.04 in. wg and shall gravity close when back-pressure is reduced.

15. Non-Fused Disconnect:

a. The unit shall have a factory-installed, non-fused disconnect for disconnecting the unit power feed during maintenance or servicing.

b. The disconnect shall be installed in the unit power box with an interlocking, through-the-door style disconnect handle. NOTE: External disconnects are not acceptable.

c. The disconnect shall be nominally sized to meet or exceed National Electric Code (NEC) sizing for combination loads. Field-provided breakers or fuses are still required for over-current protection.

d. The disconnect handle shall support lock-out and tag-out locks.

16. Power Monitor:

a. The unit shall have a factory-installed power monitor to help protect against damage from abnormal power.

b. The monitor shall be normally closed and shall detect phase loss and phase reversal.

c. The monitor shall trigger the control emergency shutdown to shut down the unit when a fault is detected.

17. Condensate Overflow Switch:

a. The unit shall have a factory-installed condensate overflow switch to help protect against clogged drain pans.

b. The overflow switch shall be an conducting type. NOTE: Float switches are not acceptable.

18. Pre-Filter Status Switch and Access Door Retainers:

a. The unit shall have a factory-installed pressure measuring switch across the entire pre-filter bank to detect when the filters are dirty.

b. The unit shall have factory-installed retainers on all access doors to hold the doors open during maintenance.

c. The pressure switch shall be field-set and adjustable from 0-2 in. wg.

d. The dirty filter alert shall be viewable from the control interface.

e. The door retainer shall be rod and stopper type with multiple stopping points.

19. Return Air Smoke Detector:

The unit shall have a factory-installed smoke detector in the return air section of the unit, to shut down the unit when smoke is detected.

20. 4 in. MERV 13 Pre-Filters:

The unit shall have a factory-installed 4 in. pre-filter rack with 4 in. MERV 13 pleated filters.

END OF SECTION 237413

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.

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:

1. 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.
   a. 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 studs 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.

PART 2 - PRODUCTS

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."
1. 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.
4. 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.
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.

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.
   3. 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.
   3. 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:
   1. 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.

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:
1. 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:
   a. 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.
2. Stranded Conductors: ASTM B 8.
3. Tinned Conductors: ASTM B 33.

4. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch in diameter.
5. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
6. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
7. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.

2.2 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:

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:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange 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: 10 ohms.
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. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

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 Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

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.

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 pallet-handling units.
   c. Mechanical rooms.

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 hot-water 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 ductile-iron pressure pipe, with plain ends and integral waterstop 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.
2. 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:

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.
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.

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:

    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.

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

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.

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.
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^2t 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.
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.

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:

1. 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.

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.
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:

1. 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 hot-water 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:

1. 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 mudrings, conduits, and pullstrings 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 ductile-iron pressure pipe, with plain ends and integral waterstop 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.

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, 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 the following:

   a. Presealed Systems.

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:

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 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 280544

APPENDICES

1. AIA Document G701 – Change Order (01250.1.4.1)
2. AIA Document G702 – Application for Payment (01290.1.3.C)
3. AIA Document G703 – Schedule of Values (01290.1.2.B.2)
4. AIA Document G710 – Supplemental Instructions (01250.1.2)
5. AIA Document G714 – Construction Change Directive (01250.1.5.A)
6. AIA Document G716 – RFI Form (01310.1.6.C)
7. CSI Form 1.5A – Subcontractor List (01310.1.3.A)
8. CSI Substitution Request Form 1.5C (00260.1.4)
9. CSI Form 13.1A – Substitution Request Form (01635.1.3.A.1)
10. CSI Log Form 13.2B – RFI Log (01310.1.6.E)
11. CSI Form 13.6A – Change Order Request (01250.1.3.B.7)
12. CSI Form 13.6C – Proposal Worksheet Detail (01250.1.3.A.2.e)
13. CSI Form 13.6D – Proposal Worksheet Summary (01250.1.3.A.2.e)

APPENDIX 1

AIA Document G701 – Change Order (01250.1.4.1)

DRAFT

AIA® Document G701™ – 2001

Change Order

PROJECT *(Name and address)*:

CHANGE ORDER NUMBER:
DATE:

TO CONTRACTOR *(Name and address)*:

ARCHITECT'S PROJECT NUMBER:
CONTRACT DATE:
CONTRACT FOR:

OWNER: ☐
ARCHITECT: ☐
CONTRACTOR: ☐
FIELD: ☐
OTHER: ☐

THE CONTRACT IS CHANGED AS FOLLOWS:
(Include, where applicable, any undisputed amount attributable to previously executed Construction Change Directives)

The original Contract Sum was	$
The net change by previously authorized Change Orders	$
The Contract Sum prior to this Change Order was	$ 0.00
The Contract Sum will be increased by this Change Order in the amount of	$
The new Contract Sum including this Change Order will be	$ 0.00

The Contract Time will be increased by Zero (0) days.
The date of Substantial Completion as of the date of this Change Order therefore is

NOTE: This Change Order does not include changes in the Contract Sum, Contract Time or Guaranteed Maximum Price which have been authorized by Construction Change Directive until the cost and time have been agreed upon by both the Owner and Contractor, in which case a Change Order is executed to supersede the Construction Change Directive.

NOT VALID UNTIL SIGNED BY THE ARCHITECT, CONTRACTOR AND OWNER.

ARCHITECT *(Firm name)*	**CONTRACTOR** *(Firm name)*	**OWNER** *(Firm name)*
ADDRESS	**ADDRESS**	**ADDRESS**
BY *(Signature)*	**BY** *(Signature)*	**BY** *(Signature)*
(Typed name)	*(Typed name)*	*(Typed name)*
DATE	**DATE**	**DATE**

APPENDIX 2

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:
CONTRACT FOR:
CONTRACT DATE:
PROJECT NOS: / /

Distribution to:
OWNER: ☐
ARCHITECT: ☐
CONTRACTOR: ☐
FIELD: ☐
OTHER: ☐

FROM CONTRACTOR:

VIA ARCHITECT:

CONTRACTOR'S APPLICATION FOR PAYMENT

Application is made for payment, as shown below, in connection with the Contract.
Continuation Sheet, AIA Document G703, is attached.

