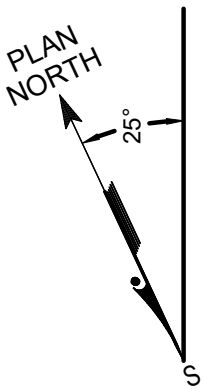


ROOF MOUNTED
SOLAR PV SYSTEM
400,710 kW

BALLASTED RACKING SYSTEM
5 DEG TILT - 128/153/168 DEG AZIMUTH
703 Q-CELL 570w PV MODULES

UTILITY
METER
UTILITY PAD
MOUNTED
TRANSFORMER



SERVICE ENTRANCE
TO BUILDING

AVAILABLE
SLAB

SWITCHBOARD MDP
IN UTILITY RM.

EC-1 ALTERNATE
DEDUCT ARRAY MODULES

INVERTER ON ROOFTOP
MECHANICAL SCREEN

INVERTER AND PV
COMBINER ON
ROOFTOP
MECHANICAL
SCREEN

ARRAY LAYOUT PLAN

1/16" = 1'

1

PV.1

GENERAL NOTE

PROPOSED ROOF ARRAY PLAN INDICATES BASIS OF DESIGN LAYOUT FOR THE PV MODULES, ETC INDICATED ON DESIGN BUILD EQUIPMENT SPECIFICATIONS AND SCHEDULES. PERMIT DESIGN DOCUMENTS TO SHOW FINAL PANEL SIZE, RATING, FOR AN EQUIVALENT ARRAY OUTPUT INDICATING THE ARRAY FOOTPRINT AND SETBACKS AT ROOF EDGE, OBSTRUCTIONS, ETC.

NOTES

1. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO COMMENCEMENT OF THE WORK. DO NOT SCALE DRAWINGS.
2. DEVICE AND WIRE SIZES SHALL BE THE RESPONSIBILITY OF THE EC.
3. ALL COORDINATION WITH THE UTILITY SHALL BE THE RESPONSIBILITY OF THE EC.
4. ALL MATERIALS AND EQUIPMENT FURNISHED FOR THIS PROJECT SHALL BE NEW AND APPROVED BY AN NRTL.
5. ALL ELECTRICAL WORK SHOULD BE INSTALLED IN ACCORDANCE WITH THE NFPA 70 - 2017 NATIONAL ELECTRICAL CODE (NEC), THE UTILITY AND FINAL APPROVAL PER AHJ.
6. THE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC WITH ALL DEVICES, ETC. SHOWN IN SYMBOL FORM. THE CONTRACTOR SHALL VERIFY ALL EQUIPMENT LOCATIONS AND CONSTRUCTION FEATURES PRIOR TO ROUGH IN OF THE ELECTRICAL COMPONENTS.
7. ALL PHOTOVOLTAIC EQUIPMENT AND WIRING SHALL BE INSTALLED IN ACCORDANCE WITH NEC SECTION 690.
8. PV MODULES AND ARRAY RACK GROUNDING TO BE UL OR ETL APPROVED WITH GROUNDING METHODS IN COMPLIANCE WITH NEC AND MANUFACTURER'S REQUIREMENTS.
9. ALL AC AND DC OUTSIDE WIRING ROUTED AWAY FROM THE RACKING SYSTEM WIRE MANAGEMENT SHALL BE INSTALLED IN WATERTIGHT EMT AND APPROVED CABLE TRAY UNLESS OTHERWISE NOTED OR APPROVED.
10. ALL DC WIRE SHALL BE INSULATED STRANDED COPPER 90 DEGREE C RATED TYPES THHN/THWN-2 AND 1000V UL 4703 LISTED PV WIRE, UNLESS SPECIFIED ON THE DRAWINGS OR APPROVED.
11. ALL EQUIPMENT GROUND CONDUCTORS TO BE #6 BARE SOLID COPPER IN THE RACKING. TRANSITION TO STRANDED WIRE WHEN RUN IN RACEWAY.
12. THE CONTRACTOR SHALL SUPPORT, FASTEN AND SECURE THE SOLAR MODULE WHIPS AND JUMPERS WITH APPROVED CLIPS OR TIE-WRAPS.
13. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY SUPPORTS, EXPANSION FITTING AND CONNECTORS REQUIRED TO PROPERLY ROUTE CONDUITS.
14. ANY CIRCUIT BREAKERS, FUSES AND DISCONNECT SWITCHES INSTALLED BETWEEN THE INVERTER AND MAIN DISTRIBUTION PANEL TO HAVE A SHORT CIRCUIT RATING EQUAL TO / EXCEEDING THE MAIN CIRCUIT BREAKER IN THE MDP.
15. INSTALL WIRING LABELS AS REQUIRED BY ARTICLE 690 AND OTHER RELATED ARTICLES IN THE NEC ON ALL ELECTRICAL EQUIPMENT ASSOCIATED WITH THE PHOTOVOLTAIC SYSTEMS.
16. PV MODULE, STRING AND ARRAY CIRCUIT RATINGS SHALL BE DISPLAYED ON LABELS PERMANENTLY MARKED AND AFFIXED ON THE INVERTER AND COMBINER BOXES.
17. INSTALL PERMANENT PLAQUES AT THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS INDICATING THE LOCATIONS OF BOTH THE POWER SOURCES. THE INSTALLATION OF THE PLAQUES SHALL BE IN COMPLIANCE WITH BOTH NEC 690 AND NEC 705.
18. MAINTAIN A SET OF RECORD DRAWINGS SHOWING MARK-UP OF THE ORIGINAL DESIGN DRAWINGS WITH APPROVED CHANGES BY THE DESIGN PROFESSIONAL OR REQUIRED BY THE AHJ.
19. PROVIDE TO THE OWNER ALL THE SPECIFICATIONS, INSTALLATION INSTRUCTIONS AND OPERATION AND MAINTENANCE MANUALS.
20. REFERENCE DIVISION 26 REQUIREMENTS FOR THE INSTALLATION AND TEST PROCEDURE FOR TEST, START-UP AND COMMISSIONING OF THE SYSTEM.

The Contractor on site shall verify all dimensions and existing conditions. The Contractor is required to perform all work in compliance with applicable codes and regulations of governing authorities having jurisdiction.

1	110725	BID DWG - NOT FOR CONSTRUCTION
NO.	DATE	DESCRIPTION

SOLAR CONSULTANT

Celentano Energy Services
7821 Flourtown Ave.
Wyndmoor, PA 19038

PROJECT
SOLAR PHOTOVOLTAIC SYSTEM
400.71 kW DC
ROOF MOUNTED ARRAY
CHATHAM ELEMENTARY
400 ALLSTON RD, HAVERTOWN, PA 19083

DRAWING TITLE

BASE BID
ARRAY LAYOUT

PROPERTY OWNER

THE SCHOOL DISTRICT
OF
HAVERFORD TOWNSHIP

ISSUE DATE		DRAWN BY
11 / 07 /25		MJC

DRAWING NO.
PV.1

GENERAL NOTE

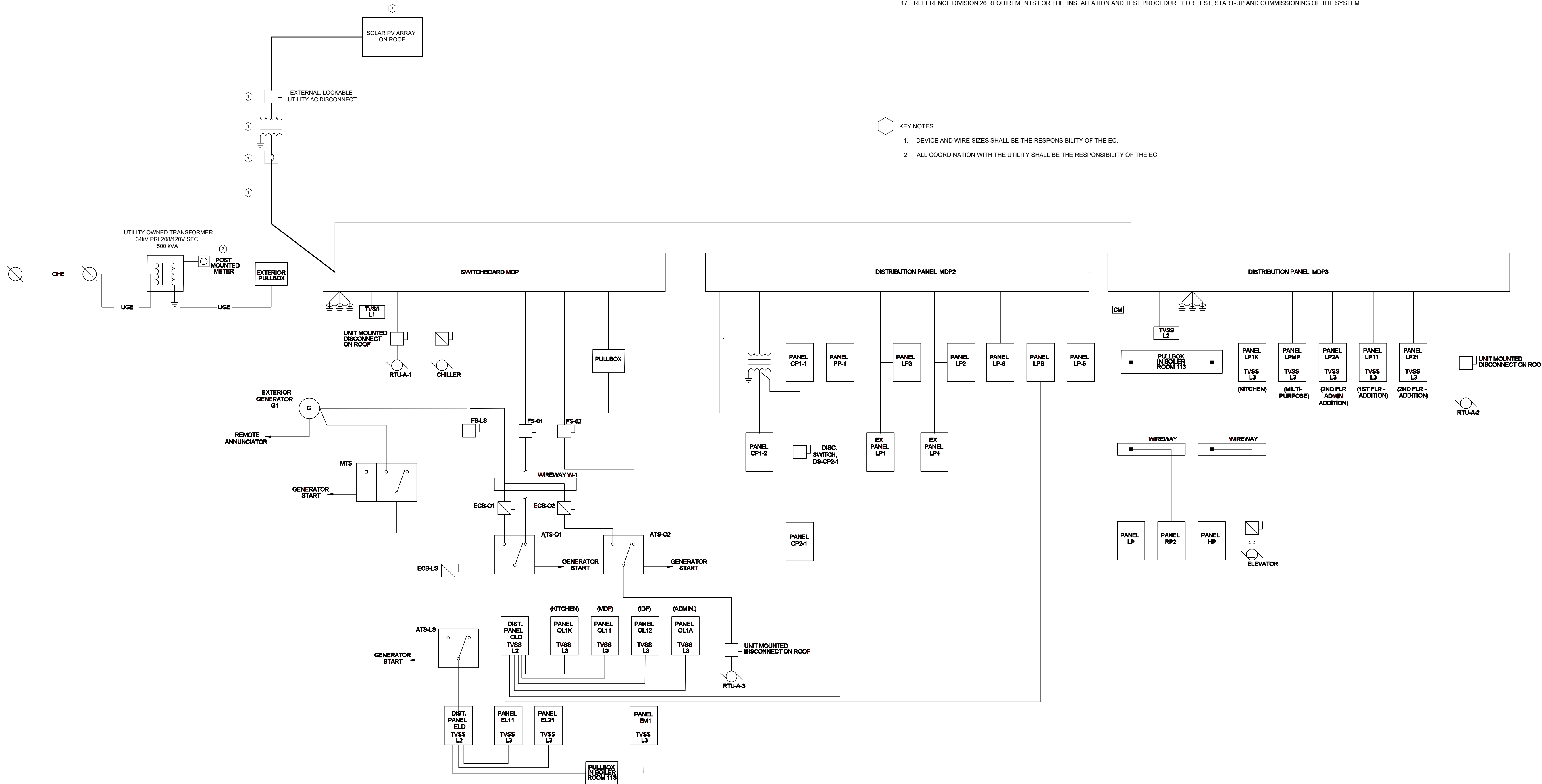
PROPOSED INTERCONNECTION ON THE LINE SIDE OF THE MAIN SWITCHBOARD INDICATES BASIS OF DESIGN ONLY. IT IS THE RESPONSIBILITY OF THE EC TO DETERMINE THE FINAL INTERCONNECTION DESIGN, INVERTER SUBPANEL AND INVERTERS TO INCLUDE IN THE UTILITY INTERCONNECTION SINGLE LINE DRAWING AND FINAL PERMIT DESIGN DOCUMENTS.

NOTES

1. ALL MATERIALS AND EQUIPMENT FURNISHED FOR THIS PROJECT SHALL BE NEW AND APPROVED BY AN NRTL.
2. ALL ELECTRICAL WORK SHOULD BE INSTALLED IN ACCORDANCE WITH THE NFPA 70 - 2017 NATIONAL ELECTRICAL CODE (NEC), THE UTILITY AND FINAL APPROVAL PER AHJ.
3. THE ELECTRICAL DRAWINGS ARE DIAGRAMMATIC WITH ALL DEVICES, ETC. SHOWN IN SYMBOL FORM. THE CONTRACTOR SHALL VERIFY ALL EQUIPMENT LOCATIONS AND CONSTRUCTION FEATURES PRIOR TO ROUGH IN OF THE ELECTRICAL COMPONENTS.
4. ALL PHOTOVOLTAIC EQUIPMENT AND WIRING SHALL BE INSTALLED IN ACCORDANCE WITH NEC SECTION 690
5. PV MODULES AND ARRAY RACK GROUNDING TO BE UL OR ETL APPROVED WITH GROUNDING METHODS IN COMPLIANCE WITH NEC AND MANUFACTURER'S REQUIREMENTS.
6. ALL AC AND DC OUTSIDE WIRING ROUTED AWAY FROM THE RACKING SYSTEM WIRE MANAGEMENT SHALL BE INSTALLED IN WATERTIGHT EMT AND APPROVED CABLE TRAY UNLESS OTHERWISE NOTED OR APPROVED.
7. ALL DC WIRE SHALL BE INSULATED STRANDED COPPER 90 DEGREE C RATED TYPES THHN/THWN-2 AND 1000V UL 4703 LISTED PV WIRE, UNLESS SPECIFIED ON THE DRAWINGS OR APPROVED.
8. ALL EQUIPMENT GROUND CONDUCTORS TO BE #8 BARE SOLID COPPER IN THE RACKING, TRANSITION TO STRANDED WIRE WHEN RUN IN RACEWAY.
9. THE CONTRACTOR SHALL SUPPORT, FASTEN AND SECURE THE SOLAR MODULE WHIPS AND JUMPERS WITH APPROVED CLIPS OR TIE-WRAPS.
10. THE CONTRACTOR SHALL PROVIDE ALL NECESSARY SUPPORTS, EXPANSION FITTING AND CONNECTORS REQUIRED TO PROPERLY ROUTE CONDUITS.
11. ANY CIRCUIT BREAKERS, FUSES AND DISCONNECT SWITCHES INSTALLED BETWEEN THE INVERTER AND MAIN DISTRIBUTION PANEL TO HAVE A SHORT CIRCUIT RATING EQUAL TO / EXCEEDING THE MAIN CIRCUIT BREAKER IN THE MDP.
12. INSTALL WIRING LABELS AS REQUIRED BY ARTICLE 690 AND OTHER RELATED ARTICLES IN THE NEC ON ALL ELECTRICAL EQUIPMENT ASSOCIATED WITH THE PHOTOVOLTAIC SYSTEMS.
13. PV MODULE, STRING AND ARRAY CIRCUIT RATINGS SHALL BE DISPLAYED ON LABELS PERMANENTLY MARKED AND AFFIXED ON THE INVERTER AND COMBINER BOXES.
14. INSTALL PERMANENT PLAQUES AT THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS INDICATING THE LOCATIONS OF BOTH THE POWER SOURCES. THE INSTALLATION OF THE PLAQUES SHALL BE IN COMPLIANCE WITH BOTH NEC 690 AND NEC 705.
15. MAINTAIN A SET OF RECORD DRAWINGS SHOWING MARK-UP OF THE ORIGINAL DESIGN DRAWINGS WITH APPROVED CHANGES BY THE DESIGN PROFESSIONAL OR REQUIRED BY THE AHJ.
16. PROVIDE TO THE OWNER ALL THE SPECIFICATIONS, INSTALLATION INSTRUCTIONS AND OPERATION AND MAINTENANCE MANUALS.
17. REFERENCE DIVISION 26 REQUIREMENTS FOR THE INSTALLATION AND TEST PROCEDURE FOR TEST, START-UP AND COMMISSIONING OF THE SYSTEM.

KEY NOTES

1. DEVICE AND WIRE SIZES SHALL BE THE RESPONSIBILITY OF THE EC.
2. ALL COORDINATION WITH THE UTILITY SHALL BE THE RESPONSIBILITY OF THE EC.



SINGLE LINE DRAWING
NOT TO SCALE

1
PV.2

The Contractor on site shall verify all dimensions and existing conditions. The Contractor is required to perform all work in compliance with applicable codes and regulations of governing authorities having jurisdiction.