1. ORIGINAL CONTRACT SUM ..... $ _____
2. Net change by Change Orders ..... $ _____
3. CONTRACT SUM TO DATE (Line 1 ± 2) ..... $ _____
4. TOTAL COMPLETED & STORED TO DATE (Column G on G703) ..... $ _____
5. RETAINAGE:
a. _____% of Completed Work
(Column D + E on G703) $ _____
b. _____% of Stored Material
(Column F on G703) $ _____
Total Retainage (Lines 5a + 5b or Total in Column I of G703)..... $ _____
6. TOTAL EARNED LESS RETAINAGE ..... $ _____
(Line 4 Less Line 5 Total)
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT ..... $ _____
(Line 6 from prior Certificate)
8. CURRENT PAYMENT DUE ..... $
9. BALANCE TO FINISH, INCLUDING RETAINAGE
(Line 3 less Line 6) $ _____

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	$	$
Total approved this Month	$	$
TOTALS	$	$
NET CHANGES by Change Order	$	

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: _____ Date: _____

State of:

County of:

Subscribed and sworn to before me this day of

Notary Public:

My Commission expires:

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, based on on-site observations and the data comprising this application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED ..... $ _____

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:

By: _____ Date: _____

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract

APPENDIX 3

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

DRAFT

AIA® Document G703™ – 1992

Continuation Sheet

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:

A	B	C	D	E	F	G		H	I
ITEM NO.	DESCRIPTION OF WORK	SCHEDULED VALUE	WORK COMPLETED		MATERIALS PRESENTLY STORED (NOT IN D OR E)	TOTAL COMPLETED AND STORED TO DATE (D+E+F)	% (G ÷ C)	BALANCE TO FINISH (C - G)	RETAINAGE (IF VARIABLE RATE)
			FROM PREVIOUS APPLICATION (D + E)	THIS PERIOD					
	GRAND TOTAL								

APPENDIX 4

AIA Document G710 – Supplemental Instructions
(01250.1.2)

DRAFT

AIA® Document G710™ – 1992

Architect's Supplemental Instructions

PROJECT *(Name and address)*:

ARCHITECT'S SUPPLEMENTAL INSTRUCTION NO:

OWNER: ☐
ARCHITECT: ☐
CONSULTANT: ☐
CONTRACTOR: ☐
FIELD: ☐
OTHER: ☐

OWNER *(Name and address)*:

DATE OF ISSUANCE:

CONTRACT FOR:

FROM ARCHITECT *(Name and address)*:

CONTRACT DATE:

TO CONTRACTOR *(Name and address)*:

ARCHITECT'S PROJECT NUMBER:

The Work shall be carried out in accordance with the following supplemental instructions issued in accordance with the Contract Documents without change in Contract Sum or Contract Time. Proceeding with the Work in accordance with these instructions indicates your acknowledgment that there will be no change in the Contract Sum or Contract Time.

DESCRIPTION:

ATTACHMENTS:
(Here insert listing of documents that support description.)

ISSUED BY THE ARCHITECT:

(Signature)

(Printed name and title)

APPENDIX 5

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

DRAFT

AIA® Document G714™ – 2007

Construction Change Directive

PROJECT: *(Name and address)*

TO CONTRACTOR: *(Name and address)*

DIRECTIVE NUMBER:
DATE:
CONTRACT FOR:

CONTRACT DATED:
ARCHITECT'S PROJECT NUMBER:

OWNER: ☐
ARCHITECT: ☐
CONSULTANT: ☐
CONTRACTOR: ☐
FIELD: ☐
OTHER: ☐

You are hereby directed to make the following change(s) in this Contract:
(Describe briefly any proposed changes or list any attached information in the alternative)

PROPOSED ADJUSTMENTS

1. The proposed basis of adjustment to the Contract Sum or Guaranteed Maximum Price is:

- ☐ • Lump Sum of $
- ☐ • Unit Price of $ per
- ☐ • 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, is .

When signed by the Owner and Architect and received by the Contractor, this document becomes effective IMMEDIATELY as a Construction Change Directive (CCD), and the Contractor shall proceed with the change(s) described above.

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**

APPENDIX 6

AIA Document G716 – RFI Form (01310.1.6.C)

DRAFT

AIA® Document G716™ – 2004

Request for Information ("RFI")

TO:	**FROM:**	
PROJECT:	**ISSUE DATE:**	**RFI No.**
PROJECT NUMBERS: /	**REQUESTED REPLY DATE:** **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.

APPENDIX 7

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

Knowledge for Creating and Sustaining the Built Environment

SUBCONTRACTORS AND MAJOR MATERIAL SUPPLIERS LIST

Project: _____ From (Contractor): _____

_____ Date: _____

To (A/E): _____ A/E Project Number: _____

_____ Contract For: _____

List Subcontractors and Major Material Suppliers proposed for use on this Project as required by the Construction Documents. Attach supplemental sheets if necessary.

Section Number	Section Title	Firm	Address	Phone Number (Fax Number)	Contact

☐ Attachments

Signed by: Date:

Copies: ☐ Owner ☐ Consultants ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ _____ ☐ File

July 1994
CSI Form 1.5A

APPENDIX 8

CSI Substitution Request Form 1.5C (00260.1.4)

Knowledge for Creating and Sustaining the Built Environment

SUBSTITUTION REQUEST

(During the Bidding/Negotiating Stage)

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

_____ A/E Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

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.
- 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.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

_____

Telephone: _____

A/E's REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01635 Substitution Procedures.

☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01635 Substitution Procedures.

☐ Substitution rejected - Use specified materials.

☐ Substitution Request received too late - Use specified materials.

Signed by: Date:

Supporting Data Attached: ☐ Drawings ☐ Product Data ☐ Samples ☐ Tests ☐ Reports ☐ _____

APPENDIX 9

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

Knowledge for Creating and Sustaining the Built Environment

SUBSTITUTION REQUEST

(After the Bidding/Negotiating Stage)

Project: _____ Substitution Request Number: _____

_____ From: _____

To: _____ Date: _____

_____ A/E Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____

Section: _____ Page: _____ Article/Paragraph: _____

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Installer: _____ Address: _____ Phone: _____

History: ☐ New product ☐ 1-4 years old ☐ 5-10 years old ☐ More than 10 years old

Differences between proposed substitution and specified product: _____

_____

_____

☐ Point-by-point comparative data attached — REQUIRED BY A/E

Reason for not providing specified item: _____

_____

Similar Installation:

Project: _____ Architect: _____

Address: _____ Owner: _____

_____ Date Installed: _____

Proposed substitution affects other parts of Work: ☐ No ☐ Yes; explain _____

_____

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: _____

Address: _____

_____

Telephone: _____

Attachments: _____

_____

_____

_____

A/E's REVIEW AND ACTION

☐ Substitution approved - Make submittals in accordance with Specification Section 01635 Substitution Procedures.
☐ Substitution approved as noted - Make submittals in accordance with Specification Section 01635 Substitution Procedures.
☐ Substitution rejected - Use specified materials.
☐ Substitution Request received too late - Use specified materials.

Signed by: _____ Date: _____

Additional Comments: ☐ Contractor ☐ Subcontractor ☐ Supplier ☐ Manufacturer ☐ A/E ☐ _____

_____

_____

_____

_____

_____

_____

_____

APPENDIX 10

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

Knowledge for Creating
and Sustaining
the Built Environment

REQUEST FOR INTERPRETATION LOG

Project: _____ A/E Project Number: _____

Owner _____ Contractor: _____

R.F.I. NO.	DATE REC'D	BRIEF DESCRIPTION OF INFORMATION REQUESTED	DATE OF RESPONSE	R.F.P. NO.

APPENDIX 11

CSI Form 13.6A – Change Order Request (01250.1.3.B.7)

Knowledge for Creating and Sustaining the Built Environment

CHANGE ORDER REQUEST (PROPOSAL)

Project: _____ Change Order Request Number: _____

_____ From (Contractor): _____

To: _____ Date: _____

_____ A/E Project Number: _____

Re: _____ Contract For: _____

This Change Order Request (C.O.R.) contains an itemized quotation for changes in the Contract Sum or Contract Time in response to proposed modifications to the Contract Documents based on Proposal Request No._____.

Description of Proposed Change:

Attached supporting information from: ☐ Subcontractor ☐ Supplier _____ ☐ _____ ☐ _____

Reason for Change:

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

July 1994
CSI Form 13.6A

APPENDIX 12

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

Knowledge for Creating and Sustaining the Built Environment

PROPOSAL WORKSHEET DETAIL

Project: _____ Change Order Request Number: _____

To: _____ From: _____ Contact: _____

Re: _____ Date: _____

Proposal Request Number: _____ A/E Project Number: _____

SHADED AREAS FOR A/E USE

ADDITIONS

	Ref. No.	Item Description	Quantity		UNIT PRICES Materials	UNIT PRICES Labor	SUBTOTALS Materials		SUBTOTALS Labor		TOTAL	
1												
2												
3												
4												

Subtotal (Enter this number on Worksheet Summary.)

DEDUCTIONS

	Ref. No.	Item Description	Quantity		UNIT PRICES Materials	UNIT PRICES Labor	SUBTOTALS Materials		SUBTOTALS Labor		TOTAL	
1												
2												
3												
4												

Subtotal (Enter this number on Worksheet Summary.)

July 1994
CSI Form 13.6C

APPENDIX 13

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

Knowledge for Creating and Sustaining the Built Environment

PROPOSAL WORKSHEET SUMMARY

Project: _____ Change Order Request Number: _____

To: _____ From: _____

Re: _____ Date: _____

Proposal Request Number: _____ A/E Project Number: _____

Complete and attach Proposal Worksheet Detail for each element of Work. Enter Worksheet Information below.

ADDITIONS

	Sheet	Description	Material	Labor	Subtotal
1					
2					
3					
4					
5					
6					
7					
		Subtotal			

DEDUCTIONS

	Sheet	Description	Material	Labor	Subtotal
1					
2					
3					
4					
5					
6					
7					
		Subtotal			

Subcontractor's Net: _____

Subcontractor's OH&P: _____

Subcontractor's Bond: _____

Subcontractor's Total: $ -

Contractor's OH&P: _____

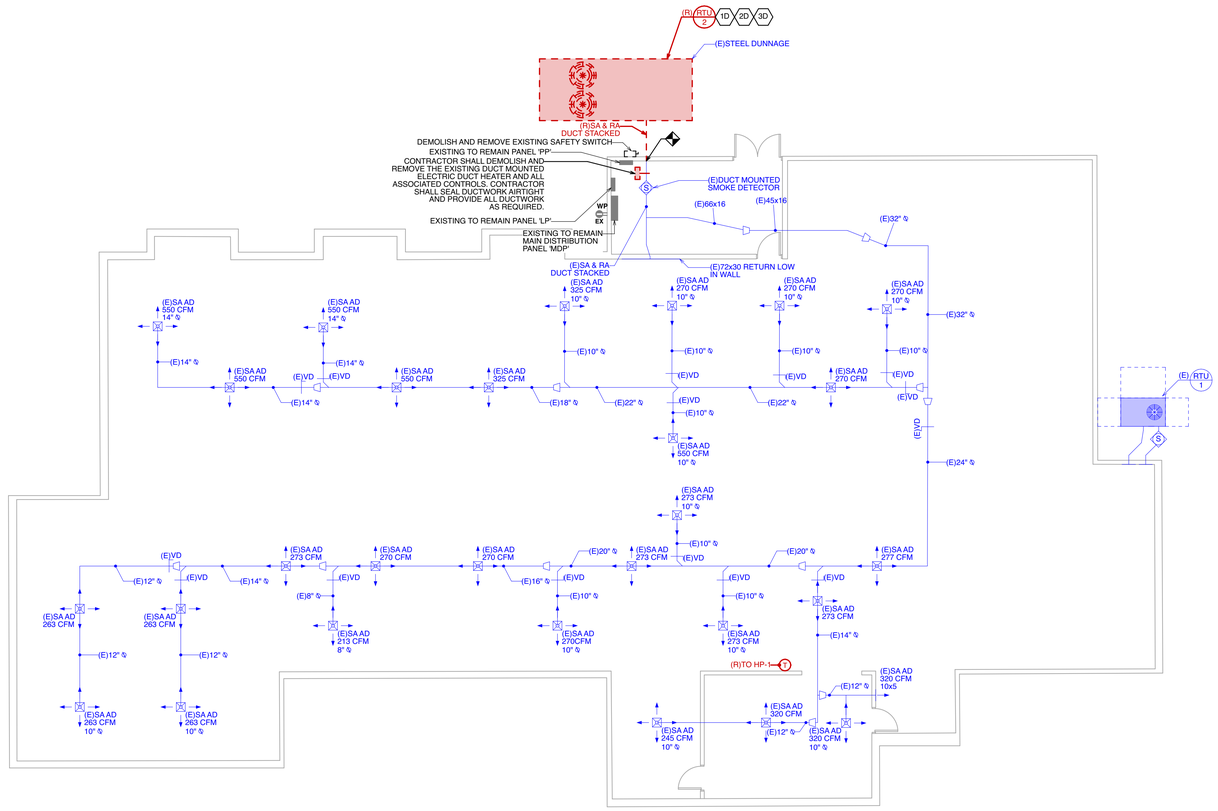
Contractor's Bond: _____

Insurance: _____

Tax: _____

WORKSHEET TOTAL $ -

July 1994
CSI Form 13.6D



FIRST FLOOR DEMOLITION MECHANICAL & ELECTRICAL PLAN

SCALE: 1/8" = 1' - 0"

DRAWING SYMBOLS

- (E) EXISTING MECHANICAL WORK TO REMAIN / EXISTING MECHANICAL WORK TO BE REUSED
- (R) EXISTING MECHANICAL WORK TO BE DEMOLISHED AND REMOVED
- EXISTING MECHANICAL WORK TO REMAIN
- EXISTING MECHANICAL WORK TO BE DEMOLISHED AND REMOVED
- NEW MECHANICAL WORK
- POINT OF DEMOLITION, CUT AND CAP EXISTING
- POINT OF CONNECTION, EXTEND AND CONNECT TO EXISTING

EXISTING CONDITIONS NOTES

1. ALL THE EXISTING SIZES AND LOCATIONS, THE MECHANICAL EQUIPMENT LOCATIONS AND TAGS, THE EXISTING ARCHITECTURAL FLOOR PLANS, ETC., HAVE BEEN DOCUMENTED BASED OFF OF EXISTING MECHANICAL DRAWINGS FROM DANGOVETSKY-KOHLER ASSOCIATES INC. CONSULTING ENGINEERS DATED SEPTEMBER 09, 1987.
2. ALTHOUGH THE EXISTING CONDITIONS DOCUMENTED ON THESE PLANS HAVE BEEN MODIFIED PER OBSERVATIONS IN THE FIELD, THE CONTRACTOR SHALL BE RESPONSIBLE TO PERFORM FINAL FIELD VERIFICATION OF ALL OF THE EXISTING CONDITIONS PRIOR TO COMMENCING WORK TO CONFIRM ALL EXISTING CONDITIONS AND LOCATIONS OF ALL HVAC EQUIPMENT, CONTROLS, PIPING, ETC.