1	110725	BID DWG - NOT FOR CONSTRUCTION
NO.	DATE	DESCRIPTION

SOLAR CONSULTANT

Celentano Energy Services
7821 Flourtown Ave.
Wyndmoor, PA 19038

PROJECT
SOLAR PHOTOVOLTAIC SYSTEM
400.71 kW DC
ROOF MOUNTED ARRAY
CHATHAM ELEMENTARY
400 ALLSTON RD, HAVERFORD, PA 19083

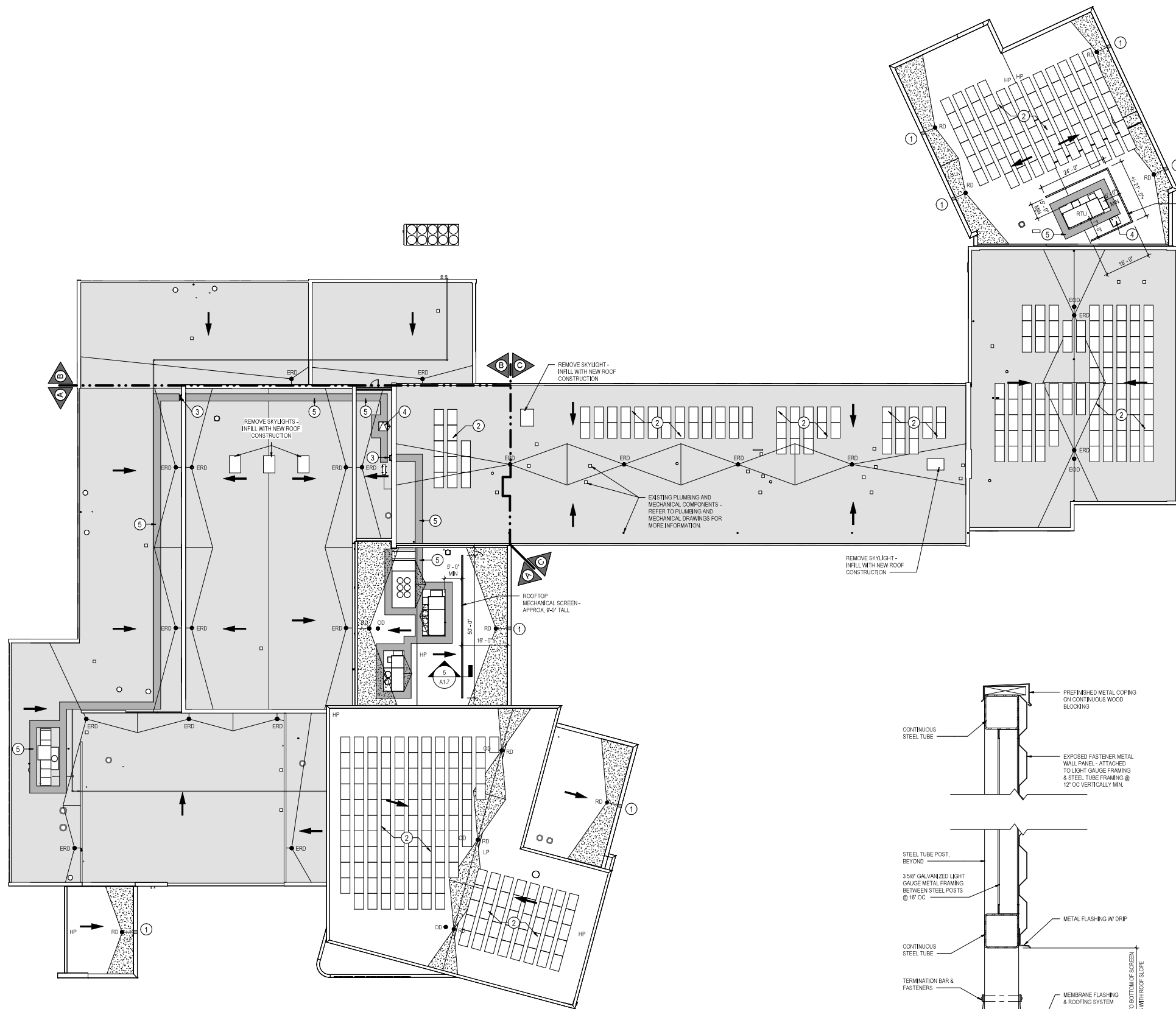
DRAWING TITLE

BASE BID
SINGLE LINE DRAWING

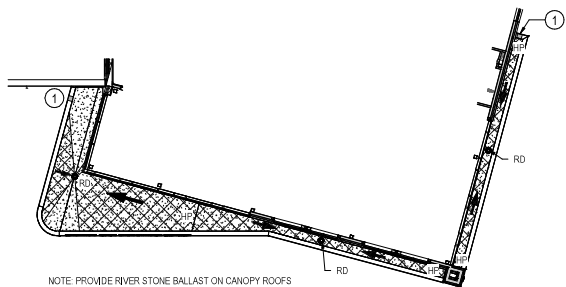
PROPERTY OWNER

THE SCHOOL DISTRICT
OF
HAVERFORD TOWNSHIP

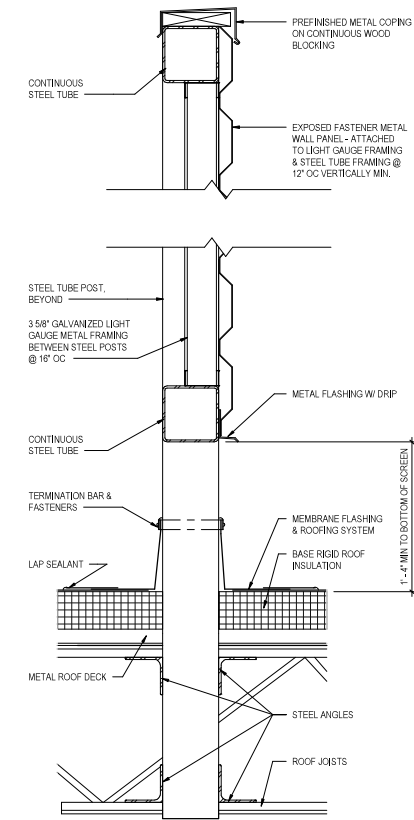
ISSUE DATE 10 / 15 /25	DRAWN BY MJC
DRAWING NO. PV.2	



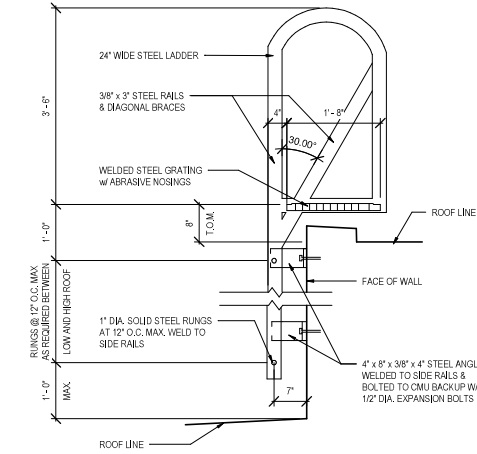
1 OVERALL ROOF PLAN
A1.7
1/16" = 1'-0"



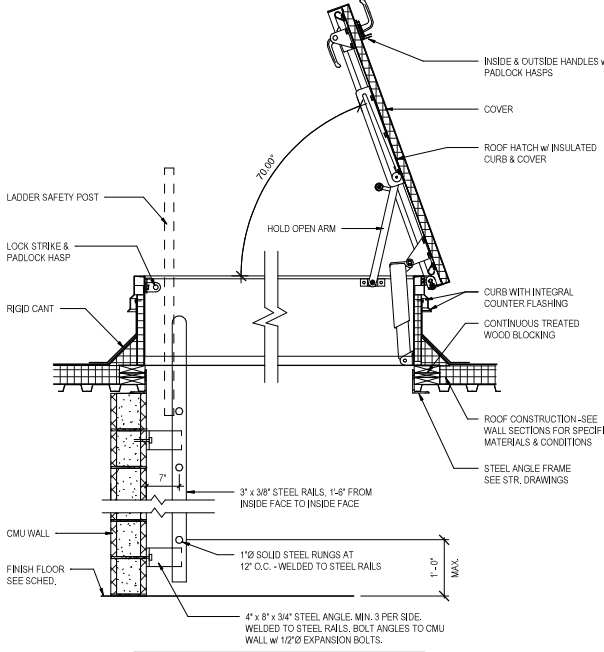
2 CANOPY ROOF PLAN
A1.7
1/16" = 1'-0"



3 ROOFTOP MECHANICAL SCREEN DETAIL
A1.7
1 1/2" = 1'-0"



4 ROOF LADDER DETAIL
A1.7
3/4" = 1'-0"



5 ROOF HATCH DETAIL
A1.7
3/4" = 1'-0"

LEGEND		ROOF PLAN NOTES:	
1	OVERFLOW SCUPPER	2	PHOTOVOLTAIC PANEL LOCATIONS - COORDINATE WITH MEP DRAWINGS
3	WALL MOUNTED METAL ROOF LADDER - SEE DETAILS	4	3' x 3' ROOF HATCH, COORDINATE W/ LADDER AND ROOF STRUCTURE
5	WALKWAY PADS		
RD	ROOF DRAIN	LP	LOW POINT
OD	OVERFLOW DRAIN	HP	HIGH POINT
ERD	EXISTING ROOF DRAIN LOCATION - REPLACE EXISTING DRAIN		
EOD	EXISTING OVERFLOW DRAIN LOCATION - REPLACE EXISTING DRAIN		
	FLOW DIRECTION		
	INDICATES MEMBRANE ROOF SYSTEM WITH RIGID INSULATION STRUCTURALLY SLOPED		
	INDICATES MEMBRANE ROOF SYSTEM WITH TAPERED INSULATION ROOF CRICKETS		
	INDICATES 1/2" COVER BOARD AND MEMBRANE ROOF SYSTEM OVER EXISTING ROOFING, INSULATION, AND CRICKETS - PRIOR TO NEW WORK. CUT EXISTING ROOFING AT ALL LOCATIONS OF "BUSTING"		
	INDICATES MEMBRANE ROOF SYSTEM WITH 1/4" PER FOOT TAPERED INSULATION ON FLAT STRUCTURE		

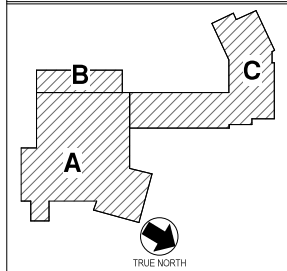
1. COORDINATE ROOF-MOUNTED EQUIPMENT & PENETRATIONS. REFER TO MEP DRAWINGS.

2. PROVIDE ROOFING MANUFACTURERS' STANDARD DETAILS FOR ALL PENETRATIONS & FLASHINGS AS PER ROOFING MANUFACTURERS' WARRANTY.

3. CRICKETS AND SADDLES SHALL HAVE A MINIMUM OF TWO TIMES THE SLOPE OF THE PRIMARY TAPERED SYSTEM OR STRUCTURAL SLOPE.

4. ROOF MOUNTED EQUIPMENT CURBS AND SUPPORTS SHALL BE FURNISHED AND INSTALLED BY THE EQUIPMENT SUPPLIER.

KEY PLAN



REVISIONS

NO.	DATE	DESCRIPTION OF CHANGES
1	5/22/2024	ADDENDUM #1

CRABTREE ROHRBAUGH & ASSOCIATES - ARCHITECTS
401 EAST WINDING HILL ROAD
MECHANICSBURG PA 17055
717-458-0272



OVERALL ROOF PLAN
PROJECT SCALE:
As indicated
DATE: MAY 3, 2024

RENOVATIONS & ADDITIONS TO
CHATHAM PARK ELEMENTARY SCHOOL
SCHOOL DISTRICT OF HAVERFORD TOWNSHIP
400 ALLSTON RD, HAVERFORD, PA 19083

PROJECT
3691
A1.7



1. ALL EXISTING ELECTRICAL ITEMS AND THEIR ASSOCIATED APPURTENANCES SHALL REMAIN AND BE MAINTAINED IN SERVICE UNLESS OTHERWISE NOTED. EXISTING ITEMS SHOWN, BUT NOT OTHERWISE NOTED, ARE SHOWN FOR REFERENCE ONLY.
2. REFER TO PANELBOARD AND SWITCHBOARD SCHEDULES IN SPECIFICATIONS 206020.
3. ANY FEEDERS INSTALLED OUTSIDE BUILDING UNDERGROUND SHALL BE CONCRETE ENCASED.
4. ALL CONDUCTORS ON THIS DRAWING ARE COPPER UNLESS NOTED OTHERWISE.
5. ENCLOSED CIRCUIT BREAKERS AND FUSED DISCONNECT SWITCHES SHALL BE IN NEMA 1 ENCLOSURES UNLESS OTHERWISE NOTED.
6. PROVIDE CONCRETE HOUSEKEEPING PADS FOR ALL SWITCHBOARDS AND TRANSFORMERS.

1. PROVIDE NEW LUG SETS AND INSULATED LUG ASSEMBLIES AS NEEDED TO TERMINATE NEW CONDUCTORS TO EXISTING SERVICE ENTRANCE CONDUCTORS, CONNECT NEW CONDUCTORS ON LINE SIDE OF MAIN BREAKER AT SWITCHBOARD OR EXTERIOR PULL BOX, PROVIDE ALL EQUIPMENT AND WIRING TO COMPLETE THE WORK NEEDED TO ENERGIZE MPDS.
2. PROVIDE GENERATOR G1 CONCRETE FOUNDATION PER DETAIL 1/E102.
3. WIRE AND CONDUIT PER PANEL SCHEDULE, VERIFY AND ADJUST BREAKER WIRE AND CONDUIT SIZES AS RECOMMENDED BY TVSS MANUFACTURER.
4. REFER TO DWG NOTE S&L1.
5. INSIDE DASHED AREA SHOWS PORTION POWER RISER EFFECTED BY ALTERNATE EC-2A AND EC-2B AND EC-2C REFER TO ALTERNATE EC-2A & EC-2B - ROOF PHOTOVOLTAIC REVISED PARTIAL POWER RISER FOR ALTERNATE EC-2A AND EC-2B WORK. REFER TO ALTERNATE EC-4 - RE-DESIGNED PORTION POWER RISER FOR ALTERNATE EC-4 WORK. REFER TO ALTERNATE EC-6 FOR EXISTING SWITCHBOARD REPLACEMENT REQUIRED FOR ALTERNATES EC-2A, EC-2B, EC-4 AND/OR EC-6.
6. REPLACE/EXTEND EXISTING SERVICE ENTRANCE CONDUITS AND CONDUCTORS AS REQUIRED TO INSTALL NEW SWITCHBOARD.
7. PROVIDE TERMINAL CONNECTIONS FOR LOAD BANK TESTING.
8. NOTE NOT USED.
9. PROVIDE PANEL AS WORK OF ALTERNATE ADD/DELETE POWER RISER.
10. PROVIDE 24 HOUR FIRE RATED GENERATOR START CIRCUIT WIRING BETWEEN GENERATOR G1, MANUAL TRANSFER SWITCH (MTS), AND ALL AUTOMATIC TRANSFER SWITCHES (ATS) AS REQUIRED IN A 1" RE-DESIGNED CONDUIT SIZES AS REQUIRED. INSTALL PER NEC 700.10(D)(1).
11. PROVIDE GENERATOR ANNUNCIATOR WIRING AS REQUIRED IN 1" CONDUIT BETWEEN GENERATOR G1 AND REMOTE GENERATOR ANNUNCIATOR.
12. PROVIDE A SEPARATE 30 CONDUCTOR TO EACH GROUNDING ELECTRODE, PROVIDE JUNCTION BOX AND EXTEND EXISTING FEEDERS AS REQUIRED TO CONNECT TO NEW SWITCHBOARD.
13. PROVIDE (4) SETS OF (4) #4@ CONDUCTORS AND (1) #10 GROUND WITH EACH SET OF 5 WIRE RISER FOR ALTERNATE EC-2A, EC-2B, EC-2C.
14. PROVIDE REMOTE MOUNTED CUSTOMER METER WITH WIRING, CTs AND ASSOCIATED EQUIPMENT INSIDE SWITCHBOARD/DISTRIBUTION PANEL.
15. NEW ELEVATOR DISCONNECT AS SHOWN ON S&L1, REWORK RACEWAY/WIRING AS REQUIRED TO COMPLETE INSTALLATION.

[illegible]

WHITE SULPHUR SPRINGS, WEST VIRGINIA

400 ALLSTON RD, HAVERTOWN, PA 19083



E9.2

School District of Haverford Township
Chatham Park Elementary Solar Array Project

SECTION 00 0110 – TABLE OF CONTENTS VOLUME I

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00 4333	SUBCONTRACTORS AND MAJOR MATERIALS SUPPLIERS LIST
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01 2600	CONTRACT MODIFICATION PROCEDURES
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	ROOFING REQUIREMENTS dated 11/7/25
	SITE LOGISTICS PLAN dated 11/7/25

END OF TABLE OF CONTENTS

Chatham Park Elementary School Solar Array Project

DOCUMENT 00 2113 - INSTRUCTIONS TO BIDDERS

1. DEFINITIONS

- A. Bidding Documents include the Bidding Requirements and the proposed Contract Documents. Bidding Requirements include the Invitation to Bid, Instructions to Bidders, Available Project Information, Bid Form, Bid Bond, Agreement of Surety, Non-Collusion Affidavit, and other sample bidding and contract forms. The Contract Documents consist of the Agreement Between Owner and Contractor (hereinafter “Agreement”), Bonds, Conditions of the Contract, Specifications, Drawings, and all Addenda issued prior to the execution of the Agreement including modifications thereto.
- B. Addenda are written or graphic instruments issued by the Architect prior to the execution of the Agreement which modify or interpret the Bidding Documents by additions, deletions, clarifications or corrections.
- C. A Bid is a complete and properly signed proposal to do the Work for the sum stipulated therein, submitted in accordance with the Bidding Documents.
- D. The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents as the base, to which work may be added or from which work may be deleted for sums stated in Alternate Bids.
- E. An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from the amount of the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.
- F. A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment or services or a portion of the Work as described in the Bidding Documents.
- G. A Bidder is a person or entity who submits a bid.

2. OBTAINING BIDDING DOCUMENTS

- A. Complete sets of Bidding Documents must be obtained electronically from the Owner’s Representative. Contractors to email Ken Matthews for the files. Kmatthews@cbdsi.com. For any issues call Ken at 610-453-0469
- B. Bidders shall use complete sets of bidding documents in preparing the bids; neither the Owner nor the Architect assumes any responsibility for errors or misinterpretations resulting from the use of incomplete sets.

3. QUALIFICATIONS OF BIDDERS

- A. The following information must be completed and submitted after the bid and promptly upon request of the Owner.
 - 1) The qualification questionnaire found in Section 00 4513. Use additional pages to complete any of the sections if more space is needed.
- B. Subcontractors, Suppliers and Others:
 - 1) All subcontractors proposed for the project shall have been in business for a minimum of five (5) years and must have a successful record of completing, at a minimum, five

Chatham Park Elementary School Solar Array Project

- (5) projects of similar size and cost. Subcontractors must also have business insurance, workmen's compensation, adequate resources of man power, tools and equipment and must be defined as an independent contractor by the IRS.
- 2) At the Owner's request the identity of certain Subcontractors, Suppliers and other persons or organizations (including those who are to furnish the principal items of material and equipment) is to be submitted to Owner in advance by the apparent Successful Bidder, and any other Bidder so requested. Within five (5) days of the Owner's execution of the Contract, submit to Owner a list of all such Subcontractors, Suppliers and other such persons or organizations proposed for those portions of the Work for which such identification is required. An experience statement shall accompany such list with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, person or organization if requested by Owner. If Owner, after due investigation, have reasonable objections to any proposed Subcontractor, Supplier, and other person or organization, then Owner may, before the Notice of Award is given, request the apparent Successful Bidder to submit an acceptable substitute without an increase in Bid Price.

4. REVIEW OF BIDDING DOCUMENTS

- A. Bidders shall thoroughly examine and be familiar with the Bidding Documents. The failure or omission of any bidder to receive or examine any form, instrument, document, or visit the site and acquaint himself with conditions there existing, shall in no way relieve any Bidder from obligation with respect to his bid. By submitting a bid, the Bidder agrees and warrants that he has examined the site and the Bidding Documents and, where documents require in any part of the Work a given result to be produced, that the Bidding Documents are adequate and the required result can be produced under the Bidding Documents.
- B. Should any Bidder find discrepancies, duplications or omissions in the documents or have doubt as to the meaning expressed by the documents, he shall make inquiry at once in writing to the Architect. Where changes, corrections, or clarifications to Bidding Documents are deemed necessary solely by the Architect, he will issue written Addenda accordingly. Addenda thus issued shall become a part of the Contract Documents. No oral, telephone or letter instructions will be considered as having effect upon the Contract Documents; Addenda only shall constitute change to them. Bidders and Sub-bidders are urged to make early examination of Contract Documents and make inquiries about them if necessary, even though bid pricing may not be determined until late in the bidding period.