DEMOLITION NOTES

1. THIS PROJECT IS AN EQUIPMENT REPLACEMENT PROJECT. THE DEMOLITION SCOPE ENTAILS THE CAREFUL REMOVAL OF EXISTING ROOFTOP HVAC UNIT. UNITS WILL BE INSTALLED, WIRING, AND CONDUIT WILL BE REUSED.
2. THE CONTRACTOR SHALL VISIT SITE PRIOR TO SUBMITTING HIS PROPOSAL TO VERIFY ACTUAL SITE CONDITIONS AND ANY DISCOVERED DISCREPANCIES BETWEEN DRAWINGS AND SITE CONDITIONS SHALL BE BROUGHT TO THE OWNER'S ATTENTION PRIOR TO SUBMITTING THEIR BID. THE CONTRACTOR SHALL INCLUDE ALL DEMOLITION WORK EXPOSED AND CONCEALED, WHETHER OR NOT SHOWN ON DRAWINGS, NECESSARY FOR THE EFFECTIVE INSTALLATION AND PERFORMANCE OF NEW SYSTEM. THE CONTRACTOR SHALL ALSO INCLUDE TEMPORARY REMOVAL AND REINSTALLATION OF EXISTING WORK WHEREVER NECESSARY. THE OWNER SHALL NOT ACCEPT (NOR THE CONTRACTOR PAID) EXTRA COSTS ASSOCIATED WITH THE DEMOLITION AND/OR TEMPORARY REMOVAL/ REINSTALLATION WORK FROM THE CONTRACTOR.
3. MAJOR PIECES OF EQUIPMENT ARE TO BE OFFERED TO THE OWNER FOR THEIR USE, OR AT THE OWNER'S DISCRETION, REMOVED FROM THE SITE AND BE DISPOSED OF BY THIS CONTRACTOR.
4. CARE SHALL BE TAKEN DURING DEMOLITION TO PRESERVE THE INTEGRITY OF THE EXISTING SYSTEMS, INCLUDING COMPONENTS, WIRING AND DEVICES IS TO BE REMOVED IN THIS PROJECT.

DEMOLITION SHEET NOTES

1D DEMOLISH AND REMOVE ROOFTOP UNIT. ITEMS BEING REUSED SHALL BE LEFT IN PLACE. ALL DUCTWORK, CONTROLS CONDUIT, POWER WIRING, PIPING AND ALL WORK NOT BEING REUSED SHALL BE DEMOLISHED, REMOVED AND MADE SAFE AS REQUIRED. ROOF CURBS SHALL BE INSPECTED AND REUSED IF FEASIBLE. IF NOT, THEY SHALL BE REPLACED UNDER THIS CONTRACT. CONTRACTOR SHALL BE RESPONSIBLE FOR MEANS AND METHODS OF ROOFTOP UNIT DEMOLITION INCLUDING ALL RIGGING AND REMOVAL. CARE SHOULD BE TAKEN TO PROTECT EXISTING ITEMS.

2D CONTRACTOR SHALL PREFORM PRE-BALANCING TO THE EXISTING ROOFTOP UNIT BEING DEMOLISHED. THE CONTRACTOR SHALL RECORD THE EXISTING UNIT'S TOTAL CFM, STATIC PRESSURES, ETC. THIS REPORT SHALL BE SUBMITTED TO THE ENGINEER PRIOR TO ORDERING THE REPLACEMENT UNITS.

3D CONTRACTOR SHALL DEMOLISH AND REMOVE THE EXISTING THERMOSTAT AND ASSOCIATED SPACE TEMPERATURE SENSOR. THE INTENT IS TO INSTALL NEW CONTROLS IN THE EXISTING LOCATION(S).

DEMOLITION GENERAL NOTES

1. REMOVE DESIGNATED ELEMENTS AS SHOWN ON DRAWINGS.
2. ALL MECHANICAL EQUIPMENT AND ASSOCIATED APPURTENANCES DESCRIBED SHALL BE REMOVED AND DEMOLISHED.
3. ALL ELECTRICAL WIRING SHALL BE DEMOLISHED BACK TO MAIN PANEL UNLESS INDICATED TO BE RECONNECTED.
4. COMPLY WITH APPLICABLE NFPA STANDARDS WHEN TORCH CUTTING.
5. PROVIDE, ERECT AND MAINTAIN TEMPORARY BARRIERS AND SECURITY DEVICES AS REQUIRED.
6. OBTAIN WRITTEN CONSENT OF OWNER PRIOR TO TORCH CUTTING.
7. ERECT AND MAINTAIN TEMPORARY PARTITIONS TO PREVENT SPREAD OF DUST, FUMES, NOISE AND SMOKE TO PROVIDE FOR CONTINUING OWNER OCCUPANCY.
8. CONDUCT DEMOLITION TO MINIMIZE INTERFERENCE WITH ADJACENT BUILDING AREAS. MAINTAIN PROTECTED LEGAL EGRESS AND ACCESS AT ALL TIMES. KEEP REQUIRED EXIT WAYS UNENCUMBERED AT ALL TIMES AND ARTIFICIALLY LIGHTED.
9. REMOVE DEMOLISHED MATERIALS FROM SITE AS WORK PROGRESSES AND DISPOSE OF IN A PROPER, LEGAL MANNER. UPON COMPLETION OF WORK, LEAVE AREAS OF WORK IN BROOM CLEAN CONDITION AT THE END OF EACH DAY.
10. COORDINATE ALL DEMOLITION WORK WITH FACILITIES MANAGEMENT PRIOR TO SHUT DOWN THE SERVICE MAINS TO PERFORM THE REQUIRED WORK.
11. PRIOR TO COMMENCEMENT OF DEMOLITON, THE CONSTRUCTION MANAGER SHALL WALK THE PROJECT WITH THE CONTRACTOR PERFORMING THIS WORK TO CONFIRM THE EXTENT OF DEMOLITION.