5. GOVERNING LAW

- A. Bids shall be submitted on the basis of full and total compliance with all Federal and State laws, regulations, statutes and requirements pertaining to this Project. Bidder shall refer to the General Conditions for additional requirements.
- B. Prior to bidding, Bidder shall contact the local municipality having jurisdiction and ascertain the licenses, permits, fees, and regulations pertaining to this Project. It is the responsibility of the Bidder to determine what local ordinances, if any, will affect his work. He should check for any County, City, Borough, or Township rules and regulations applicable to the area in which the Project is being constructed and, in addition, for any rules or regulations of other organizations having jurisdiction. Any costs related to compliance with local controls shall be included in the prices bid, even though requirements of such local controlling agencies may not be listed herein.

Chatham Park Elementary School Solar Array Project

6. PRE-BID MEETING

- A. For the benefit of all Bidders, a **non-mandatory** pre-bid meeting will be held at the location, date and time indicated in the Invitation to Bid. Attendance by all interested bidders is **highly encouraged**.
- B. Questions from this meeting requiring modification of Bidding Documents, as solely determined by the Architect, will be issued in the form of an addendum. Bidders may rely only on addenda issued in response to questions raised at pre-bid meeting.

7. SITE INSPECTION

- A. The site will be available for a visit on Friday November 14, 2025 at 9am.
- B. The bidders can inspect the existing building at additional times, **prior notification of your visit is required, contact Ken Matthews, KMatthews@cbdsi.com**
- C. Information and data reflected in the Contract Documents with respect to Underground Facilities at or contiguous to the site is based upon information and data furnished to Owner and Architect by owners of such Underground Facilities or others, and Owner and Architect do not assume responsibility for the accuracy or completeness thereof. Contractor shall verify the location of all underground utilities prior to any excavation.
- D. General Contractor is responsible, on behalf of the Owner, for providing the physical markings of all existing utilities including those on site as indicated on the drawings or that may be identified in the field. The locations shown on the drawings are approximate. The General Contractor must include in his proposal the cost for hand-dug test holes, or other means, to ascertain the precise position of such underground facilities on the site owned by the Owner. This verification should be performed for any utilities to be relocated, removed, modified or that may otherwise interfere with planned work. The utilities in the public right of way will be identified and marked by the appropriate facility owner as per the requirements of the PA One Call Act as amended. Physical layout is to be performed in full compliance with the PA One Call PA Act 287 of 1974 as amended by Act 18 of 1996.
- E. The Owner, and Architect will not be responsible for the adequacy of data furnished to prospective Bidders on subsurface conditions, Underground Facilities and other physical conditions. This information is provided based on information available. Bidder assumes responsibility for verifications, adjustments and modifications that may be required since this is generally recognized as inherent to the work of the Contract Documents.
- F. Before submitting a Bid, each Bidder will, at Bidder's expense, make or obtain any additional examinations, investigations, explorations, tests and studies and obtain any additional information and data which pertain to the physical conditions (surface, subsurface and Underground Facilities) at or contiguous to the site or otherwise which may affect cost, progress, performance or furnishing the Work and which Bidder deems necessary to determine its Bid for performing and furnishing the Work in accordance with the time, price and other terms and conditions of the Contract Documents.
- G. On request in advance, Owner will provide each Bidder access to the site to conduct such explorations and tests, as each Bidder deems necessary for submission of a Bid. Bidder shall fill

Chatham Park Elementary School Solar Array Project

all holes, clean up and restore the site to its former condition upon completion of such explorations.

- H. The lands upon which the Work is to be performed, rights-of-way and easements for access thereto and other lands designated for use by the Bidder in performing the Work are identified in the Contract Documents. All additional lands and access thereto required for temporary construction facilities or storage of materials and equipment are to be provided by Bidder. Easements for permanent structures or permanent changes in existing structures are to be obtained and paid for by Owner unless otherwise provided in the Contract Documents.

8. ANY QUESTIONS SHALL BE DIRECTED TO:

Ken Matthews

kmatthews@cbdsi.com

610-453-0469

All questions MUST be submitted electronically via email

9. ADDENDA

- A. Addenda, if any, will be emailed to all Contractors that have signed up to get bid documents.

10. PRE-BID SUBSTITUTIONS

- A. The drawings and specifications establish the standard of function, appearance, and quality to be met by any proposed substitution.
- B. No substitution will be considered prior to receipt of Bids unless written request for approval has been received by the Architect at least ten days prior to the date for receipt of Bids. Substitution requests will only be considered from prime contract bidders. Such requests shall be in accordance with the following substitution request procedures.
- C. Submit three copies of each request for consideration on CSI Form 1.5C. Supporting documentation shall include the following:
- 1) Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - 2) List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - 3) Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - 4) Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - 5) Samples, where applicable or requested.
 - 6) Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - 7) Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.

Chatham Park Elementary School Solar Array Project

- 8) Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - 9) 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.
- D. The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.
 - E. If the Architect approves a proposed substitution prior to receipt of Bids, such approval will be set forth in an Addendum. Bidders shall not rely upon approvals in any other manner.
 - F. No substitutions will otherwise be considered after the Contract award except where specifically provided for in the Contract Documents.
 - G. No substitutions will be considered if received later than ten (10) days before bids are due.
 - H. The forgoing provisions of this article do not apply to proprietary specifications as defined in Division 01 of the specifications. In such cases provide the product or system as specified or indicated without substitutions.
 - I. Architect's Action for Pre-bid Substitutions: Comply with timing requirements indicated above.
 - 1) Form of Acceptance: Addendum.
 - 2) Use product specified if substitution is not included by Addendum.

11. PREPARATION OF BID

- A. Any Contract will be entered into by the Owner with the understanding that the Bidder, prior to submission of his Bid, acquainted himself with the requirements of the Plans and Specifications, conditions of the site, and all other matters pertinent to the Work contemplated. It will be assumed that the Bidder has satisfied itself as to the conditions to be encountered overhead, on the surface and concealed, the character, quality and quantities of work to be done and materials to be furnished, and the requirements of the Contract Documents. No allowance or concession will be made for the lack of such information on the part of the Bidder. The Bidder shall not at any time after execution of the Agreement make any claims whatsoever based upon insufficient data or incorrectly assumed conditions, nor shall he claim any misunderstanding in regard to the nature, conditions or character of the Work to be done under the Contract, and he assumes all risk resulting from any changes in the conditions which may occur during the progress of the Work.
- B. Bids shall be submitted on forms identical to the Bid Form included in the Bidding Documents. All blanks on the Bid Form shall be filled in by typewriter or manually in ink.
- C. Where so indicated by the make-up of the Bid Form, sums shall be expressed in both words and figures, and in case of discrepancy between the two, the amount written in words shall govern.
- D. Interlineations, alterations and erasures must be initialed by the signer of the Bid. Each Bid must contain the full business address of the Bidder and must be signed by him correctly. If

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the Bid is made by an individual, in addition to his signature, his post office address should be shown. If the Bid is made by a partnership, the name and post office of each partner of the partnership must be shown and the proposal must be signed in the partnership name by at least one (1) of the general partners. If the Bid is made by a corporation, the proposal should be signed by the President or Vice President and attested by the Secretary or Assistant Secretary, and identify the name, business address and state of incorporation for the corporation, and have the corporate seal affixed.

- E. All Bids must include the Bid Security and Non-Collusion Affidavit as set forth herein. If Bid Security is provided in a form other than Bid Bond, the Bid must include an Agreement of Surety as described herein.
- F. Proposals indicating a qualification of the Bid, conditions or uninvited alternate Bids or which contain alteration of the Bid Form, or additions or deductions not called for shall be rejected. Bids containing minor irregularities or informalities, not relating to price, time, or changes affecting the quality of work, may be rejected at Owner's sole discretion. Owner reserves the right to waive any such informalities or irregularities.
- G. The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which must be filled in on the Bid Form). Properly issued Addenda shall be binding upon all Bidders, regardless of whether a Bidder fails to acknowledge receipt. The Owner may reject a bid that fails to acknowledge all addenda if the Owner determines that it is in its best interest to do so.
- H. The address and telephone number for communications regarding the Bid must be shown.

12. NON-COLLUSION AFFIDAVIT

- A. More than one proposal for the contract from an individual, partnership, corporation, or an association under the same or different name will be grounds for the rejection of all proposals in which such Bidder is interested. Any or all proposals will be rejected if there is reason for believing that collusion exists among any of the Bidders. Participants in such collusion will not be considered in future proposals. A Non-Collusion Affidavit shall be executed and submitted with the Bidder's proposal using the form set forth herein.

13. TAXES

- A. Bidder, as Contractor shall be responsible for and shall pay all applicable sales, use, excise or other taxes required by law on all materials, tools, apparatus, equipment, fixtures, services, incidentals or otherwise which may be purchased or used in connection with the Work or portions thereof. The Bid shall be made in accordance with such laws and shall include all applicable taxes in the Bid amount.

Notwithstanding the foregoing, however, Owner is exempt (excluded) from sales and/or use tax in Pennsylvania on certain transactions. Prime Contractor and all subcontractors shall bid and shall purchase as exempt (excluded) from Pennsylvania sales and/or use tax all tangible personal property within the definition of 'building machinery and equipment' as that term is defined in Act No. 45-1998 (72 P.S. § 7201 et seq.). Refer to the General Conditions for complete requirements.

Chatham Park Elementary School Solar Array Project

14. PREVAILING WAGE REQUIREMENTS

- A. This project shall meet all requirements of Commonwealth of Pennsylvania, Department of Labor and Industry Prevailing Minimum Wage section. Requirements and wage rate schedules relative to the prevailing minimum wage determination for this project are included in the project manual for review.
- B. Questions of concerns about published prevailing wage rates shall be directed to the Commonwealth of Pennsylvania, Department of Labor and Industry Prevailing Minimum Wage section.

15. BID SECURITY

- A. A proposal shall be rejected unless accompanied by a Bid Security in an amount not less than ten percent (10%) of the total Base Bid. Bid Security shall be in the form of a certified check or bank cashier's check payable to Owner or a Bid Bond in the form set forth herein, naming as obligee, **School District of Haverford Township**.
- B. The Owner may declare the Bid Security forfeited to the Owner if, following the issuance of a Notice of Intent to Award to the apparent lowest responsible Bidder, such Bidder fails to deliver the items required under paragraph "Execution of Contracts and Bonds" of these Instructions to Bidder within ten (10) days thereafter.
- C. If Bid Security is submitted in the form of a Bid Bond, the Bid Bond shall be submitted on the form included in the Bidding Documents, and the Attorney-in-Fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of its Power of Attorney, authorizing said Attorney-in-Fact to act on behalf of the surety. The Power of Attorney must be dated the same date as the Bid Bond and both the Bid Bond and Power of Attorney shall have affixed the raised corporate seal of the surety. The Bid Bond form must be executed by a surety licensed and authorized to conduct business within the Commonwealth of Pennsylvania and named in the current list of companies holding Certificates of Authority as acceptable sureties on federal bonds and/or as acceptable reinsuring companies as published in Circular 570 (as amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department, and the amount of the bond shall not exceed the underwriting risk of such surety set forth in said circular or revision thereof.
- D. The Bid Security of Bidders will be returned (unless forfeited as stated above) at the Bidder's request, upon (1) the execution of the Agreement Between Owner and Contractor by Owner, or (2) the rejection of all bids by Owner, or (3) the expiration of the firm bid period set forth in these Instructions to Bidder. The Owner shall not be liable for any interest on bid security which is held in accordance with these Bidding Instructions.
- E. If the Bid Security is submitted in the form of a certified check or bank cashier's check, the Bidder shall submit an Agreement of Surety certifying that a surety company will provide the Bidder with a Performance Bond and Payment Bond each in the amount of one hundred percent (100%) of the Contract Sum. The Agreement of Surety shall be in the form included in the Bidding Documents. The Agreement of Surety shall be executed by a surety satisfying the requirements set forth in Paragraph C above, and shall be accompanied by the necessary Power of Attorney as noted in Paragraph C above.
- F.

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16. PROJECT START AND COMPLETION

- A. Bidder must agree to commence work within ten (10) days of a date to be specified in a written "Notice To Proceed" by the Owner.
- B. Each proposal shall be based on Substantial Completion of the project within time limits indicated in the Agreement and Division 01 Section; Summary.

17. SUBMISSION OF BIDS

- A. Two copies of the Bid, the bid security and other required documentation shall be enclosed in a sealed opaque envelope and hand delivered to the party receiving bids. The envelope shall be addressed to Mr. Tony Testa and shall be identified as a sealed bid **Chatham Park Elementary Solar Array Project**, the bidders name and address, and the Contract for which the bid is submitted.
- B. If the bid is sent by courier, or any mail service, the sealed bid shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof. Bids delivered by mail service shall be registered, return receipt and plainly marked "Bid for *0*" and marked to the attention of Mr. Robert Riegel.
- C. **THE BID FORM SHALL NOT BE ALTERED. ALTERED BID FORMS SHALL BE CONSIDERED NON-RESPONSIVE AND MAY BE REJECTED.**
- D. All blanks on the Bid Form must be completed in ink or by type.
- E. All names must be typed or printed below the signature.
- F. The Bid shall contain an acknowledgment of receipt of all Addenda (the numbers of which must be filled in on the Bid Form). Properly issued Addenda shall be binding upon all Bidders, regardless of whether a Bidder fails to acknowledge receipt. The Owner may reject a bid that fails to acknowledge all addenda if the Owner determines that it is in its best interest to do so.
- G. The address and telephone number for communications regarding the Bid must be shown.

18. WITHDRAWAL OF BID

- A. Bidders will be given permission to withdraw any Bid after it has been received by the Owner, provided the Bidder or his agent duly authorized to act for him, personally appears at the Haverford Township School District Administration Building, 50 Eagle Road, Havertown, PA 19083 with a written request signed by the Bidder prior to the time set forth for the opening of the Bids. At the time set for the opening of Bids, the withdrawn Bid will be returned to the Bidder. Such withdrawn Bid will not be opened or read at the Bid opening. Bids may not be modified after submittal.
- B. Bids shall be irrevocable for sixty (60) days after the actual day of opening thereof unless delayed by the required approval of another governmental agency, the sale of bonds or the award of a grant, in which case, Bids shall be irrevocable for 120 days after Bid opening. Extensions of the date for the award of contract may be made by the mutual written consent of Owner and the lowest responsible and responsive Bidder.

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- C. Neither the designation of the apparent lowest responsible Bidder, nor the issuance of a Notice of Intent to Award to the Bidder so designated shall operate to release any other Bidder from its Bid. Each such other Bidder, unless earlier released from its Bid by specific action of the Owner, shall remain bound by its Bid until the earlier of (1) the date of actual execution by Owner of the Agreement Between Owner and Contractor with the Bidder to whom the Award of Contract has been made, or (2) the expiration of the firm Bid period stipulated above.
- D. Negligence by the Bidder in preparing his proposal confers no right of withdrawal or modification of his proposal after such proposal has been opened. No claims on account of mistakes or omissions of any proposal will be considered. Notwithstanding the above, a Bidder may withdraw his proposal within two (2) business days after the Bid opening time in accordance with the Public Contracts – Withdrawal of Bids Law, Act of January 23, 1974, P.L. 9, No. 4, 73 P.S. § 1601 et seq., as amended. A Bid which has been opened may be withdrawn only in accordance with the causes set forth in said Act and for no other reasons. Strict compliance with said Act is required to withdraw a Bid after opening.

19. RECEIPT AND OPENING OF BIDS

- A. According to the Drawings, Specifications, General Conditions, and these Instructions to Bidders, proposals will be received at location, time and date indicated in the Invitation to Bid.
- B. The Bids so received, will be publicly opened and read aloud immediately after the specified closing time.
- C. The Owner reserves the right to award the work in any manner deemed in his best interest, and to accept any bid, to reject any or all bids, to accept alternates in any order and to waive informalities in bids.

20. ALTERNATES

- A. All requested alternates as defined in Division 01 shall be bid. Include changes to contract sum. Methods for bidding Alternates are as specified in Division 01. The Owner shall have the right to accept Alternates in any order of combination and to determine the low Bidder on the basis of the sum of the Base Bid and Alternates accepted.
- B. Provide alternate prices filled-in on Bid Form in spaces provided. Strike out the inappropriate modifier “Add” or “Delete” so the correct modifier remains with the written price. If there is no change in contract sum enter “N.C.” in the appropriate fields.

21. UNIT PRICES

- A. Provide unit prices filled-in on Bid Form in accordance with requirements specified in Division 01. No unit costs (other than those required by Allowances) shall be included in the Base Bid. Unit costs will be used for adjustment of the Contract Sum if any are required. The Owner reserves the right to reject any unit prices bid.

22. ALLOWANCES

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- A. Include all allowances listed on the Bid Form and project drawings and specifications in the base bid price. Do not adjust allowances for any alternates unless specifically listed in the alternate.

23. QUALIFICATIONS OF BIDDERS

- A. The Owner may make such investigation as is deemed necessary to determine the ability of the bidder to perform the work according to the requirements of the Contract Documents. The bidder shall furnish to the Owner all such information and data for the purpose as the Owner may request. The Owner reserves the right to reject any bid if the evidence submitted by, or as the result of investigation of, such bidder fails to satisfy the Owner that the bidder is properly qualified to carry out the obligations of the Contract. Conditional bids shall not be submitted.
- B. Contractor's Qualification Statement: Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request, a Bidder's Qualification Questionnaire, Section 00 4513.

24. LOWEST RESPONSIVE AND RESPONSIBLE BIDDER

- A. The Contract will be awarded to the "lowest responsive and responsible Bidder". In awarding Contracts, the Owner shall have sole discretion in determining lowest responsive and responsible Bidder and shall have the right to take into consideration the following factors, in addition to price:
 - 1) The character, integrity, reputation, and judgment of the Bidder.
 - 2) The previous and existing compliance of the Bidder with the requirements of similar installations.
 - 3) The ability, capacity, experience, and skill of the Bidder to perform the contract.

25. EXECUTION OF CONTRACTS AND BONDS

- A. The Owner will notify the lowest responsive and responsible Bidder of the Owner's intent to accept his proposal and to make a formal award of contract to him by the Notice of Intent to Award. The Owner will include with the Notice of Intent to Award the Agreement to be signed by the successful Bidder. Within ten (10) days of receipt of the Notice of Intent to Award, the successful Bidder shall furnish (1) a Performance Bond and a Payment Bond in the forms provided in the Bidding Documents, each in the amount of one hundred percent (100%) of the contract sum; (2) Certificates of Insurance as required pursuant to Article 11 of the General Conditions of the Contract or Construction; (3) the signed Agreement and (4) an executed Public Works Employment Verification Form. The Bonds, Insurance Certificates and Agreement (5) shall be submitted to the Architect's office within the required time period.
- B. The Attorney-in-Fact who executes the Payment and Performance Bonds on behalf of the surety shall affix to the bonds a certified and current copy of its Power of Attorney, authorizing said Attorney-in-Fact to act on behalf of the surety. The Power of Attorney must be dated the same day as the bonds and both the bonds and Power of Attorney shall have affixed the raised corporate seal of the surety.
- C. After approval of bonds and insurance, the Owner will sign and date the Agreement. Owner shall return to the successful Bidder one (1) copy of the dated, executed Agreement within

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sixty (60) days after the award of the contract, unless the time of issuance of such Agreement shall be extended by mutual written agreement of the Owner and successful Bidder.

- D. Prime Contractor Certification: Upon receipt of the Notice of Intent to Award, lowest Bidder for each Contract shall submit to the Architect a prepared and signed Pennsylvania Department of Education Plancon Form G08, Prime Contractor Certification.
- E. Proposed Subcontractor and Major Materials Manufacturers: Upon receipt of the Notice of Intent to Award, lowest Bidder for each Contract shall submit to the Architect a prepared CSI Form 13.1A, Subcontractors and Major Material Suppliers List (see Section 00 4333).
- F. Failure of the Bidder, to whom Notice of Intent to Award has been given, to deliver appropriate Payment and Performance Bonds, Certificates of Insurance and other required documents, or execute the Agreement within the time specified, shall constitute a default by such Bidder and the Owner may, at its sole discretion, award the contract to the next lowest responsive and responsible Bidder or re-advertise for Bids. The defaulting Bidder shall pay to the Owner the amount of its Bid Security and, if the amount for which the Owner ultimately contracts to have the work performed (plus any advertising, consulting, legal or other expenses incurred by reason of the default) exceeds the amount of the defaulting Bidder's bid by more than the amount of the Bid Security, then the defaulting Bidder shall pay to the Owner the full amount of the shortfall. The Owner may, in its sole discretion, extend the time period for submission of the above items, upon request of Bidder. Such request of Bidder, if accepted by Owner in writing, shall constitute a mutual agreement to extend the date for issuance of the Agreement to the date stipulated in such written agreement, or if no date is stipulated, until twenty (20) business days after the submission to the Owner of the properly executed Agreement and all required documents in proper form as required by the Contract Documents.

26. AGREEMENT

- A. As indicated in Section 00 5216 AGREEMENT FORM

END OF DOCUMENT 00 2113

Chatham Park Elementary Solar Array Project 11/7/25

DOCUMENT 00 4313.13 - BID BOND FORM

KNOW ALL MEN BY THESE PRESENTS that we, _____ (hereinafter called the "Principal"), and _____, a corporation authorized to transact business in Pennsylvania, and having its principal office at _____ (hereinafter called the "Surety"), as Surety, are held and firmly bound unto the **School District of Haverford Township** (hereinafter called the "Obligee"), as Obligee, in the sum of _____ Dollars (\$_____) lawful money of the United States of America, for payment of which we bind ourselves, and each of our respective heirs, legal representatives, successors and assigns, jointly and severally, by these presents on this _____ day of _____, _____.

WHEREAS, said Principal is herewith submitting to the Obligee a bid to perform work for the Obligee's proposed **Chatham Park Elementary Solar Array Project in 400 Allston Rd, Havertown, PA 19083**, pursuant to plans, specifications, and other Contract Documents incorporated into said bid by reference; and it is a condition of the Obligee's receipt and consideration of said bid that such shall be accompanied by bid security to be held by the Obligee on terms embodied herein.

THEREFORE, the condition of this obligation is that if said Principal shall, in the event of acceptance of his bid by Obligee and within the period specified therefore in the bidding requirements, enter into a written agreement with the Obligee, in accordance with the bid as accepted, and give bonds with good and sufficient surety or sureties, as may be required for the faithful performance and proper fulfillment of such contract, in the form specified by the Owner, furnish properly executed Public Works Employment Verification Forms, and furnish required certificates of insurance, in all respects as required by the bidding requirements, then this obligation shall be void and of no effect, but otherwise it shall remain in full force. In the event of the failure to enter into such contract, give such bonds, and furnish such certificates within the time specified, the Principal and Surety will pay to the Obligee the difference between the amount of the Principal's accepted bid and any higher amount for which the Obligee may contract for the required work, as well as any advertising, architectural, legal and other costs incurred by the Obligee by reason of the default; provided, however, that the obligations of the Surety hereunder shall not exceed the amount of this Bid Security together with interest.

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

(Individual Principal)

Signature of Individual (SEAL)

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Witness:

(Partnership Principal)

Trading and doing business as:

(Name of Partnership)

Witness:

By: _____ (SEAL)
Partner

By: _____ (SEAL)
Partner

By: _____ (SEAL)
Partner

(Corporation Principal)

(Name of Corporation)

Attest: _____
Secretary/Assistant Secretary

By: _____
President/Vice President

(CORPORATE SEAL)

OR (if applicable)

Attest: _____ *By: _____
Authorized Representative

*Attach appropriate proof, dated as of the same date as the bond, evidencing authority to execute on behalf of the corporation.

(CORPORATE SURETY)

Name of Corporation

Witness or Attest:

**By: _____
Title

(CORPORATE SEAL)

**Attach an appropriate Power of Attorney, dated as of the same date as the bond, evidencing the authority of the Attorney-in-Fact to act on behalf of the Corporation.

END OF DOCUMENT 00 4313.13

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DOCUMENT 00 4313.16 - AGREEMENT OF SURETY

KNOW ALL MEN BY THESE PRESENTS, that we, _____ ,
as Surety, a corporation existing under the laws of the State of _____, and authorized
to transact business in the Commonwealth of Pennsylvania hereby agrees intending to be legally bound
hereby, to execute and deliver to **School District of Haverford Township**, within the time limit specified in
the Contract Documents, the Performance Bond and Payment Bond in the forms included in the Contract
Documents each in an amount of 100% of the Contract Sum, in favor of the **School District of Haverford
Township**, as required for the faithful performance and proper fulfillment of the
_____ contract for the **Chatham Park Elementary Solar Array** Project, located
in **Havertown, PA**, on behalf of _____ (hereinafter
called the Bidder) provided that the above contract be awarded to the bidder within ninety (90) days after the
date of opening of the bids or otherwise as set forth in the Bidding Instructions and Invitation to Bidders.

Surety further agrees that should the Surety, after notification of intent to make such award, omit or refuse to
execute the required bonds and agreement, then the Surety shall pay to the **School District of Haverford
Township**, hereinafter called the Obligee, any difference between the total amount specified in said bidder's
proposal for the required work and the amount of which said Obligee may procure the same work, if the
latter amount be in excess of the former, plus any advertising, architectural, legal and other expenses incurred
by Obligee; provided, however, that the obligations of Surety hereunder shall not exceed the amount of bid
security provided by the Bidder together with interest.

Dated: _____, 20_____
(CORPORATE SURETY)

WITNESS OR ATTEST:

By: _____
Attorney-in-Fact*

NAME: _____
(Please Type)

*Attach an appropriate Power of Attorney, dated as of the same date as this Agreement, evidencing the
authority of the Attorney-in-Fact to act on behalf of the corporation.

END OF DOCUMENT 00 4313.16

Chatham Park Elementary Solar Array Project 11/7/25

DOCUMENT 00 4333 - SUBCONTRACTOR AND MAJOR MATERIALS SUPPLIER'S LIST

1. Bidder, within five (5) days of the Owner's execution of the Contract, shall complete the attached form for submission to the Architect. In all cases, this list shall be submitted no less than ten (10) days prior to a Subcontractor starting work.
 - A. Bid Form Supplement:
 - 1) CSI 15.1 - Subcontractor and Major Materials Suppliers List (1 sheet).
 - B. Required information: Each Bidder shall identify on the attached form Subcontractors for all work which the Bidder is not qualified to perform or which the Bidder will not be doing with his own forces. Bidder shall also list all major material suppliers. List shall be acceptable to the Architect.

END OF DOCUMENT 00 4333



Advancement
of Construction
Technology

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
-------------------	------------------	------	---------

☐ Attachments

Signed by:

Copies: ☐ Owner ☐ Consultants ☐ ☐ ☐ ☐ ☐

Chatham Park Elementary Solar Array Project 11/7/25

DOCUMENT 00 4513 – BIDDER’S QUALIFICATIONS QUESTIONNAIRE

Submitted To: **School District of Haverford Township**

For consideration with regard to:

Chatham Park Elementary Solar Array Project

Date: _____

1. Companies that wish to bid on this Project must submit this Qualification Statement after their bids and promptly upon request by the **School District of Haverford Township**, hereinafter referred to as the “Owner”.
2. Only Companies which are determined to be responsible contractors under applicable law will be designated as qualified bidders at the time awards are made on the prime contracts offered on the Project.
3. The Instructions to Bidders and govern the Owner's consideration of this completed Qualification Statement.
4. All prospective bidders must complete this form by answering all questions, and supplying all requested documents, using the spaces indicated (with additional pages if necessary) and attaching documents as required and submit the completed form within the time period and deadline established in the request.

I. Capability

1. Form of organization (sole proprietorship, partnership, corporation, etc.)

2. Years the organization has been in business as a contractor under its present name.

3. List of all affiliated or subsidiary organizations and companies.

4. List of all organizations and individuals who have a financial interest of or a specified percentage in the company.

5. Any other organization or individual who controls bidding or operation of the organization.

6. Identification of all offices in the state.

7. The numbers, categories and locations of all employees and officers.

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8. The officers, administrators, managers and superintendents who will be assigned to the project -- identification of qualifications, with specific attention to years in present position, years of construction experience, and magnitude and type of work.

9. Any work the organization has performed for the Owner.

10. Other work that the organization has performed in Pennsylvania for other Municipalities or clients (up to ten most recent projects) -- for each, identify the name and address of owner, location of project, nature of contract (prime, sub, etc.), contract amount, kind of work, and nature of project.

11. Other projects involving multi-prime contracts on which the organization has served as a prime contractor (up to ten most recent projects) -- for each, identify the name and address of owner, location of project, nature of contract, contract amount, kind of work, and nature of project.

12. Other projects for the type of construction that is to be undertaken, performed by the organization at any time -- for each, identify the name and address of owner, location of project, nature of contract (prime, sub, etc.), contract amount, kind of work, and nature of project.

13. Projects constructed with CPM or some other form of computerized project scheduling and capabilities that otherwise can be provided-- for each, identify the name and address of the owner, location of project, nature of contract (prime, sub, etc.), contract amount, kind of work, and nature of project.

14. Projects awarded but which the organization failed to complete or complete on time -- identify dates, name and address of owner, name and location of project and kind of work, and the reasons the project was not completed.

15. Equipment owned that will be utilized on the project by type, size or capacity, years of service, and condition.

16. Leased equipment that will be utilized on the project by type, size or capacity, years of service, and condition.

17. Portion of the contract to the nearest ten (10%) that the bidder expects to perform using its own labor and equipment.

18. Has any Owner ever removed work from a prior Contract, through a change order or other means, due to unsatisfactory or untimely performance? If yes, please give details of scope of work removed, documentation as to Owner involvement and date of occurrence, and other pertinent facts or extenuating circumstances.

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19. Has the Owner ever refused to award you a bid, in which you were the lowest bidder? If yes, please give details and pertinent facts or extenuating circumstances.
-

20. Has the Owner disqualified your bid because you failed to divulge or withheld required information? If yes, please give details and pertinent facts or extenuating circumstances.
-

II. Financial Integrity

1. Attach the most recent financial statement, with an explanation of whether it is a certified statement or a compilation, date of preparation, name and address of preparer (financial information can be treated as confidential if placed in a sealed envelope and marked as such).

2. Net working capital (current assets over current liabilities) and date of determination.
-

3. Identification of credit lines, with information on the total lines, amounts drawn down and amounts remaining.
-

4. Identification of the contractor's surety for the required performance bond, total bonding capacity and available bonding capacity.
-

III. Conduct

1. All felony convictions, all bidding-related offenses, and all misdemeanor convictions involving moral turpitude of the organization, its affiliates, its owners, its officers, and its administrators, managers, and superintendents that will be assigned to the project.
-

2. Debarments, suspensions, and denials of pre-qualification of the organization for any federal, state, local or other governmental contracting.
-

3. Construction-related disputes of any kind including lawsuits, arbitrations, mechanics liens, and other claims.
-

4. Proceedings of an administrative enforcement nature of whatever kind, including environmental, wage and hour, prevailing wage, employment discrimination, or other kind of proceeding.
-

5. Unpaid obligations to local, state, or federal taxing authorities, including but not limited to income, withholding and unemployment taxes.
-

Chatham Park Elementary Solar Array Project 11/7/25

6. Cancellation, termination or rescission of contracts of insurance or surety ship.

7. Provide all other information requested in accordance with “Instructions to Bidders” or any other information requested by Owner as part of its investigation.

When the Bidder is an individual proprietor:

WITNESS:

_____	(SEAL)	_____
Signature of Witness	Signature of Proprietor	
	Print Name of Proprietor	_____

When the Bidder is a partnership:

	Print name of Partnership	_____
	Address	_____
	City, State and ZIP Code	_____
	Phone number with Area Code	_____

WITNESS:

_____	(SEAL)
Signature of Witness	General Partner

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When the Bidder is a corporation:

Print name of Corporation _____

Address _____

City, State and ZIP Code _____

Phone number with Area Code _____

ATTEST:

_____ BY: _____

Secretary/Assistant Secretary/
Treasurer/Assistant Treasurer
or other authorized representative

President/Vice President or other
authorized representative

Print name of corporate representative

(CORPORATE SEAL)

END OF DOCUMENT 00 4513

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DOCUMENT 00 4519 - NON-COLLUSION AFFIDAVIT

State of: _____

SS: _____

County of: _____

_____, being first duly sworn, deposes and says that:
(Full Name)

- 1) He is _____
(owner, partner, officer, representative or agent)
of _____
(Name of Company)

the Bidder that has submitted the attached Bid for _____ Construction
(Name of Contract)

for _____
(Name of Project)

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

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Signature

By: _____
Title

Subscribed and sworn to before me

this _____ day of _____, 20____.

(SEAL) _____
Notary Public

My Commission Expires: _____

END OF DOCUMENT 00 4519

SECTION 00 5216 - AGREEMENT FORM

The "Standard Form of Agreement, modified by the Owner for this project, shall be in effect for the duration of this project. A draft copy of the modified Agreement Form is bound herein.

- A. The Form of the Agreement for the Work shall be written on **AIA Document A101, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stipulated Sum.**

END OF SECTION 00 5216

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DOCUMENT 00 6113.13 - BONDS

1. Within ten (10) days of receipt of the Notice of Intent to Award, the successful Bidder shall furnish a Performance Bond (00 6113.16) and a Payment Bond (00 6113.19) in the forms provided in the these Bidding Documents, each in the amount of one hundred percent (100%) of the Contract Sum.
2. The Attorney-in-Fact who executes the Performance and Payment Bonds on behalf of the surety shall affix to the bonds a certified and current copy of its Power of Attorney, authorizing said Attorney-in-Fact to act on behalf of the surety. The Power of Attorney must be dated the same day as the bonds and both the bonds and Power of Attorney shall have affixed the raised corporate seal of the surety.
3. The Performance and Payment Bonds must be executed by a surety licensed and authorized to conduct business within the Commonwealth of Pennsylvania and named in the current list of companies holding Certificates of Authority as accepted sureties on Federal Bonds and as acceptable reinsuring companies as published in Circular 570 (as amended) by the Audit Staff, Bureau of Government Financial Operations, U.S. Treasury Department, and the amount of the bond shall not exceed the underwriting risk of such surety set forth in said Circular or revision thereof.

END OF DOCUMENT 00 6113.13

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DOCUMENT 00 6113.16 - PERFORMANCE BOND

KNOW ALL MEN BY THESE PRESENTS that we, _____, as Principal (the "Principal"), and _____, a corporation organized and existing under the laws of the _____ of _____, having its principal office at _____, and authorized to do business in the Commonwealth of Pennsylvania, as Surety (the "Surety"), are held and firmly bound unto the **School District of Haverford Township** as Obligee (the "Obligee"), as hereinafter set forth in the full and just sum of _____ Dollars (\$_____), lawful money of the United States of America, for the payment of which sum we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WITNESSETH THAT:

WHEREAS, The Principal heretofore has submitted to the Obligee a certain bid, dated _____, 20____ (the "Bid"), to perform certain _____ work for the Obligee, in connection with the **Chatham Park Elementary Solar Array** Project located in **400 Allston Rd, Havertown, PA 19083**, pursuant to plans, specifications and other related documents, constituting the Contract Documents, which are incorporated into the Bid by reference (the "Contract Documents"), as prepared by KCBA Architects, 8 East Broad Street, Hatfield, PA 19440 ; and

WHEREAS, the Obligee is a "Contracting Body" under provisions of Act No. 385 of the General Assembly of the Commonwealth of Pennsylvania, approved by the Governor on December 20, 1967, known and cited as the "Public Works Contractors' Bond Law of 1967" (the "Act"); and

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

WHEREAS, it also is a condition of the Contract Documents that this Bond shall be furnished by the Principal to the Obligee; and

WHEREAS, under the Contract Documents, it is provided, *inter alia*, that if the Principal shall furnish this Bond to the Obligee, and if the Obligee shall make an award to the Principal in accordance with the Bid, then the Principal and the Obligee shall enter into an agreement with respect to performance of such work (the "Agreement"), the form of which Agreement is set forth in the Contract Documents.

NOW, THEREFORE, the terms and conditions of this bond are and shall be that if: (a) the Principal well, truly and faithfully shall comply with and shall perform the Agreement in accordance with the Contract Documents, at the time and in the manner provided in the Agreement and in the Contract Documents, and if the Principal shall satisfy all claims and demands incurred in or related to the performance of the Agreement

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by the Principal or growing out of the performance of the Agreement by the Principal, and if the Principal shall indemnify completely and shall save harmless the Oblige and all of its officers, agents and employees from any and all costs and damages which the Oblige and all of its officers, agents and employees may sustain or suffer by reason of the failure of the Principal to do so, and if the Principal shall reimburse completely and shall pay to the Oblige any and all costs and expenses which the Oblige and all of its officers, agents and employees may incur by reason of any such default or failure of the Principal, including, but not limited to, additional legal and professional fees resulting from such default or failure of the Principal, delay damages resulting from such default or failure of the Principal, and liquidated damages in accordance with the Contract Documents; and (b) if the Principal shall remedy, without cost to the Oblige, all defects which may develop during the period of one (1) year from the date of substantial completion by the Principal and acceptance of the Oblige of the work to be performed under the Agreement in accordance with the Contract Documents, which defects, in the sole judgment of the Oblige or its legal successors in interests, shall be caused by or shall result from defective or inferior materials or workmanship, then this Bond shall be void; otherwise, this Bond shall be and shall remain in force and effect and all claims, demands, costs, expenses and damages including, but not limited to, additional legal and professional fees resulting from the default or failure of Principal, delay damages resulting from such default or failure of the Principal, and liquidated damages in accordance with the Contract Documents, shall be payable by Principal and Surety to the School District of Haverford Township; provided, however, that the obligations of the Surety hereunder shall not exceed the amount of this Performance Bond.