ELECTRICAL DEMOLITION NOTES

1. 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 SPECIFIES, SHOWN OR REQUIRED.
2. PERFORM ALTERATION AND ADDITIONS TO PRESENT ELECTRICAL SYSTEM WITH AM 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.
3. WHERE SPECIFIED OR REQUIRED, EXTEND EXISTING SYSTEMS OR TIE INTO SAME TO PROVIDE A COMPLETE COORDINATED ELECTRICAL SYSTEM TO SATISFACTION OF OWNER AND ARCHITECT.
4. ALL EXISTING WORK TO REMAIN, BUT DISTURBED AND DISCONNECTED BECAUSE OF ALTERATIONS AND NEW CONSTRUCTION SHALL BE REPLACED AND PUT IN OPERATING CONDITION UNLESS INSTRUCTED OTHERWISE IN WRITING BY OWNER OR ARCHITECT.
5. EXISTING BRANCH CIRCUITS NOT SHOWN SHALL REMAIN INTACT TO EXTENT PRACTICABLE, AND SHALL BE EXTENDED AS REQUIRED.
6. DISCONNECT AND REMOVE EXISTING WIRING DEVICES, LIGHTING FIXTURES AND ASSOCIATED BRANCH CIRCUIT WIRING NO LONGER REQUIRED BY NEW CONSTRUCTION.
7. 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.
8. DEMOLISH AND REMOVE EXISTING ELECTRICAL EQUIPMENT, FEEDERS AND CONDUIT NO LONGER REQUIRED BY NEW CONSTRUCTION BACK TO ELECTRICAL PANEL.
9. ALL CIRCUIT BREAKERS NO LONGER REQUIRED BY NEW CONSTRUCTION SHALL BE MADE SPARE AND SET OPEN POSITION.
10. ELECTRICAL CONTRACTOR SHALL UPDATE PANEL DIRECTORIES AT THE COMPLETION OF WORK.
11. THE CONTRACTOR SHALL VISIT SITE PRIOR TO SUBMITTING HIS PROPOSAL TO VERIFY ACTUAL SITE CONDITIONS AND ANY DISCOVERED DISCREPANCIES BETWEEN DRAWINGS AND SITE CONDITIONS SHALL BE BROUGHT TO THE OWNER'S ATTENTION PRIOR TO SUBMITTING THEIR BID. THE CONTRACTOR SHALL INCLUDE ALL DEMOLITION WORK EXPOSED AND CONCEALED, WHETHER OR NOT SHOWN ON DRAWINGS, NECESSARY FOR THE EFFECTIVE INSTALLATION AND PERFORMANCE OF NEW SYSTEM. THE OWNER SHALL NOT ACCEPT (NOR THE CONTRACTOR PAID) EXTRA COSTS ASSOCIATED WITH THE DEMOLITION AND/OR TEMPORARY REMOVAL/REINSTALLATION WORK FROM THE CONTRACTOR.

HOLSTEIN WHITE
ENGINEERS
3800 Horizon Blvd., Suite 503 O: (215).322.7711
Trevose, PA 19053 F: (215).322.7709
www.holsteinwhite.com

Scott A. White, P.E.
License No. PA: PE075392

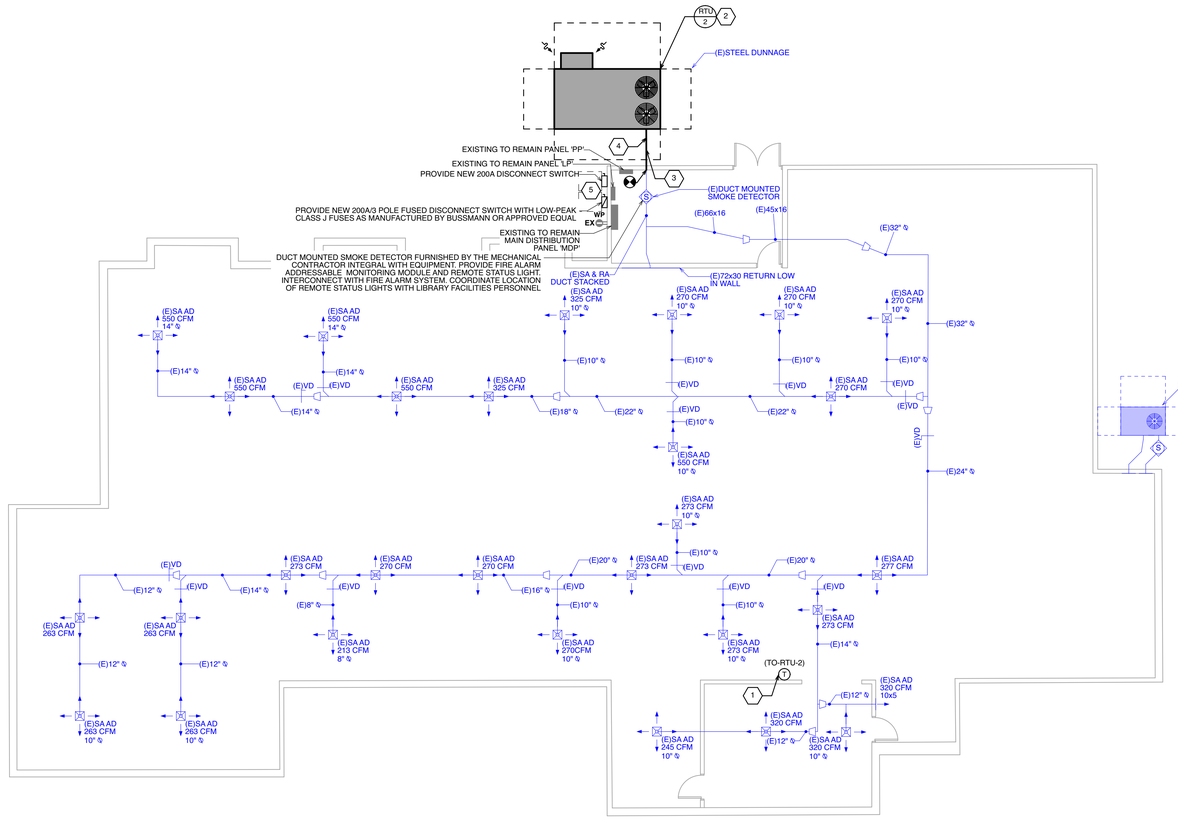
FIRST FLOOR DEMOLITION MECHANICAL & ELECTRICAL PLAN

HVAC UNIT REPLACEMENT FOR THE PERKASIE AREA BRANCH LIBRARY OF THE BUCKS COUNTY FREE LIBRARY SYSTEM
491 Arthur Avenue
Perkasie, PA 18944

Revisions

PROJECT NO:	26-1170
DATE:	JUNE 12, 2026
DRAWN BY:	KM | JS
CHECKED:	JB | PP
SCALE:	AS NOTED
PLOT DATE:	

DME-1.0



1 FIRST FLOOR MECHANICAL & ELECTRICAL PLAN

SCALE: 1/8" = 1' - 0"

EXISTING CONDITIONS NOTES

1. ALL THE EXISTING SIZES AND LOCATIONS, THE MECHANICAL EQUIPMENT LOCATIONS AND TAGS, THE EXISTING ARCHITECTURAL FLOOR PLANS, ETC., HAVE BEEN DOCUMENTED BASED OFF OF EXISTING MECHANICAL DRAWINGS FROM DANGOVETSKY-KOHLER ASSOCIATES INC. CONSULTING ENGINEERS DATED SEPTEMBER 09, 1987.
2. ALTHOUGH THE EXISTING CONDITIONS DOCUMENTED ON THESE PLANS HAVE BEEN MODIFIED PER OBSERVATIONS IN THE FIELD, THE CONTRACTOR SHALL BE RESPONSIBLE TO PERFORM FINAL FIELD VERIFICATION OF ALL OF THE EXISTING CONDITIONS PRIOR TO COMMENCING WORK TO CONFIRM ALL EXISTING CONDITIONS AND LOCATIONS OF ALL HVAC EQUIPMENT, CONTROLS, PIPING, ETC.