This Bond is executed and delivered under and subject to the Act, to which reference hereby is made.

The Principal and the Surety agree that any alterations, changes and/or additions to the Contract Documents, and/or any alterations, changes and/or additions to the work to be performed under the Agreement in accordance with the Contract Documents, and/or any alterations, changes and/or additions to the Agreement, and/or any giving by the Oblige of any extensions of time for the performance of the Agreement in accordance with the Contract Documents, and/or any act of forbearance of either the Principal or the Oblige toward the other with respect to the Contract Documents and the Agreement, and/or the reduction of any percentage to be retained by the Oblige as permitted by the Contract Documents and by the Agreement, shall not release, in any manner whatsoever, the Principal and the Surety, or either of them, or their heirs, executors, administrators, successors and assigns, from liability and obligation under this bond; and the Surety, for value received, does waive notice of any such alterations, changes, additions, extensions of time, acts of forbearance and/or reduction of retained percentage.

If the Principal is a foreign corporation (incorporated under any laws other than those of the Commonwealth of Pennsylvania) then further terms and conditions of this Bond are and shall be that the Principal and the Surety shall not be discharged from liability on this Bond, nor this Bond surrendered until such Principal files with the Oblige a certificate from the Pennsylvania Department of Revenue evidencing the payment in full of all bonus taxes, penalties and interest, and a certificate from the Bureau of Employment and Unemployment Compensation of the Pennsylvania Department of Labor and Industry, evidencing the payment of all unemployment compensation, contributions, penalties and interest due the Commonwealth from said Principal or any foreign corporation, subcontractor thereunder or for which liability has accrued but the time for payment has not arrived, all in accordance with provisions of the Act of June 10, 1947, P.L. 493, of the Commonwealth of Pennsylvania.

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IN WITNESS WHEREOF, the Principal and the Surety cause this Bond to be signed, sealed and delivered this _____ day of _____, 20____.

(Individual Principal) _____ (SEAL)

Witness:

Signature of Individual
Trading & doing business as:

(Partnership Principal)

(Name of Partnership)

Witness:

By: _____ (SEAL)
Partner

By: _____ (SEAL)
Partner

By: _____ (SEAL)
Partner

(Corporation Principal)

(Name of Corporation)

Attest: _____
Secretary/Assistant Secretary

By: _____
President/Vice President

(CORPORATE SEAL)

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OR (if applicable)

Attest: _____

*By: _____
Authorized Representative

*Attach appropriate proof, with raised corporate seal, dated as of the same date as the bond, evidencing authority to execute on behalf of the corporation.

(CORPORATE SURETY)

Name of Corporation

Witness or Attest:

**By: _____
Title

(CORPORATE SEAL)

**Attach an appropriate power of attorney, with raised corporate seal, dated as of the same date as the bond, evidencing the authority of the Attorney-in-fact to act on behalf of the Corporation.

END OF DOCUMENT 00 6113.13

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DOCUMENT 00 6113.19 - PAYMENT BOND

KNOW ALL MEN BY THESE PRESENTS that we, _____, as Principal (the “Principal”), and _____, a corporation organized and existing under laws of the _____ of _____, with a principal office at _____, and _____, authorized to do business in the Commonwealth of Pennsylvania, as Surety (the “Surety”), are held and firmly bound unto the **School District of Haverford Township** as Obligee (the “Obligee”), as hereinafter set forth, in the full and just sum of _____ Dollars (\$_____)

lawful money of the United States of America, for the payment of which we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WITNESSETH THAT:

WHEREAS, The Principal heretofore has submitted to the Obligee a certain bid, dated _____, 20____ (the “Bid”), to perform certain _____ work for the Obligee, in connection with the **Chatham Park Elementary Solar Array** Project located in **400 Allston Rd, Havertown, PA 19083**, pursuant to plans, specifications and other related documents, which are incorporated into the Bid by reference (the “Contract Documents”), as prepared by KCBA Architects, 8 East Broad Street, Hatfield, PA 19440; and

WHEREAS, The Obligee, is a “Contracting Body” under provisions of Act No. 385 of the General Assembly of the Commonwealth of Pennsylvania, approved by the Governor on December 20, 1967, known as and cited as the “Public Works Contractors’ Bond Law of 1967” (the “Act”); and

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

WHEREAS, it also is a condition of the Contract Documents that this Bond shall be furnished by the Principal to the Obligee; and

WHEREAS, under the Contract Documents, it is provided, *inter alia*, that if the Principal shall furnish this Bond to the Obligee, and if the Obligee shall make an award to the Principal in accordance with the Bid, then the Principal and the Obligee shall enter into an agreement with respect to performance of such work (the “Agreement”), the form of which Agreement is set forth in the Contract Documents.

NOW, THEREFORE, the terms and conditions of this Bond are and shall be that if the Principal and any subcontractor of the Principal to whom any portion of the work under the Agreement shall be subcontracted, and if all assignees of the Principal and of any such subcontractor, promptly shall pay or shall cause to be paid, in full, all money which may be due any claimant supplying labor or materials in the prosecution and

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performance of the work in accordance with the Agreement and in accordance with the Contract Documents, including any amendment, extension or addition to the Agreement and/or to the Contract Documents, for material furnished or labor performed, then this Bond shall be void; otherwise, this Bond shall be and shall remain in force and effect.

This Bond, as provided by the Act, shall be solely for the protection of claimants supplying labor or materials to the Principal or to any subcontractor of the Principal in the prosecution of the work covered by the Agreement, including any amendment, extension or addition to the Agreement. The term "claimant", when used herein and as required by the Act, shall mean any individual, firm, partnership, association or corporation. The phrase "labor or materials" when used herein and as required by the Act, shall include public utility services and reasonable rentals of equipment, but only for periods when the equipment rented is actually used at the site of the work covered by the Agreement. As required by the Act, the provisions of this Bond shall be applicable whether or not the material furnished or labor performed enters into and becomes a component part of the public building, public work or public improvement contemplated by the Contract Documents and the Agreement.

As provided and required by the Act, the Principal and the Surety agree that any claimant, who has performed labor or furnished material in the prosecution of the work in accordance with the Agreement and in accordance with the Contract Documents, including any amendment, extension or addition to the Agreement and/or to the Contract Documents, and who has not been paid therefore, in full, before the expiration of ninety (90) days after the day on which such claimant performed the last of such labor or furnished the last of such materials for which payment is claimed, may institute an action upon this Bond, in the name of the claimant, in assumpsit, to recover any amount due the claimant for such labor or material; and may prosecute such action to final judgment and may have execution upon the judgment; provided, however, that: (a) any claimant who has a direct contractual relationship with any subcontractor of the Principal, but has no contractual relationship, express or implied, with the Principal, may institute an action upon this Bond only if such claimant first shall have given written notice, served in the manner provided in the Act, to the Principal, within ninety (90) days from the date upon which such claimant performed the last of the labor or furnished the last of the materials for which payment is claimed, stating, with substantial accuracy, the amount claimed and the name of the person for whom the work was performed or to whom the material was furnished; and (b) no action upon this Bond shall be commenced after the expiration of one (1) year from the day upon which the last of the labor was performed or material was supplied, for the payment of which such action is instituted by the claimant; and © every action upon this Bond shall be instituted either in the appropriate court of the County where the Agreement is to be performed or of such other County as Pennsylvania statutes shall provide, or in the United States District Court for the district in which the project, to which the Agreement relates, is situated, and not elsewhere.

This Bond is executed and delivered under and subject to the Act, to which reference hereby is made.

The Principal and the Surety agree that any alterations, changes and/or additions to the Contract Documents, and/or any alterations, changes and/or additions to the work to be performed under the Agreement in accordance with the Contract Documents, and/or any alterations, changes and/or additions to the Agreement, and/or any giving by the Obligatee of any extensions of time for the performance of the Agreement in accordance with the Contract Documents, and/or any act of forbearance of either the Principal or the Obligatee toward the other with respect to the Contract Documents and the Agreement, and/or the reduction of any percentage to be retained by the Obligatee as permitted by the Contract Documents and by the Agreement, shall not release, in any manner whatsoever, the Principal and the Surety, or either of them, or their heirs, executors, administrators, successors and assigns, from liability and obligations under this Bond; and the Surety, for value received, does waive notice of any such alterations, changes, additions, extensions of time, acts of forbearance and/or reduction of retained percentage.

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Provided, that it is expressly agreed that this Bond shall be deemed amended automatically and immediately, without formal and separate amendments hereto, upon amendment to the Contract Documents not increasing the contract price more than twenty percent (20%), so as to bind the Principal and the Surety to the full and faithful performance of the Contract Documents as so amended. The term "Amendment", wherever used in this Bond and whether referring to this Bond, the Contract Documents, or the Agreement, shall include any alteration, addition, extension or modification of any character whatsoever.

Provided, further, that no final settlement between the Obligee and the Principal shall abridge the right of any beneficiary hereunder, whose claim may be unsatisfied.

If the Principal is a foreign corporation (incorporated under any laws other than those of the Commonwealth of Pennsylvania) then further terms and conditions of this Bond are and shall be that the Principal or the Surety shall not be discharged from liability on this Bond, nor this Bond surrendered until such Principal files with the Obligee a certificate from the Pennsylvania Department of Revenue evidencing the payment in full of all bonus taxes, penalties and interest, and a certificate from the Bureau of Employment and Unemployment Compensation of the Pennsylvania Department of Labor & Industry, evidencing the payment of all unemployment compensation, contributions, penalties and interest due the Commonwealth from said Principal or any foreign corporation, subcontractors thereunder or for which liability has accrued but the time for payment has not arrived, all in accordance with provisions of the Act of June 10, 1947, P.L. 493, of the Commonwealth of Pennsylvania.

IN WITNESS WHEREOF, the Principal and the Surety cause this Bond to be signed, sealed and delivered this _____ day of _____, 20____.

(Individual Principal)

Signature of Individual (SEAL)

Witness:

Trading and doing business as:

(Partnership Principal)

(Name of Partnership)

By: _____ (SEAL)
Partner

By: _____ (SEAL)
Partner

By: _____ (SEAL)
Partner

(Corporation Principal)

(Name of Corporation)

Attest: _____
Secretary/Assistant Secretary

By: _____
President/Vice President

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(CORPORATE SEAL)

OR (if applicable)

Attest:_____

*By:_____

Authorized Representative

*Attach appropriate proof, dated as of the same date as the bond, evidencing authority to execute on behalf of the corporation.

(CORPORATE SURETY)

(Name of Corporation)

Witness or Attest:

**By:_____

Title

(CORPORATE SEAL)

**Attach an appropriate Power of Attorney, dated as of the same date as the bond, evidencing the authority of the Attorney-in-Fact to act on behalf of the Corporation.

END OF DOCUMENT 00 6113.16

DOCUMENT 00 7343 – PENNSYLVANIA PREVAILING WAGE RATES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Document specifies administrative and procedural requirements for the implementation of Pennsylvania Prevailing Wage Rates.
- B. Pennsylvania Prevailing Wage Rates: For work with a total value in excess of \$25,000, this regulation and the general Pennsylvania prevailing minimum wage rates (Act 442 of 1961, P.L. 987, amended by Act 342 of 1963, P.L. 653 and as amended from time to time (43 P.S. § 165-1, et seq.)). amended), as determined by the Secretary of Labor and Industry, which shall be paid for each craft or classification of all workers needed to perform the contract during the anticipated term therefore in the locality in which public work is performed, are made part of the Contract Documents.
- C. Attachments: Two pages of Pennsylvania prevailing wage forms, and ten pages of Pennsylvania prevailing wage rates are attached to the end of this document.

1.2 PENNSYLVANIA PREVAILING WAGE PROVISIONS

- A. The general provisions of the Pennsylvania Prevailing Wage Act, approved August 15, 1961, as amended are applicable to this project.
- B. The general prevailing minimum wage rates including contributions for employee benefits as shall have been determined by the Secretary of Labor and Industry (hereinafter "Secretary") which must be paid to the workmen employed in the performance of the Contract.
- C. The Contractor shall pay no less than the wage rates as determined in the decision of the Secretary and shall comply with the conditions of the Pennsylvania Prevailing Wage Act approved August 15, 1961 (Act No. 442), as amended August 9, 1963 (Act No. 342), and the Regulations issued pursuant thereto, to assure the full and proper payment of said rates.
- D. These Contract provisions shall apply to all work performed on the Contract by the Contractor and to all work performed on the Contract by all subcontractors.
- E. The Contractor shall insert in each of his subcontracts all of the stipulations contained in these required provisions.
- F. No workmen may be employed on the Work except in accordance with the classifications set forth in the decision of the Secretary. In the event that additional or different classifications are necessary the procedure set forth in the Regulations shall be followed.
- G. All workmen employed or working on the Work shall be paid unconditionally, regardless of whether any contractual relationship exists or the contractual relationship which may be alleged to exist between any Contractor, subcontractor and workmen, not less than once a week without deductions or rebate, on any account, either directly or indirectly, except authorized deductions, the full amount due at the time of payment, computed at the rates

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applicable to the time worked in the appropriate classification. Nothing in this Contract, the Act or the Regulations shall prohibit the payment of more than the general prevailing minimum wage rates as determined by the Secretary to the workmen on the Work.

- H. The Contractor and each subcontractor shall post for the entire period of construction the wage determination decisions of the Secretary, including the effective date of any changes thereof, in a prominent and easily accessible place or places at the site of the work and at such place or places used by them to pay workmen their wages. The posted notice of wage rates must contain the following information.
1. Name of project.
 2. Name of public body of which it is constructed.
 3. The crafts and classifications of workmen listed in the Secretary's general prevailing minimum wage rate determination for the particular project.
 4. The general prevailing minimum wage rates determined for each craft and classification and the effective date of any changes.
 5. A statement advising workmen that if they have been paid less than the general prevailing minimum wage rate for their job classification or that the Contractor and/or subcontractor are not complying with the Act or the Regulations in any manner whatsoever, they may file a protest with the Secretary within three (3) months of the date of the occurrence, objecting to the payment to the Contractor to the extent of the amount or amounts due or to become due to them as wages for work performed on the Project. Any workmen paid less than the rate specified in the Contract shall have a civil right of action for the difference between the wage paid and wages stipulated in the Contract, which right of action must be exercised within six (6) months from the occurrence of the event creating such right.
- I. The Contractor and all subcontractors, shall keep an accurate record showing the name, craft and/or classification, number of hours worked per day, and the actual hourly rate of wage paid (including employee benefits) to each workman employed by him in connection with the Work and such record must include any deductions from each workman. The record shall be preserved for two (2) years from the date of payment and shall open at all reasonable hours to the inspection of the Owner and to the Secretary or his duly authorized representative.
- J. Apprentices shall be limited to such numbers as shall be in accordance with a bona fide apprenticeship program registered with and approved by the Pennsylvania Apprenticeship and Training Council and only apprentices whose training and employment are in full compliance with the provisions of the Apprenticeship and Training Act approved July 14, 1961 (Act No. 304) and the Rules and Regulation issued pursuant thereto shall be employed on the Work. Any workmen using the tools of a craft who does not qualify as an apprentice within the provisions of the Apprenticeship and Training Act shall be paid the rate predetermined for journeyman in that particular craft and/or classification.
- K. Wages shall be paid without any deductions except authorized deductions. Employers not party to a Contract requiring contributions for employee benefits which the Secretary has determined to be included in the general prevailing minimum wage rate shall pay the monetary equivalent thereof directly to the workman.
- L. Payment of compensation to workmen for work performed on public work on a lump sum basis, or a piece work system, or a price certain for the completion of a certain amount of work, or the production of a certain result shall be deemed a violation of the Pennsylvania Prevailing Wage Act and the Regulations, regardless of the average hourly earnings resulting

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there from.

- M. Prevailing Wage Certification: 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 Owner, under oath, and in form satisfactory to the Secretary, certifying that all workmen have been paid wages in strict conformity with the provisions of the Contract as prescribed by the Regulations, or if any wages remain unpaid, to set forth the amount of wages due and owing to each workman respectively.
- N. The provision of the Act and the Regulations are incorporated by reference in the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF DOCUMENT 00 7343

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

Project Name:	Chatham Park Elementary School Solar Array Project
General Description:	Project is to install a new solar array on the roof of the existing school. Array will be approximately 400 KW.
Project Locality	Haverford Township
Awarding Agency:	School District of Haverford Township
Contract Award Date:	1/15/2026
Serial Number:	25-09543
Project Classification:	Building
Determination Date:	10/24/2025
Assigned Field Office:	Philadelphia
Field Office Phone Number:	(215)560-1858
Toll Free Phone Number:	
Project County:	Delaware County

BUREAU OF LABOR LAW COMPLIANCE

PREVAILING WAGES PROJECT RATES

Project: 25-09543 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Asbestos & Insulation Workers	5/1/2025		\$60.84	\$48.71	\$109.55
Boilermaker (Commercial, Institutional, and Minor Repair Work)	3/1/2024		\$36.71	\$19.13	\$55.84
Boilermakers	1/1/2024		\$52.10	\$35.72	\$87.82
Bricklayer	5/1/2025		\$50.00	\$32.57	\$82.57
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	5/1/2024		\$45.72	\$29.02	\$74.74
Carpenters	5/1/2025		\$47.47	\$29.02	\$76.49
Cement Finishers & Plasterers	5/1/2022		\$38.57	\$32.39	\$70.96
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	5/1/2024		\$52.98	\$37.99	\$90.97
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	5/1/2024		\$61.54	\$41.74	\$103.28
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	5/1/2024		\$52.98	\$37.99	\$90.97
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
Electricians	5/1/2024		\$69.58	\$45.66	\$115.24
Electricians	5/1/2025		\$70.97	\$47.27	\$118.24
Elevator Constructor	1/1/2024		\$68.97	\$44.70	\$113.67
Elevator Constructor	1/1/2025		\$71.85	\$45.77	\$117.62
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
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
Iron Workers (Rodman/Reinforcing)	7/1/2025		\$47.80	\$36.65	\$84.45
Laborers (Class 01 - See notes)	5/1/2024		\$35.85	\$26.00	\$61.85
Laborers (Class 01 - See notes)	5/1/2025		\$37.25	\$26.10	\$63.35
Laborers (Class 02 - See notes)	5/1/2024		\$39.40	\$27.55	\$66.95
Laborers (Class 02 - See notes)	5/1/2025		\$41.00	\$27.70	\$68.70
Laborers (Class 03 - See notes)	5/1/2024		\$36.27	\$26.18	\$62.45
Laborers (Class 03 - See notes)	5/1/2025		\$37.67	\$26.28	\$63.95
Laborers (Class 04 - See notes)	5/1/2024		\$36.27	\$26.18	\$62.45
Laborers (Class 04 - See notes)	5/1/2025		\$37.67	\$26.28	\$63.95

BUREAU OF LABOR LAW COMPLIANCE PREVAILING WAGES PROJECT RATES

Project: 25-09543 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Laborers (Class 05 - See notes)	5/1/2024		\$35.85	\$26.00	\$61.85
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	5/1/2023		\$39.52	\$29.30	\$68.82
Marble Finisher	5/1/2025		\$41.17	\$30.75	\$71.92
Marble Mason	5/1/2023		\$47.20	\$31.95	\$79.15
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)	5/1/2024		\$53.36	\$33.65	\$87.01
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)	5/1/2024		\$56.37	\$34.53	\$90.90
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)	5/1/2024		\$53.11	\$33.58	\$86.69
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)	5/1/2024		\$56.13	\$34.45	\$90.58
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)	5/1/2024		\$49.03	\$32.37	\$81.40
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)	5/1/2024		\$48.73	\$32.28	\$81.01
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)	5/1/2024		\$47.00	\$31.78	\$78.78
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)	5/1/2024		\$46.02	\$31.48	\$77.50
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)	5/1/2024		\$64.80	\$38.61	\$103.41
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)	5/1/2024		\$64.50	\$38.53	\$103.03
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 - Line Stripping	12/1/2024		\$44.12	\$27.91	\$72.03
Painters Class 4 (see notes)	5/1/2024		\$45.06	\$34.11	\$79.17

**BUREAU OF LABOR LAW COMPLIANCE
PREVAILING WAGES PROJECT RATES**

Project: 25-09543 - Building	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Painters Class 4 (see notes)	5/1/2025		\$46.47	\$34.55	\$81.02
Plasterers	5/1/2024		\$39.88	\$33.08	\$72.96
plumber	5/1/2024		\$67.53	\$38.31	\$105.84
plumber	5/1/2025		\$70.53	\$39.46	\$109.99
Pointers, Caulkers, Cleaners	5/1/2023		\$48.80	\$30.70	\$79.50
Pointers, Caulkers, Cleaners	5/1/2025		\$51.35	\$31.80	\$83.15
Roofers (Composition)	5/1/2024		\$44.13	\$34.77	\$78.90
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
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	5/1/2023		\$47.20	\$31.95	\$79.15
Stone Masons	5/1/2025		\$50.00	\$32.80	\$82.80
Terrazzo Finisher	5/1/2023		\$43.75	\$27.86	\$71.61
Terrazzo Finisher	5/1/2025		\$45.61	\$29.41	\$75.02
Terrazzo Grinder	5/1/2023		\$44.02	\$27.86	\$71.88
Terrazzo Grinder	5/1/2025		\$45.88	\$29.41	\$75.29
Terrazzo Mechanics	5/1/2023		\$50.26	\$29.56	\$79.82
Terrazzo Mechanics	5/1/2025		\$52.21	\$31.26	\$83.47
Tile Finisher	5/1/2023		\$39.52	\$29.30	\$68.82
Tile Finisher	5/1/2025		\$41.17	\$30.75	\$71.92
Tile Setter	5/1/2023		\$50.26	\$29.56	\$79.82
Tile Setter	5/1/2025		\$52.21	\$31.26	\$83.47
Truckdriver class 1(see notes)	5/1/2024		\$36.79	\$22.54	\$59.33
Truckdriver class 2 (see notes)	5/1/2024		\$36.89	\$22.54	\$59.43
Window Film / Tint Installer	6/1/2019		\$24.52	\$12.08	\$36.60
Window Film / Tint Installer	6/1/2024		\$26.37	\$14.83	\$41.20

BUREAU OF LABOR LAW COMPLIANCE PREVAILING WAGES PROJECT RATES

Project: 25-09543 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Bricklayer	5/1/2025		\$50.00	\$32.57	\$82.57
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	5/1/2024		\$52.98	\$37.99	\$90.97
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	5/1/2024		\$61.54	\$41.74	\$103.28
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	5/1/2024		\$52.98	\$37.99	\$90.97
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
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)	5/1/2024		\$38.80	\$27.65	\$66.45
Laborers (Class 01 - See notes)	5/1/2025		\$40.20	\$27.80	\$68.00
Laborers (Class 02 - See notes)	5/1/2024		\$39.00	\$27.65	\$66.65
Laborers (Class 02 - See notes)	5/1/2025		\$40.40	\$27.80	\$68.20
Laborers (Class 03 - See notes)	5/1/2024		\$39.00	\$27.65	\$66.65
Laborers (Class 03 - See notes)	5/1/2025		\$40.40	\$27.80	\$68.20
Laborers (Class 04 - See notes)	5/1/2024		\$33.60	\$27.65	\$61.25
Laborers (Class 04 - See notes)	5/1/2025		\$35.00	\$27.80	\$62.80
Laborers (Class 05 - See notes)	5/1/2024		\$39.65	\$27.65	\$67.30
Laborers (Class 05 - See notes)	5/1/2025		\$41.05	\$27.80	\$68.85
Laborers (Class 06 - See notes)	5/1/2024		\$39.70	\$27.65	\$67.35
Laborers (Class 06 - See notes)	5/1/2025		\$41.10	\$27.80	\$68.90
Laborers (Class 07 - See notes)	5/1/2024		\$39.55	\$27.65	\$67.20
Laborers (Class 07 - See notes)	5/1/2025		\$40.95	\$27.80	\$68.75
Laborers (Class 08 - See notes)	5/1/2025		\$40.70	\$27.80	\$68.50
Laborers (Class 09 - See notes)	5/1/2024		\$39.15	\$27.65	\$66.80
Laborers (Class 09 - See notes)	5/1/2025		\$40.55	\$27.80	\$68.35
Laborers (Class 10- See notes)	5/1/2024		\$39.30	\$27.65	\$66.95
Laborers (Class 10- See notes)	5/1/2025		\$40.70	\$27.80	\$68.50
Laborers (Class 11 -See Notes)	5/1/2024		\$39.20	\$27.65	\$66.85

BUREAU OF LABOR LAW COMPLIANCE PREVAILING WAGES PROJECT RATES

Project: 25-09543 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Laborers (Class 11 -See Notes)	5/1/2025		\$40.60	\$27.80	\$68.40
Laborers (Class 12 -See Notes)	5/1/2024		\$40.90	\$27.65	\$68.55
Laborers (Class 12 -See Notes)	5/1/2025		\$42.30	\$27.80	\$70.10
Laborers (Class 13 -See Notes)	5/1/2024		\$42.93	\$27.65	\$70.58
Laborers (Class 13 -See Notes)	5/1/2025		\$44.33	\$27.80	\$72.13
Laborers (Class 14 -See Notes)	5/1/2024		\$39.50	\$27.65	\$67.15
Laborers (Class 14 -See Notes)	5/1/2025		\$40.90	\$27.80	\$68.70
Laborers Utility (PGW ONLY) (Flagperson)	5/1/2025		\$34.07	\$19.73	\$53.80
Laborers Utility (PGW ONLY)	5/1/2025		\$41.10	\$19.73	\$60.83
Landscape Laborer	5/1/2024		\$30.28	\$24.05	\$54.33
Landscape Laborer	5/1/2025		\$31.73	\$24.15	\$55.88
Millwright	5/1/2024		\$54.67	\$35.81	\$90.48
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)	5/1/2024		\$53.36	\$33.65	\$87.01
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)	5/1/2024		\$56.37	\$34.53	\$90.90
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)	5/1/2024		\$53.11	\$33.58	\$86.69
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)	5/1/2024		\$56.13	\$34.45	\$90.58
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)	5/1/2024		\$49.03	\$32.37	\$81.40
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)	5/1/2024		\$48.73	\$32.28	\$81.01
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)	5/1/2024		\$47.00	\$31.78	\$78.78

BUREAU OF LABOR LAW COMPLIANCE PREVAILING WAGES PROJECT RATES

Project: 25-09543 - Heavy/Highway	Effective Date	Expiration Date	Hourly Rate	Fringe Benefits	Total
Highway)					
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)	5/1/2024		\$46.02	\$31.48	\$77.50
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)	5/1/2024		\$64.80	\$38.61	\$103.41
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
Operators Class 07 (B) - See Notes (Building, Heavy, Highway)	5/1/2024		\$64.50	\$38.53	\$103.03
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 Class 2 (see notes)	2/1/2024		\$49.57	\$33.34	\$82.91
Painters Class 2 (see notes)	2/1/2025		\$50.85	\$33.91	\$84.76
Painters Class 3 (see notes)	2/1/2024		\$60.53	\$33.38	\$93.91
Painters Class 3 (see notes)	2/1/2025		\$61.81	\$33.95	\$95.76
Pointers, Caulkers, Cleaners	5/1/2025		\$51.35	\$31.80	\$83.15
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 2 (see notes)	5/1/2024		\$36.74	\$22.54	\$59.28

DRAFT AIA® Document A101™ – 2017

Standard Form of Agreement Between Owner and Contractor *where the basis of payment is a Stipulated Sum*

AGREEMENT made as of the « » day of « » in the year « »
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

«School District of Haverford Township »« »
«50 East Eagle Road »
«Havertown, PA 19083»
« »

and the Contractor:
(Name, legal status, address and other information)

« »« »
« »
« »
« »

for the following Project:
(Name, location and detailed description)

«Chatham Park Elementary Solar Array Project
400 Allston Rd.
Haverford, PA 19083

The Architect:
(Name, legal status, address and other information)

Celentano Energy Services
7821 Flourtown Ave.
Wyndmoor, PA 19038
215-836-9958 (O)

The Owner Representative:
(Name, legal status, address and other information)

C.B. Development Services, Inc.
1617 JFK Boulevard, Suite 1090
Philadelphia, PA 19103

The Owner and Contractor agree as follows.

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

The parties should complete A101™-2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201™-2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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TABLE OF ARTICLES

- 1 THE CONTRACT DOCUMENTS
- 2 THE WORK OF THIS CONTRACT
- 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
- 4 CONTRACT SUM
- 5 PAYMENTS
- 6 DISPUTE RESOLUTION
- 7 TERMINATION OR SUSPENSION
- 8 MISCELLANEOUS PROVISIONS
- 9 ENUMERATION OF CONTRACT DOCUMENTS

EXHIBIT A INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), all documents identified as part of the Contract Documents in the General Conditions, Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:

(Check one of the following boxes.)

☐ The date of this Agreement.

☒ A date set forth in a notice to proceed issued by the Owner.

☐ Established as follows:

(Insert a date or a means to determine the date of commencement of the Work.)

« »

If a date of commencement of the Work is not selected, then the date of commencement shall be the date of this Agreement.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

§ 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

(Check one of the following boxes and complete the necessary information.)

[« »] Not later than « » (« ») calendar days from the date of commencement of the Work.

[« X »] By the following date: « See Milestone Dates »

§ 3.3.2 Subject to adjustments of the Contract Time as provided in the Contract Documents, if portions of the Work are to be completed prior to Substantial Completion of the entire Work, the Contractor shall achieve Substantial Completion of such portions by the following dates:

Portion of Work

As listed in Section 01 1000 Summary

Substantial Completion Date

As listed in Section 01 1000 Summary

§ 3.3.3 Intentionally deleted.

ARTICLE 4 CONTRACT SUM

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be « » (\$ « »), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 Alternates

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item

See Specification section
012300 ALTERNATES

Price

§ 4.2.2 Subject to the conditions noted below, the following alternates may be accepted by the Owner following execution of this Agreement. Upon acceptance, the Owner shall issue a Modification to this Agreement.
(Insert below each alternate and the conditions that must be met for the Owner to accept the alternate.)

Item

Price

Conditions for Acceptance

§ 4.3 Allowances, if any, included in the Contract Sum:
(Identify each allowance.)

Item

See Specification section
012215 UNIT PRICES AND
ALLOWANCES

Price

§ 4.4 Unit prices, if any:

(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item

See Specification section
012215 UNIT PRICES AND
ALLOWANCES

Units and Limitations

Price per Unit (\$0.00)

§ 4.5 Intentionally Deleted.

§ 4.6 Intentionally Deleted.

ARTICLE 5 PAYMENTS

§ 5.1 Progress Payments

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

« »

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the 25th day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the 10 business days after the second regularly scheduled School Board meeting of the following month.

(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 In accordance with AIA Document A201™–2017, General Conditions of the Contract for Construction, and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

§ 5.1.6.1 The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 That portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction, or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing; and
- .3 That portion of Construction Change Directives that the Owner's Representative, with input from the Architect, determines to be reasonably justified.

§ 5.1.6.2 The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201–2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201–2017; and
- .5 Retainage withheld pursuant to Section 5.1.7.

§ 5.1.7 Retainage

§ 5.1.7.1 For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due in accordance with the General Conditions.

§ 5.1.7.1.1 The following items are not subject to retainage:

(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)

« As per Article 9.6.7 of modified AIA A201-2017 »

§ 5.1.7.2 Reduction or limitation of retainage, if any, shall be as set forth in the General Conditions.

§ 5.1.7.3 Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall be processed in accordance with the General Conditions.

§ 5.1.8 Intentionally deleted.

§ 5.1.9 Intentionally deleted..

§ 5.2 Final Payment

§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor in accordance with the General Conditions.

§ 5.2.2 The Owner's final payment to the Contractor shall be in accordance with the General Conditions.

§ 5.3 Interest

Payments due and unpaid under the Contract shall bear interest from the date payment is due at the rate stated below, or in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

3% per year.

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 Initial Decision Maker

The Owner Representative will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201–2017, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker.

§ 6.2 Binding Dispute Resolution

For any Claim subject to, but not resolved by, mediation pursuant to Article 15 of AIA Document A201–2017, the method of binding dispute resolution shall be as set forth in the General Conditions.

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in the General Conditions.

§ 7.1.1 If the Contract is terminated for the Owner's convenience in accordance with Article 14 of AIA Document A201–2017, then the Owner shall pay the Contractor in accordance with the General Conditions.

§ 7.2 The Work may be suspended by the Owner as provided in the General Conditions.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2017 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 The Owner's representative:

(Name, address, email address, and other information)

C.B. Development Services, Inc.
1617 JFK Boulevard, Suite 1090
Philadelphia, PA 19103

§ 8.3 The Contractor's representative:

(Name, address, email address, and other information)

<< >>
<< >>
<< >>
<< >>
<< >>
<< >>

§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

§ 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth in the Instructions to Bidders and the General Conditions .

§ 8.5.2 The Contractor shall provide bonds as set forth in the Contract Documents.

§ 8.6 Notice in electronic format, pursuant to Article 1 of AIA Document A201–2017, may be given in accordance with AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, if completed, or as otherwise set forth below:

(If other than in accordance with AIA Document E203–2013, insert requirements for delivering notice in electronic format such as name, title, and email address of the recipient and whether and how the system will be required to generate a read receipt for the transmission.)

§ 8.7 Other provisions:

N/A

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds
- .3 AIA Document A201™–2017, General Conditions of the Contract for Construction, as modified
- .4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:

(Insert the date of the E203-2013 incorporated into this Agreement.)

« »

- .5 Drawings

Number	Title	Date
Included in the bid documents		

- .6 Specifications

Section	Title	Date	Pages
Included in the bid documents			

- .7 Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

- .8 Other Exhibits:

(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[« »] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017 incorporated into this Agreement.)

« »

[« »] The Sustainability Plan:

Title	Date	Pages

[« »] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

- .9 Other documents, if any, listed below:
The Instructions to Bidders
The Payment Bond
The Performance Bond

This Agreement entered into as of the day and year first written above.

OWNER *(Signature)*

« »« »

(Printed name and title)

CONTRACTOR *(Signature)*

« »« »

(Printed name and title)

DRAFT AIA® Document A201™ – 2017

General Conditions of the Contract for Construction

for the following PROJECT:

(Name and location or address)

Chatham Park Elementary School Solar Array Project
400 Allston Rd.

Haverford, PA 19083 THE OWNER:

(Name, legal status and address)

«School District of Haverford Township »
«50 East Eagle Road »
«Havertown, PA 19083 »

THE ARCHITECT: All locations throughout the contract documents where the word “Architect” is used shall be Synonymous with “Solar Consultant”

(Name, legal status and address)

SOLAR Consultant

Celentano Energy Services
7821 Flourtown Ave.
Wyndmoor, PA 19038
Telephone- 215-836-9958»

THE OWNER REPRESENTATIVE:

C.B. Development Services, Inc.
1617 JFK Boulevard, Suite 1090
Philadelphia PA 19010

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ADDITIONS AND DELETIONS:

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 Basic Definitions

§ 1.1.1 The Contract Documents

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, the Instructions to Bidders, the Bid Bond, the Payment Bond, the Performance Bond, the Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, or portions of Addenda relating to bidding or proposal requirements.

§ 1.1.2 The Contract

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor, except as set forth in paragraph 3.3.7. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 The Work

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 The Project

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

§ 1.1.5 The Drawings

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

§ 1.1.6 The Specifications

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 Instruments of Service

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 Initial Decision Maker

The Initial Decision Maker is the Owner Representative as is identified in the Agreement and is responsible to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

§ 1.2 Correlation and Intent of the Contract Documents

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent

consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings. Typographical and spelling errors shall be interpreted by the Architect for their obvious meaning and intent. References throughout the Contract Documents expressed in the singular number shall mean one or more like items as may be required to complete the Work. Likewise, plural references that obviously imply only one item shall mean only one item.

§ 1.2.4 In the case of an inconsistency within or between Contract Documents not clarified by Addendum, the better quality or greater quantity of Work shall be provided in accordance with Architect's interpretation. Such conflict shall be promptly referred to the Architect and Owner Representative for interpretation and final decision.