PROJECT SCHEDULE & SHUTDOWN NOTES

1. ALL WORK AND SCHEDULED SHUTDOWNS MUST BE PERFORMED DURING LIBRARY OFF HOURS (8PM-9AM).
2. ALL SHUTDOWNS SHALL BE INCLUDED IN PROJECT SCHEDULE AND APPROVED IN WRITING BY THE OWNER PRIOR TO COMMENCING WORK. EXPECTED DURATIONS OF ALL SHUTDOWNS SHALL BE INCLUDED.
3. NOTIFY THE OWNER OF EACH PLANNED SHUTDOWN AT LEAST 48 HOURS PRIOR, AND RECEIVE WRITTEN APPROVAL FROM OWNER.
4. UNLESS OTHERWISE DIRECTED BY OWNER, NO SHUTDOWNS SHALL EXTEND INTO THE LIBRARY'S BUSINESS HOURS.

DRAWING SYMBOLS

- (E) EXISTING MECHANICAL WORK TO REMAIN / EXISTING MECHANICAL WORK TO BE REUSED
- (R) EXISTING MECHANICAL WORK TO BE DEMOLISHED AND REMOVED
- EXISTING MECHANICAL WORK TO REMAIN
- EXISTING MECHANICAL WORK TO BE DEMOLISHED AND REMOVED
- NEW MECHANICAL WORK
- POINT OF DEMOLITION, CUT AND CAP EXISTING
- POINT OF CONNECTION, EXTEND AND CONNECT TO EXISTING

SHEET NOTES

1. PROVIDE NEW SEVEN DAY PROGRAMMABLE THERMOSTAT WITH TAMPER PROOF COVER. THE INTENT IS TO INSTALL THE NEW THERMOSTAT FOR RTU-2 WHERE THE EXISTING THERMOSTAT IS LOCATED. VERIFY EXACT LOCATION IN FIELD WITH BUILDING FACILITIES.
2. REFER TO THE FOLLOWING NOTES FOR (N) RTU:
   - THE INTENT IS TO REUSE THE EXISTING STEEL DUNNAGE AND SUPPORTS FOR (N) RTU. CONTRACTOR SHALL VERIFY EXISTING DIMENSIONS OF STEEL DUNNAGE AND SUPPORTS AND MODIFY ACCORDING TO MANUFACTURES RECOMMENDATIONS IF REQUIRED.
   - ALL CONDENSATE FROM RTU SHALL RUN TO GRADE.
3. CONTRACTOR SHALL PROVIDE ALL REQUIRED SUPPLY AND RETURN DUCTWORK TRANSITIONS TO TIE NEW ROOF TOP UNITS SUPPLY AND RETURN DUCTWORK INTO THE EXISTING SUPPLY AND RETURN DUCTWORK INSIDE MECHANICAL ROOM. VERIFY ALL SIZES AND LOCATIONS IN FIELD.
4. ALL EXPOSED DUCTWORK SHALL BE SEALED AND WEATHERTIGHT, REFER TO THE MATERIALS AND INSULATION SCHEDULE ON ME-2.0 FOR FURTHER INFORMATION PROVIDE PATE DUCTWORK SUPPORT AT INTERVALS AS REQUIRED BY THE MANUFACTURE ON ALL GRADE MOUNTED DUCTWORK.
5. PROVIDE NEW DISCONNECT SWITCHES AND FEEDS FOR NEW ROOF-TOP UNIT (RTU-2). REFER TO SINGLE LINE DIAGRAM ON DRAWING ME-2.0. FOR ADDITIONAL INFORMATION.

ELECTRICAL SYMBOLS

- **GFI Duplex Receptacle - 125V, 2P, 3W**
- **Motor**
- **Unfused Disconnect Switch**
- **Fused Disconnect Switch**
- **WP** **Weatherproof**
- **Electrical Panel**

ELECTRICAL DRAWING NOTES

1. FIELD VERIFY LOCATION OF ALL WIRING DEVICES WITH ARCHITECT PRIOR TO ROUGH-IN.
2. COORDINATE INSTALLATION OF HVAC EQUIPMENT WITH MECHANICAL CONTRACTOR AND WIRE DISCONNECT SWITCHES FURNISHED BY MECHANICAL CONTRACTOR.

ELECTRICAL STANDARD MOUNTING HEIGHTS

9" Below Finished Ceiling	Wall-Mounted Clocks, Program Bells, Fire Alarm Gongs and Horns
10'-0"	Battery Lighting Units and Remote Wall Mounted Lighting Heads (Or 1'-0" Below Finised Ceiling)
8'-6"	Pendant Hung Industrial and Strip Lighting Fixtures
Center Above Door or Window Opening	Warning and Signaling Fixtures/Signs
6'-8" or 6" Below Finished Ceiling	Fire Alarm Illuminated Flashing Lights (Lowest of the two Heights). **Mounting Height to the Bottom of Device.**
6'-8"	Top of Back-Mounted Wall Exit Signs (Not Mounted Above Doors)
6'-6"	Top of Flush and Surface Mounted Electrical Panelboards and Communication System Cabinets
6'-0"	Top of Highest Electrical Safety Disconnect Switches, Magnetic Motor Starters and Contactors
4'-6"	Wall Mounted Telephones and Pay Stations (3'-6" at Handicap Locations)
4'-0"	Top of Highest Circuit Breaker in Accessible Load Centers
3'-6"	Fire Alarm Pull Stations
3'-4"	Wall Mounted Electrical Device Lighting Switches
2'-0"	Electrical Receptacles in Mechanical Spaces, Electrical and Elevator Rooms
1'-6"	Electrical Receptacles, Television Outlets, Telephone Outlets, and Computer Outlets
0'-0"	Finished Floor

Mounting Heights to center of outlets unless otherwise noted. In masonry construction the mounting heights shall be used for reference to the nearest block or brick coursing.
The above mounting heights shall be adhered to unless specifically noted or detailed on the Architectural drawings or specifications.