§ 1.2.5 Where the Work is shown in complete detail on only half or portion of a Drawing or there is an indication of continuation, the remainder being shown in outline, the Work drawn out in detail shall be understood to apply to other like portions of the structure.

§ 1.2.6 On all Work of a remodeling nature or installation within the present buildings, it will be the responsibility of the Contractor, by personal inspection, to satisfy himself as to the correctness of any information given which may affect the quantity, size, and quality of materials required for a satisfactorily completed Contract, whether or not such information is indicated on the Drawings or within the Specifications.

§ 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

§ 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

§ 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

§ 1.7.1 The Architect may, with the concurrence of the Owner, furnish to the Contractors versions of Instruments of Service in electronic form. The Contract Documents executed or identified in accordance with Subparagraph 1.2.1 shall prevail in case of an inconsistency with subsequent versions made through manipulatable electronic operations involving computers.

§ 1.7.2 The Contractor shall not transfer or reuse Instruments of Service in electronic or machine-readable form without the prior written consent of the Architect.

§ 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

ARTICLE 2 OWNER

§ 2.1 General

§ 2.1.1 The Owner is the entity identified as such in the Agreement and is a Pennsylvania Public School District. Only the Board of School Directors by majority vote at a public meeting may create or increase the liability of the Owner under any contract or quasi-contract. The Board may, by affirmative vote at a public meeting, authorize an individual to approve changes in the contract sum or contract time between Board meetings under whatever terms the Board deems appropriate. On other matters, the Owner designates the Owner's Representative to provide approval or authorization on behalf of the Owner. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority.

§ 2.1.2 Intentionally deleted.

§ 2.3 Information and Services Required of the Owner

§ 2.3.1 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.3.1.1 The Owner will secure and pay for necessary zoning approvals, site development approvals, highway access approvals, design approvals, and other approvals related to permanent facilities and required precedent to applications for permits for Work at the Project Site. **The Owner will pay directly for all Township required permits (Building, Mechanical, Electrical, Plumbing)**

§ 2.3.2 The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 The Owner will shall furnish surveys describing physical characteristics, easements, right of ways, and utility locations for the site of the Project, and a legal description of the site.

§ 2.3.5 Information or services under the Owner's control shall be furnished by the Owner with reasonable promptness after receipt from the Contractor of a written request for such information or services.

§ 2.3.6 The Contractor will be furnished, free of charge, one (1) hard copy and one (1) electronic PDF set of Contract Documents including Drawings, Project Manuals, addenda, and modifications thereof, plus additional sets as required for permits. The Contractor shall pay the actual cost of reproduction for all additional sets or individual prints requested by him. Additional sets will be furnished at the cost of reproduction, postage and handling.

§ 2.2.7 The Owner will provide for special testing and inspections not specifically indicated as by the Contractor in accordance with the requirements of Division 01 Section "Quality Requirements

§ 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.5 Owner's Right to Carry Out the Work

§ 2.5.1 If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents or project schedule, or fails to adequately staff the project with proper management, supervision, materials and Workforce, including its duty to proceed expeditiously with adequate forces so as to achieve substantial completion within the Contract Time, and fails within a seventy-two (72) hour period after receipt of written notice from the Owner to commence and continue correction of such default of neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due to the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses, including attorney's fees and costs and compensation for the Architect's additional services made necessary by such default, neglect or failure. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. Notwithstanding the above, Owner shall not be required to comply the notice provisions hereof, and may proceed to correct deficiencies if Contractor fails within a 24-hour period after receipt of written notice form the Owner to commence and continue correction of such deficiencies where further delay would cause substantial disruption to the project schedule. Owner shall have the further right to carry out Work without any prior notice to Contractor, in an emergency affecting safety of persons or property, and said Work is necessary to prevent threatened damage, injury or loss. Owner's right in this regard shall not relieve Contractor of its obligations and responsibilities under the Contract Documents and shall not give rise to a duty on the part of the Owner to exercise the right for the benefit of the Contractor or any other person or entity.

§ 2.6 OWNER'S REPRESENTATIVE

§ 2.6.1 The Owner has employed a qualified person or firm as Owner Representative. Owner's Representative shall have the right to attend job conferences or project meetings and to come to the Project site while the Work is in progress. Nothing herein contained shall create any contractual relationship between Owner Representative and any Contractor, Subcontractor or Sub-subcontractor. Owner's employment of an Owner Representative shall not relieve the Contractor of any of its responsibilities or obligations under the Contract Documents.

ARTICLE 3 CONTRACTOR

§ 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have

express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents. Where term "Contractor" is modified in any way, such as, without limit, "this Contractor", "General Construction Contractor", "Mechanical Contractor", "Plumbing Contractor", "Electrical Contractor", "separate contractor", the modified term shall be deemed to refer to the trade involved with the Work mentioned, but such meaning does not relieve the Contractor from his responsibility for all Work, whether or not such Work is sublet.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor. Observation of Work by the Architect or by employees of the Architect shall not be interpreted as relieving Contractor from his responsibility for coordination of all Work, his Superintendence of the Work, and his scheduling of the Work.

§ 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents. The Contractor shall review the drawings and Work of other separate contracts to determine if that Work affects the Contractor's planned Work.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities. The Contractor shall give the Architect timely notice of any additional design drawings, specifications, or instructions required to define the Work in greater detail, or to permit the proper progress of the Work. The Contractor shall not proceed with any Work not clearly and consistently defined in detail in the Contract Documents, special requests, additional drawings or instructions from the Architect. If the Contractor proceeds with such Work without obtaining further drawings or instruction, he shall correct Work incorrectly done at his own expense.

§ 3.2.5 Explorations and Reports: Reference is made to the General Requirements and Bidding Documents for identification of those reports of explorations and tests of subsurface conditions at the Project site that have been utilized by Architect in preparation of the Contract Documents. Contractor may rely upon the accuracy of the technical data contained in such reports, but not upon non-technical data, interpretations or opinions contained therein or for the completeness thereof for Contractor's purposes. Except as indicated in the immediately preceding

sentence and in paragraph 3.7.4, Contractor shall have full responsibility with respect to subsurface conditions at the Project site.

§ 3.2.6 Existing Structures: Reference is made to the Bidding Documents for identification of those drawings of physical conditions in or relating to existing surface structures which are at or contiguous to the Project site that have been utilized by Architect in preparation of the Contract Documents. Contractor may rely upon the accuracy of the technical data contained in such drawings, but not for the completeness thereof for Contractor's purposes. Except as indicated in the immediately preceding sentence and in subparagraph 3.7.4, Contractor shall have full responsibility with respect to physical conditions in or relating to such natures.

§ 3.2.7 The Owner shall be entitled to deduct from the Contract Sum amounts paid to the Architect for the Architect to evaluate and respond to the Contractor's requests for information, where such information was available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior Project correspondence or documentation.

§ 3.2.8 The Contractor shall be liable to the Owner for damages resulting from errors, inconsistencies or omissions in the Contract Documents or from differences between field measurements or conditions and the Contract Documents, if (1) the Contractor knowingly fails to report such error, inconsistency, omission or difference to the Architect, or the Contractor fails to carefully study and compare the Contract Documents relative to that portion of the Work for which the Contractor is responsible, such that, had Contractor done so, Contractor would have discovered such error, inconsistency or omission and reported same to Architect and (2) the damages would not have been suffered but for the Contractor's failure.

§ 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.3.4 Contractor's supervision of Work shall include expediting and coordination of Work of trades. Contractor shall perform all supervising and procuring required to insure delivery of materials to maintain Work schedules of Subcontractors and progress schedule of project to insure full completion of Work, to supply equipment or instruments necessary to complete specified test, checks, balancing of system, to furnish operating instructions, etc.

§ 3.3.5 The Contractor, his employees or his Subcontractors shall not install any product or equipment in a manner which is in direct conflict with the manufacturer's recommended requirements. If the manufacturer of the product or equipment has requirements which cannot be met by the specific application indicated, the Contractor shall bring this information to the attention of the Architect. Products or equipment installed contrary to their manufacturer's requirements shall be replaced at no additional cost to the Owner unless specifically authorized in writing by the Architect.

§ 3.3.6 When complex mechanical and electrical installations are involved, Contractor's representatives shall be sufficiently familiar with these trades to provide intelligent and efficient supervision through all phases of Work.

§ 3.3.7 The General Contractor is designated as the Project Coordinator for this Project. The Project Coordinator and other Contractors are responsible for coordination of the Work. The Project Coordinator is responsible for making all coordination decisions not mutually agreed to by all affected Contractors. Disputes between or among the Project Coordinator and one or more other Contractors and disputes in connection with the construction schedule, the furnishing of additional resources to meet the project schedule, job coordination and all aspects of the means and methods of construction shall be submitted promptly to the Project Coordinator for a final construction decision. The Project Coordinator and the affected Contractor or Contractors shall in connection with all submissions for a final construction decision provide actual written notice contemporaneously to the Owner's Representative and the Architect. The final construction decision of the Project Coordinator must, at all times, be consistent with content and intent of the Contract Documents and the latest accepted schedule. The final construction decision of the Project Coordinator will be observed, accepted and fully followed by all Contractors and their Subcontractors on the project, subject only to commencement of litigation proceedings between Project Coordinator and separate Contractor(s). The progress of the Work in accordance with the final construction decision of the Project Coordinator shall not be delayed pending any such litigation proceedings. The Contractors, including Project Coordinator, shall have no right of action against the Owner, the Owner's Representative or Architect in connection with such suits, and shall not join Owner, Owner Representative or Architect in any such suits. To the extent necessary to effectuate the terms and conditions of this subparagraph, the separate contractors are granted third party beneficiary status to this Contract between Owner and Contractor.

§ 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 The various materials and products specified in the Contract Documents by name or description are given to establish a standard of quality and of cost for bid purposes. Unless materials or products specified are indicated as "no substitutions" or words to that effect, then it is not the intent to limit bidder, the bid or the evaluation of the bid to any one material or product specified, but rather describe the minimum standard. Proposed substitutions must be submitted pre-bid in accordance with the Instructions to Bidders and only those substitutions that are approved pre-bid by way of addendum will be permitted. When proprietary names are used, they shall be followed by the words "or alternatives of the quality necessary to meet the specifications". No substitutions may be offered for materials and products specified as "no substitutions" or words to that effect.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.4.4 The Contractor shall supply the Owner with state and federal criminal history reports pursuant to 24 P.S. §1-111, Pennsylvania Child Abuse History Clearances, and signed PDE-6004 disclosure forms for all employees, agents and Subcontractors and their employees and agents who will be on the Owner's property, prior to such individuals being permitted on the Owner's property. Original clearances must be presented to the Owner prior to each employee, agent or Subcontractor coming on the Owner's property. All documents shall be dated no earlier than one year prior to date of presentation to the Owner. The Owner shall retain copy of all such documents in its file.

§ 3.4.1.1 Owner reserves the right to reject any person Owner deems unfit to be permitted on school grounds and in proximity to students. Upon written notice from Owner, Contractor shall have all such persons removed from the Project. Owner's right to declare such person unfit shall not be limited to the required exclusion of persons from school property as set forth in Section 1-111 of the Pennsylvania Public School Code and/or Subchapter C.2 of the Child Protective Services Law.

§ 3.4.1.2 The Owner will issue identification badges to individuals upon the Owner's satisfactory review of the individual's state and federal criminal history reports, child abuse clearance, and signed PDE-6004 disclosure form. All individuals working on site must have an Owner-issued identification badges before entering the site.

§3.4.1.3 The Contractor shall notify the Superintendent in writing within 72 hours if any person working on the Project under the Contractor's supervision (employee, agent, Subcontractor, Subcontractor's employee, etc.) is arrested or convicted of offense listed in 24 P.S. §1-111.

§3.4.5 Standards of quality for the Work is established by description, by reference to trade name, manufacturer's names or by catalog model or figure numbers.

§ 3.4.5.1 Such references require that which is established as standards of quality shall be provided without substitution unless permitted by the Contract Documents.

§ 3.4.5.2 Work specified which becomes unavailable due to strike, loss of plant through fire or flood, bankruptcy, or other unforeseeable cause, shall be substituted equally from another source subject to substitution procedures in the Contract Documents.

§ 3.4.5.2.1 Work covered by paragraph 3.4.5.2 shall not automatically entitle the Contractor to either an increase in Contract Sum or Contract Time. Notwithstanding the same, if the Work covered by 3.4.5.2 results in a savings to Contractor, Owner shall be entitled to a reduction in the Contract Sum. In any event, Work covered by paragraph 3.4.5.2 shall be incorporated into the Project through a properly executed Change Order.

§ 3.4.5.2.2 Items not ordered by the Contractor in a timely manner for incorporation into the Work will not be considered for claims by the Contractor for additional time or costs.

§ 3.4.5.3 Substitute Work offered and approved shall not be a basis for contingent extra charges or additional charges due to changes in related Work, such as rough-in, changes in supporting foundations, and other related Work. The cost of changes in Work by other contracts as a result of substitute Work of this Contract shall be the responsibility of this Contractor and will be deducted by Change Order.

§ 3.4.5.4 The Contractor shall assume full responsibility for substitute Work.

§ 3.4.5.5 The Owner shall be entitled to deduct from the Contract Sum amounts paid to the Architect to evaluate the Contractor's proposed substitutions and to make agreed-upon changes in the Drawings and Specifications made necessary by the Owner's acceptance of such substitutions.

§ 3.4.6 Whether indicated or not, all products included in the Work shall be asbestos-free and lead-free. If any suspected asbestos-containing or lead-containing materials are installed, the Owner has the right to have the material in question tested and if proven to contain asbestos or lead exceeding the amounts permitted by law, the Contractor shall remove all material in question and replace it with acceptable material at no additional cost to the Owner.

§ 3.4.7 The Contractor must comply with the Public Works Employment Verification Act (the "Act"), including, but not limited to the following:

- .1 The Contractor and every Subcontractor performing work under the Contract shall utilize the E-Verify Program (EVP) operated by the United States Department of Homeland Security to electronically verify employment eligibility of each new employee hired after January 1, 2013.
- .2 The Contractor, as precondition of the Contract, shall submit the Public Works Employment Verification Form to the Owner along with its Payment Bond, Performance Bond, Certificates of Insurance and Form Contract.
- .3 Every Subcontractor shall submit completed Public Works Employment Verification Form to the Owner prior to performing work on the Project.
- .4 During term of the Contract, each new employee hired by the Contractor, regardless of whether employee will be working onsite or offsite of the Project, shall be verified within 5 business days of his or her start date.
- .5 During the Project, new employee hired by Subcontractor, regardless of whether employee will be working onsite or offsite of Public Work or otherwise, shall be verified within 5 business days of his or her start date.

- .6 Subcontracts between the Contractor and its Subcontractors and between Subcontractors of any tier and their Subcontractors are required to contain notification of applicability of the Act, information regarding use of the EVP, and reference to the Department's web site at www.dgs.state.pa.us to obtain copy of the Form.
- .7 The Contractor and all Subcontractors shall cooperate with the Department during investigation or audit arising under the Act.
- .8 The Contractor and every Subcontractor shall maintain documentation of continued compliance with the Act by utilizing the EVP for new employees hired throughout duration of the Public Work Contract.

§ 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4. The minimum Warranty period, as defined above shall be two (2) years from date of Substantial Completion. The warranty provided in subparagraph 3.5.1 shall be in addition to and not in limitation of any other warranty required by the Contract Documents or otherwise prescribed by law.

§ 3.6 Taxes

§ 3.6.1 The Contractor shall pay sales, consumer, use and similar taxes for the Work or portions thereof provided by the Contractor and shall comply with the following:

§ 3.6.1.1 Contractor shall be responsible for and shall pay all applicable sales, use, excise or other taxes required by law on all materials, tools, apparatus, equipment, fixtures, services, incidentals or otherwise which may be purchased or used in connection with the Work or portions thereof. The Contract Sum shall include all applicable taxes.

Notwithstanding the foregoing, however, Owner is exempt (excluded) from sales and/or use tax in Pennsylvania on certain transactions. Contractor and all Subcontractors shall purchase as exempt (excluded) from Pennsylvania sales and/or use tax all tangible personal property within the definition of 'building machinery and equipment' as that term is defined in Act No. 45-1998 (72 P.S. § 7201 et seq.). Refer to Instructions to Bidders for additional information regarding the definition of "building machinery and equipment." No charges for taxes shall be allowed for such exempt items. It shall be the Contractor's responsibility to determine those items for which an exemption will apply, and the Contractor shall obtain legal or other tax advice to determine how and to what extent an exemption from the taxes apply. In order to facilitate such purchase free of sales and/or use tax in Pennsylvania, and upon certification by Contractor that an item is, in fact, tax exempt, the Owner agrees to execute a tax exemption certificate certification prepared by Contractor or a Subcontractor as may be required by the regulations of the Pennsylvania Department of Revenue.

§ 3.6.1.2 Assignment of Refund Rights.

- .1 Owner shall be entitled to claim refunds of sales and/or use tax paid on these and other purchases of tangible personal property required in connection with the Work. The Contractor and all Subcontractors hereby assign to Owner all rights to any such refund claim and to any resulting refund and hereby appoint the Owner as their Attorney-in-Fact to execute and acknowledge in their respective names and to prosecute such refund claims before administrative agencies and courts in Pennsylvania having jurisdiction over such claims. The Owner or its agent shall have the right to review the books

and records of the Contractor and all Subcontractors for the purpose of documenting and substantiating any such refund claim. Contractor and all Subcontractors shall cooperate fully with Owner in pursuing any such refund claim and shall make available to the Owner any applicable documents.

§ 3.6.1.3 Access to Accounting Records.

- .1 The Contractor shall check all materials, equipment and labor entering into the Work, and shall keep such full and detailed accounts as may be necessary for proper financial management under the Contract and the system shall be satisfactory to Owner. The Owner or its representative shall be afforded access to, including the right to photocopy, all the Contractor's records, books, correspondence, instructions, drawings, receipts, vouchers, memoranda, and similar data relating to the Work, and the Contractor shall preserve all such records for a period of three (3) years, or for such longer period as may be required by the law, after receipt of final payment.

§ 3.6.1.4 Contracts with Subcontractors.

- .1 The Contractor agrees to include the "Access to Accounting Records" and "Assignment of Refund Rights" paragraphs, in full, in any contracts with Subcontractors. The Contractor further agrees that it will not file a claim for refund for any sales and/or use tax which is the subject of the assignment in Subparagraph 3.6.1.2 above. Contractor shall obtain from all Subcontractors similar agreements that they will not file claims for refund for any sales and/or use tax which is the subject of the assignment in Subparagraph 3.6.1.2 above.