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FIRST FLOOR MECHANICAL & ELECTRICAL PLAN

HVAC UNIT REPLACEMENT FOR THE PERKASIE AREA BRANCH LIBRARY OF THE BUCKS COUNTY FREE LIBRARY SYSTEM
491 Arthur Avenue
Perkasie, PA 18944

Revisions

PROJECT NO:	26-1170
DATE:	JUNE 12, 2026
DRAWN BY:	KM | JS
CHECKED:	JB | PP
SCALE:	AS NOTED
PLOT DATE:	

ME-1.0

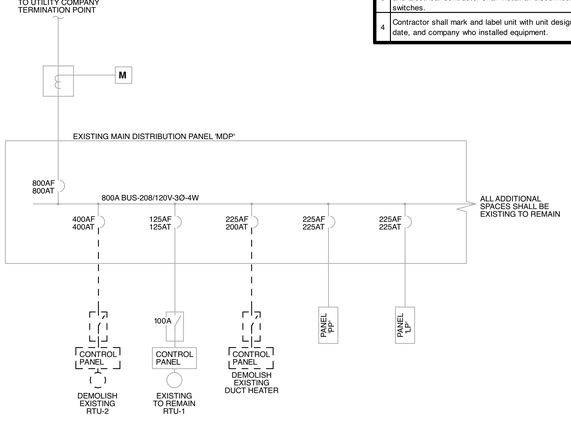
ELECTRIC ROOFTOP UNIT SCHEDULE	
Unit Designation	**RTU-2**
Basis of Design	Carrier
Model Number	50K4DJD26C7B5A1B3B1
Nominal Tonnage	25
Total Airflow [CFM]	9100
ESP [in. W.C.]	1
Dimensions (L x W x H)[in]	166 x 94 x 79
Approximate Weight [lbs]	4000
Service	Library
Cooling Performance	
Gross Total Capacity [MBH]	303.61
Gross Sensible Total Capacity [MBH]	220.2
EAT (db / wb)[°F]	80 / 67
LAT (db / wb)[°F]	57.6 / 56.4
EER	10
IEER	15.1
Heating Performance	
Electric Heater FLA	150.1
Heating Capacity (kW)	54.1
EAT (db)[°F]	70
LAT (db)[°F]	88.8
Electrical	**208V / 3Ph / 60Hz**
Compressor Quantity	2
Compressor 1 RLA / LRA [A]	28.7 / 207.5
Compressor 2 RLA / LRA [A]	49 / 386.3
Indoor Fan Motor Hp / MOC [A]	5 / 15.4
Outdoor Fan Quantity	2
Outdoor Fan FLA / MOC (ea) [A]	2 / 5.8
MCA [A]	176.0
MOCP [A]	200
Options	
24/7 Programmable Thermostat	Yes
BACNET controls compatible for future tie into building automation system	Yes
Humidity & Enthalpy Sensors	Yes
Condensate Overflow Switch	Yes
Low Ambient Cooling	Yes
Stainless Steel Drain Pan	Yes
2" MERV Filter	Yes
Ultra Low Leak Economizer	Yes
Factory Installed Smoke Detector	Yes
Factory Mtd. Powered GFCI Outlet	Yes
Non-Fused Disconnect	Yes
R-454B Refrigerant	Yes
Low Sound Package	Yes
Digital Compressor	Yes
Shaft Grounding Rings	Yes
Double Wall Bottom	Yes
Barometric Relief	Yes
Standard Compressor Warranty	Yes
General Notes	
1	Entire installation shall conform to manufacturer's recommendations.
2	Provide thermostat capable of operating unit at occupied and unoccupied cycle.
3	Mechanical Contractor shall furnish all disconnect switches and Electrical Contractor shall install all disconnect switches.
4	Contractor shall mark and label unit with unit designation, date, and company who installed equipment.

ELECTRICAL SPECIFICATIONS

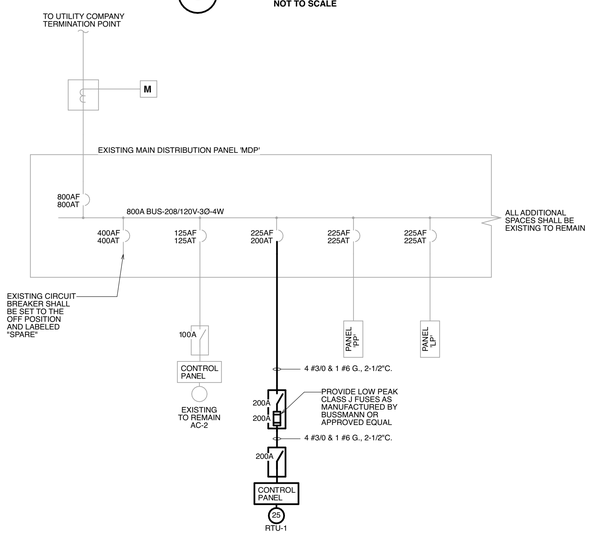
1. Contractor shall provide all labor, materials, tools, apparatus and equipment required to complete his work in accordance with the contract documents, codes, laws and ordinances, and accepted trade procedures.
2. The contractor by his acceptance of the contract guarantees that all work installed shall 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.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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.
8. 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.
9. 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.
10. 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.
11. 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.
13. 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.
14. 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 shall run 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.
15. Where conductors connect directly to equipment, the insulation temperature rating of the conductor shall meet or exceed the equipment temperature rating.
16. Color code conductors to designate neutral conductor and phases. Color coding shall conform with existing building standard.
17. 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 equipment terminals.
18. Grounding shall comply with Article 250 of NEC and to approval of local Underwriters inspection authorities.
19. 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.
20. 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.
21. Provide all labor, materials and equipment required to provide electric power to meet the requirements for heating, ventilating, air-conditioning 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.
22. 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 satisfaction of Owner and Architect.
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.
28. 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.
31. 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.
33. Provide typed updated panel directory at the completion of the project.
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 passageways clear.
35. Protect all conduit, fittings, panel boards, and other equipment before and during installation and keep clean.
36. Identify each 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 Sotorite 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 programming..
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.

SINGLE LINE DIAGRAM NOTES

1. UNLESS OTHERWISE NOTED, ALL DEVICES AND SPACES ARE 3 POLE.
2. UNLESS OTHERWISE NOTED, ALL ABOVE GRADE CONDUCTORS SHALL BE COPPER, TYPE THW, RATED 75°C.
3. UNLESS OTHERWISE NOTED ALL BELOW GRADE CONDUCTORS SHALL BE COPPER, TYPE XHHW-2, RATED 75°C.
4. UNLESS OTHERWISE NOTED, ALL INTERIOR CONDUITS SHALL BE EMT.
5. UNLESS OTHERWISE NOTED ALL UNDERGROUND AND EXTERIOR CONDUITS SHALL BE SCHEDULE 40 PVC.
6. LIGHT LINEWEIGHT INDICATES EXISTING EQUIPMENT.
7. HEAVY LINEWEIGHT INDICATES NEW EQUIPMENT.
8. DASHED LINEWEIGHT INDICATES DEMOLISH AND REMOVE.
9. ALL EQUIPMENT SHALL BE SERIES RATED TO WITHSTAND THE AVAILABLE SHORT CIRCUIT CURRENT.
10. CONTRACTOR SHALL PROVIDE PERMANENT LABELS ON ALL ELECTRICAL AND HVAC EQUIPMENT INDICATING THE MAXIMUM AVAILABLE FAULT CURRENT.



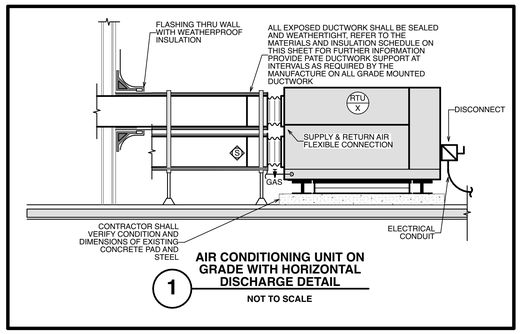
3 DEMOLITION SINGLE LINE DIAGRAM
NOT TO SCALE



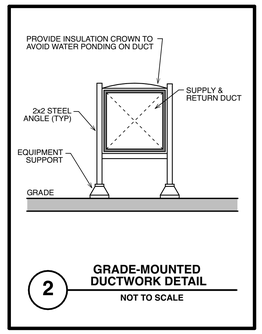
4 NEW WORK SINGLE LINE DIAGRAM
NOT TO SCALE

MATERIAL AND INSULATION SCHEDULE

	Material		Insulation			
System	Basis of Design	Basis of Design	Type	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"
Ductwork - Supply/Return Air (Exposed)	Galvanized Steel	Certainteed	3M Wrap	1/2	Integral	Pressure Class/Seal Class "B". Construct per SMACNA Standards.



1 AIR CONDITIONING UNIT ON GRADE WITH HORIZONTAL DISCHARGE DETAIL
NOT TO SCALE



2 GRADE-MOUNTED DUCTWORK DETAIL
NOT TO SCALE

MECHANICAL SPECIFICATIONS

GENERAL NOTES:

1. 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.
2. 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.
3. 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.
4. 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.
5. 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.
6. 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.
7. 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.
8. 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.
9. 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.
10. 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.
11. 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.
12. 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.
13. The Contractor shall be responsible for all working conditions and shall maintain a safe working environment at the job site for all Employees.
14. All work shall be installed in strict accordance with the equipment Manufacturer's recommendations and requirements.
15. Openings around ductwork and piping passing through the construction shall be sealed with fire barrier caulking.
16. All systems are to be tested, adjusted and balanced to provide performance as indicated on the drawings. Test and adjust all safety controls.
17. 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.
18. 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.
19. The HVAC and Plumbing trades shall coordinate all work with the General Contractor prior to installation.
20. 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 work.
21. The Contractor shall maintain as-built drawings and deliver them to the Owner upon completion of the project.
22. 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.
23. The HVAC trades shall coordinate all electrical loads with the Electrical Contractor.

HVAC NOTES:

1. 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.
2. Provide all specialties, accessories, controls and the like to provide a complete, quiet, properly operating automatically controlled systems.
3. 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.
4. 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.
5. 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 balance the systems and produce quiet, draftless operation. Ductwork sizes shown on the plans are sheet metal I.D. free area.
6. Ductwork shall be constructed to the sizes shown and made airtight during erection with caulked, taped or hardcast joints to restrict leakage to 5% or less of circulated air.
7. 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.
8. 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.
9. 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.
11. Contractor shall coordinate all diffuser, grille and register locations with architectural ceiling plans and lighting layouts.
12. 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

XX / X	EQUIPMENT DESIGNATION TAG
	SUPPLY AIR DIFFUSER (CEILING)
	SUPPLY AIR DIFFUSER (SIDEWALL)
	SUPPLY AIR DIFFUSER (LINEAR, CEILING)
	SUPPLY AIR DIFFUSER (LINEAR, WALL)
	RETURN AIR DIFFUSER (CEILING)
	EXHAUST AIR DIFFUSER (CEILING)
	RETURN/EXHAUST AIR DIFFUSER (SIDEWALL)
	BRANCH DAMPER
	VOLUME DAMPER
	2" DOOR UNDERCUT
T	THERMOSTAT
S	DUCT MOUNTED SMOKE DETECTOR
	DUCT SIZE TRANSITION
	EXHAUST FAN
	FLEXIBLE DUCTWORK
	DUCT W/ ACOUSTICAL LINING
	RETURN/EXHAUST AIR DUCT UP
	RETURN/EXHAUST AIR DUCT DN
	SUPPLY/MAKE-UP AIR DUCT UP
	SUPPLY/MAKE-UP AIR DUCT DN
CD	CONDENSATE DRAIN
	DIRECTION OF FLOW
	PIPE TURNING DOWN
	PIPE TURNING UP
	CAPPED FLANGE

AD	AIR DEVICE
A.F.F.	ABOVE FINISHED FLOOR
CFM	CUBIC FEET OF AIR PER MINUTE
DN	DOWN
EA	EXHAUST AIR
EF	EXHAUST FAN
FFH	FAN FORCED HEATER
M.O.D.	MOTORIZED DAMPER
OA	OUTSIDE AIR
RA	RETURN AIR
RTU	ROOFTOP UNIT
SA	SUPPLY AIR
UC	UNDERCUT
UH	UNIT HEATER

PIPING AND DUCT CRITERIA

1. 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.
2. 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 FOLLOWS:

CONDENSATE PIPE SIZING CHART

TONS	SIZE
0-20	3/4"
20-40	1"
40-90	1-1/4"
90-125	1-1/2"
125-250	2"

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

ELECTRICAL COORDINATION

1. IT SHALL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR TO COORDINATE THE LOCATIONS OF SUPPRESSION SYSTEM 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 MAY RESULT IN RELOCATION OF SUPPRESSION SYSTEM PIPING AT CONTRACTOR'S EXPENSE.
3. PER NFPA 70, ARTICLE 110.26(F): DEDICATED EQUIPMENT SPACE SHALL APPLY TO SWITCHBOARDS, DISTRIBUTION PANELS, AND MOTOR CONTROL CENTERS. THE SPACE EQUAL TO 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.

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MECHANICAL & ELECTRICAL SCHEDULES & DETAILS

HVAC UNIT REPLACEMENT FOR THE PERKASIE AREA BRANCH LIBRARY OF THE BUCKS COUNTY FREE LIBRARY SYSTEM
491 Arthur Avenue
Perkasie, PA 18944

Revisions

PROJECT NO:	26-1170
DATE:	JUNE 12, 2026
DRAWN BY:	KM | JS
CHECKED:	JB | PP
SCALE:	AS NOTED
PLOT DATE:	

ME-2.0