§ 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 The Architect on the Owners behalf will submit the project drawings for Township Code review to facilitate procurement of the Building Permit. Owner shall pay Township directly for Building Permit. Contractor shall complete all necessary Township formwork and formally apply for and obtain the Building Permit. Except as set forth in this paragraph and in subparagraph 2.3.1.1, Contractor shall secure and pay for all other permits, governmental fees, licenses and inspections necessary for the proper execution and completion of the Work. The contractors shall secure and pay for all necessary administrative costs, insurance, business privilege licenses, certifications, or taxes to apply for the necessary required to perform the Work.'

§ 3.7.1.1 To the extent Contractor pays any permits, fees, including connection and/or tap-in fees not otherwise properly due, the Owner shall be entitled to any refund relating thereto and the Contractor agrees to assign any and all rights to said refund or refund claim to Owner. The Contractor and all Subcontractors hereby assign to Owner all rights to claim any such refund claim and to any resulting refund and hereby appoint the Owner as their Attorney-in-Fact to execute and acknowledge in their respective names and to prosecute such refund claims before administrative agencies and courts in Pennsylvania having jurisdiction over such claims. The Owner or its agent shall have the right to review the books and records of Contractor and all Subcontractors for the purpose of documenting and substantiating any such refund claim. Contractor and all Subcontractors shall cooperate fully with Owner in pursuing any such refund claim and shall make available to Owner any applicable documents.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work including any work hour or parking restrictions imposed by Haverford Township

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from

those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If the Contractor disputes the Architect's determination or recommendation, then the Contractor may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

§ 3.8 Allowances

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items and materials covered by allowances shall be supplied by the Contractors and in the amounts indicated in Division 01 Section "Quantity Allowances."

§ 3.8.2 Project allowances shall be limited to "Quantity Allowances" in accordance with the Division 01 Section.

§ 3.8.3 No cash allowances are permitted on this Project.

§ 3.9 Superintendent

§ 3.9.1 The Contractor shall employ a competent Superintendent and necessary assistants who shall be in regular attendance at the Project site full time during the progress of the Work until the day of Substantial Completion, and for such additional time thereafter as the Architect may determine to be necessary for the expeditious completion of the Work. The Superintendent shall represent the Contractor, and communications given to the Superintendent shall be as binding as if given to the Contractor. Important communications shall be confirmed in writing. Other communications shall be similarly confirmed on written request in each case.

§ 3.9.2 Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection. The Project Superintendent must be approved by the Owner and Architect prior to the start of Work. Within ten (10) days following receipt of Notice to Proceed, the Contractor shall submit a resume of the proposed Superintendent who will be on site full time. The resume shall include at least three (3) recent projects of similar contract scope with the names and telephone numbers of Owner and Architect representatives for each project. The Superintendent shall be on site full time and shall not be changed except with the consent of the Owner and Architect, unless the Superintendent proves to be unsatisfactory to the Contractor and ceases to be in his employ. In any event, a replacement Superintendent shall be subject to the approval of the Owner and Architect.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed. If during the course of the Project, it is evident that the Superintendent is not competent or is not managing the progress of the Work or is not coordinating the various trades under the Contractor's supervision, then the Owner Representative will document such findings to the Contractor. If within ten (10) days of receiving such notice, no substantial effort or correction of the findings is made, then the Owner, based upon the Owner Representative request, may require the replacement of the Superintendent with an acceptable Superintendent.

§ 3.9.4 The Contractor may not substitute another job superintendent without prior consent of the Owner. Each Contractor shall maintain a full time qualified Project Superintendent on site at all times.

§ 3.10 Contractor's Construction and Submittal Schedules

§ 3.10.1 Within eight (8) days of the issuance of the Notice to Proceed, the Project Coordinator shall submit for the Owner Representative's Owner's and Architect's information and for the other Contractors' review, consideration, and comment, a preliminary draft of a Construction Schedule. Within five (5) days of the Project Coordinator's

issuance of the preliminary draft Construction Schedule, each Contractor will review the preliminary draft Construction Schedule and provide comments, including detailed work items, sequencing, durations, and such other relevant information regarding the Contractor's work in each area of the Project as required by the Project Coordinator for preparing a final construction Schedule to the Project Coordinator, the other Contractors, the Owner's Representative, and the Architect. Following submission of that information, a Prescheduling Conference will be held in accordance with the Contract Documents. Within five (5) days of receiving the comments from the other Contractors, the Contractors will hold the Preconstruction Scheduling Conference. Within five (5) days of the Preconstruction Scheduling Conference, the Project Coordinator will prepare a Construction Schedule incorporating the separate Contractors' items of Work, sequencing, and durations and issue the Construction Schedule to the other Contractors with copies to the Owner's Representative and Architect. Each Contractor shall have five (5) days to review and comment on or approve the Construction Schedule. Following approval by all Contractors, the Owner shall review the Construction Schedule and either provide comments within five (5) days or approve the Construction Schedule. Upon written approval of the Construction schedule by each Contractor and the Owner, the Construction Schedule shall with respect to time, become of the essence of the Contract in regard to Contractor's performance of the Work and any Contractor who does not comply with the schedule may be held in violation of Article 8, Paragraph 8.2, Progress and Completion. The Construction Schedule may be changed or revised only with the written consent of all Contractors and the Owner.

The term "Milestone Date" shall mean the dates set forth for commencement or completion of various milestones intended to keep the overall project on schedule. **The Milestone Dates are identified in section 011000 summary of work of the Contract documents.**

§ 3.10.2 Each Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Construction Schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 Contractors shall perform the Work in general accordance with the most recent approved Construction Schedule.

§ 3.10.4 All schedule and Work items must be in conformance with the Construction Schedule requirements listed in the project manual specification section 013200 including any phasing and the milestones provided in the PH Contract drawings

§ 3.10.5 All Contractors shall be responsible to perform Work to ensure that the Project is completed by the Project Contract Completion Date and any Milestone Dates established in the Contract Documents are met. Any claims for additional costs associated with completion of the Work within the required Contract time frames will not be considered unless the Owner actively interferes with the Contractor's performance of the Work and such interference causes a delay in the Construction Schedule. Contractors, who feel extra time, in any form such as shift Work, overtime, and premium time, is necessary to meet Contract requirements regardless of trade, should include these costs in their bids. Contractors must recognize that although their Work might not require shift, overtime, or premium time Work for completion within the stipulated time frame, it may be required in order to allow other Contractors to complete within the time frame. Contractors must allow for these overtime requirements and include the costs necessary to allow the other Contractors to complete within the specified time. Failure to recognize the extra costs in his bid shall not relieve the Contractor from utilizing shift, overtime, or premium time Work in performance of his Contract. All costs associated with meeting the timeframes indicated in the construction schedules shall be included in the Contract Sum.

§ 3.10.6 Preparation, review and updating of the Construction Schedule shall not result in liability on the part of Owner or Owner's representative, in favor of Contractor for time, cost overruns or schedule changes which are required to maintain project Substantial Completion date and all Milestone Dates established in the Contract Documents.

§ 3.10.7 GENERAL SCHEDULING REQUIREMENTS

§ 3.10.7.1 The Work under the Contract Documents shall be planned, scheduled, executed, reported and accomplished using sequential and logical activities, in calendar days. The provisions of the General Requirements and the directions of the Project Coordinator are to be followed by all Contractors in scheduling his construction activities. The scheduling services of the Project Coordinator are part of its Contract with the Owner, but nothing herein relieves the obligations of the Contractor and other Contractors to schedule their own construction activities and nothing herein alters the obligation of the Project Coordinator to resolve all supervision, coordination and scheduling issues between and amongst the Contractors.

§ 3.10.7.2 Each Contractor is responsible for determining the sequence and logic of activities, the time estimates of the detailed construction activities and the means, methods, techniques and procedures to be employed with regard to his portion of the Work and for providing that information to the Project Coordinator. The approved Construction Schedule shall represent each Contractor's best judgment of how its Work will progress in compliance with the requirements of the Contract Documents. Each Contractor shall ensure that the Construction Schedule (a) incorporates the Contractor's work including sequences and durations, (b) is current and accurate and (c) is properly and timely monitored, updated and revised as Project conditions and the Contract Documents may require, and as may be directed by Project Coordinator. Each Contractor shall notify the Project Coordinator and the Owner's representative in writing if it determines that the Construction Schedule does not adequately incorporate its Work, sequences, or durations, or requires revision or updating.

§ 3.10.7.3 Each Contractor shall consult with his major Subcontractors relating to his review of the draft Construction Schedule prepared by the Project Coordinator. Major Subcontractors shall receive copies of those portions of Construction Schedule which relate to their Work and shall be continually advised of any updates or revisions to the Construction Schedule as the Work progresses. When Contractor submits his review and comment on the Construction Schedule to the Project Coordinator or makes any proposed updates or revisions to such Schedule, it shall be concluded by Owner and Project Coordinator that Contractor has consulted with and has the concurrence of his major Subcontractors. Each Contractor shall be solely responsible for ensuring that its Subcontractors comply with the requirements of the Construction Schedule for their portions of the Work.

§ 3.10.7.4 Each Contractor shall provide all data as required by Project Coordinator relating to activities, durations and sequences as part of Contractor's review and comment upon the initial draft Construction Schedule or any proposed revision or update thereof. This data shall reflect Contractor's actual plan for construction for the Project, and shall fully comply with all requirements of the Contract Documents.

§ 3.10.7.5 Contractor agrees that the pre-construction scheduling conference, the provision of drafting and computerization services by the Project Coordinator, and the reasonable exercise of any rights under this Paragraph by Owner shall not be grounds for any claim against Owner or Owner Representative or any representative of the Owner by Contractor or any of his Subcontractors or Sub-Subcontractors, alleging interference, lack of cooperation, delay, disruption, harassment, negligence or hindrance by Owner, Owner Representative or Project Coordinator and Contractor covenants not to sue therefore. This provision shall not relieve Project Coordinator from any liability otherwise arising under Subparagraph 6.2.3.

§ 3.10.7.6 Each Contractor acknowledges and agrees that his portion of the Work and planned activities must be flexible in order to accommodate and allow for his coordination with the construction activities of the other Contractors and the incorporation of those activities in the Construction Schedule, and Contractor agrees to mutually cooperate with the other Contractors in this regard.

§ 3.10.7.7 The review by Owner, Architect or Project Coordinator of the Contractor's comments to the draft Construction Schedule or any proposed update or revision thereof does not constitute an agreement by Owner, Owner Representative, Architect or Project Coordinator of any start or finish date in the schedule or specific durations or sequences for activities of the Contractor; further, nothing herein shall be construed as modifying or changing, or excusing the performance of Contractor of required portions of the Work by the Completion Dates and Milestone Dates as set forth in the Contract Documents.

§ 3.10.7.8 The Completion Dates and Milestone Dates set forth in the Contract Documents represent only the major items of Work and may include interface dates with the construction activities of the other Contractors or others. Completion Dates and Milestone Dates are Contract requirements and are of the essence to the Contract Documents and to the coordination of the Work by Contractor. Completion Dates and Milestone Dates represent the latest allowable completion time for those portions of the Work to which each Completion Date or Milestone Date relates.

The Completion Dates and Milestone Dates are not intended to be a complete listing of all Work under the Contract Documents or of all interfaces with Work performed by other Contractors or others. Contractor shall determine the time requirements for all such interfaces and shall be responsible for planning, scheduling and coordinating the Work in order to complete in accordance with those requirements.

§ 3.10.7.9 Review by the Project Coordinator of Contractor's review and comment on the draft Construction Schedule or any proposed revisions or updates thereto, are advisory only and shall not relieve Contractor of the responsibility for accomplishing each portion of the Work within each and every applicable Completion Date and each and every Milestone Date. If a Contractor commits an error in the preparation of or omits an element of the Work from its comments on the draft Construction Schedule or any update thereof and the omission and/or error is incorporated into the approved or accepted Construction Schedule, or any revisions or updates, the Contractor committing the error or omissions shall not be excused from performing the Work in compliance with the Contract Documents and shall be responsible to the other Contractors and the Owner for any additional costs or damages incurred as a result of the error or omission. Review by the Project Coordinator does not make Owner, Project Coordinator or Architect liable to Contractor for time or cost overruns flowing from such omissions or errors. This provision shall not relieve Project Coordinator from any liability otherwise arising under Subparagraph 6.2.3.

§ 3.10.8 UPDATING OF CONSTRUCTION SCHEDULE / PROGRESS REPORTS

§ 3.10.8.1 At a minimum of one time per month or as requested by Owner or in accordance with the dates specified in the Contract Documents or established by the Project Coordinator, the Project Coordinator shall update the Construction Schedule. Each Contractor shall arrange for his Superintendent to meet at the Project site with the Project Coordinator to review Contractor's report of actual progress. Said report shall set forth up-to-date and accurate progress data, shall be based upon Contractor's best judgment and shall be prepared by Contractor in consultation with all Subcontractors.

§ 3.10.8.2 The progress report of each Contractor shall show the Work activities, or portions of activities, completed during the reporting period, the actual start and finish dates for these activities, remaining durations and/or estimated dates for completion of Work for activities currently in progress.

§ 3.10.8.3 Project Coordinator shall produce an update Work sheet for Contractor to complete as a part of this process.

§ 3.10.8.4 Contractor shall submit a written report with the updated progress analysis which shall include, but not be limited to, a description of problem areas, current and anticipated delaying factors and their impact, explanations of corrective actions taken or planned, any newly planned activities or changes in sequence, and proposed logic for a recovery schedule, if required, as further described herein. The report shall also include:

- (1) a narrative describing actual Work accomplished during the reporting period;
- (2) a list of major construction equipment used on the Project during the reporting period and any construction equipment idle during the reporting period;
- (3) the total number of personnel by craft actually engaged in the Work during the reporting period, with such total stated separately as to office, supervisory, and field personnel;
- (4) a manpower and equipment forecast for the succeeding thirty (30) days, stating such total as to office, supervisory and field personnel;
- (5) a list of Contractor-supplied materials and equipment, indicating current availability and anticipated Project site delivery dates; and
- (6) changes or additions to Contractor's supervisory personnel, if any, since the preceding progress report.

The Contractor shall furnish to the Owner progress reports in the form and quantity as the Owner may from time to time require, including, but not limited to, status reports of the project, project account statements, certificates, approvals, proposed budgets, invoices, copies of all contracts executed and proposed, employment placements, follow-up reports and all other information relative to the Agreement as may be requested. The Owner or its representative shall have the right to make reasonable inspections to monitor the Contractor's performance under this Agreement. If the Owner determines that the Contractor has not furnished the reports as required by the Owner, the Owner, by giving written notice to the Contractor, may suspend payments under this Agreement until the required reports are submitted.

§ 3.10.8.5 Application for Payment: Except as provided in Subparagraph 3.10.9, Contractor understands and agrees that the submission and acceptance of progress updates and the receipt of progress reports are an integral part and basic element of the Applications for Payment; and that Contractor shall not be entitled to any progress payment under the Contract Documents until Contractor has fully complied with the requirements of this Paragraph 3.10.

§ 3.10.8.6 Contractor shall be solely responsible for expediting the delivery of all materials and equipment to be furnished by or to him so that the progress of construction shall be maintained according to the currently accepted Construction Schedule for the Work. Contractor shall notify Project Coordinator in writing, and in a timely and reasonable manner, whenever Contractor determines or anticipates that the delivery date of any material or equipment to be furnished by Contractor shall be later than the delivery date indicated by the Construction Schedule, or required consistent with the completion requirements of the Contract Documents, subject to schedule updates as herein provided.

§ 3.10.8.7 Contractor shall ensure that off the site work activities do not adversely affect progress in accordance with the Construction Schedule.

§ 3.10.9 Initial Progress Payment. The completed Construction Schedule, including the Schedule of Values, shall be required for each Application for Payment. However, one initial provisional progress payment may be payable in the discretion of Owner Representative if it determines Contractor is complying with this Paragraph 3.10 during the development of the Construction Schedule and Schedule of Values as required herein. However, no more than one Application for Payment shall be approved until all of the requirements of this Paragraph 3.10 have been met.

§ 3.10.10 RECOVERY SCHEDULE

§ 3.10.10.1 Should the updated Construction Schedule, at any time during Contractor's performance, show that Contractor is five (5) or more days behind schedule for any Completion Date or milestone date, or if Contractor's actual performance fails to meet a Milestone Date or Completion Date, Contractor shall prepare a recovery schedule at no cost to Owner (unless the delay was directly caused by the Owner's active interference with the Work) explaining and displaying how Contractor intends to reschedule his Work in order to regain compliance with the Construction Schedule during the immediate subsequent pay period.

§ 3.10.10.2 If Contractor believes that all of the time can be recovered during the subsequent pay period, Contractor shall be permitted to prepare a recovery schedule as set forth below. However, if Contractor believes it shall take more than thirty (30) days to recover all of the lost time, he shall prepare and submit a request for revision to the Construction Schedule and comply with all of the requirements of a schedule revision as set forth in this Subparagraph 3.10.10 and Subparagraph 3.10.11.

§ 3.10.10.3 Contractor shall prepare and submit to the Project Coordinator a limited duration recovery schedule, incorporating best available information from Subcontractors and others which shall permit return to Construction Schedule at the earliest possible time. Contractor shall prepare a recovery schedule to the same level of detail as the Construction Schedule for a maximum duration of one month. The recovery schedule shall be prepared in coordination with other Contractors.

§ 3.10.10.4 Within two (2) days after submission by the Contractor of a recovery schedule to Project Coordinator, Contractor and the Project Coordinator shall participate in a conference to review and evaluate the recovery schedule. Within two (2) days of the conference, Contractor shall submit the revisions necessitated by the review for Project Coordinator review and acceptance. Contractor shall use the accepted recovery schedule as his plan for returning to the Construction Schedule.

§ 3.10.10.5 Each Contractor shall confer continuously with the Project Coordinator to assess the effectiveness of the recovery schedule. As a result of this conference:

§ 3.10.10.5.1 If Project Coordinator determines Contractor is still behind schedule, Project Coordinator shall direct Contractor to prepare a schedule revision with the assistance of the Project Coordinator and comply with all of the requirements of a schedule revision as stated herein and the other requirements of the Contract Documents; provided, however, that nothing herein shall limit in any way the rights and remedies of Owner and Project Coordinator as provided elsewhere in the Contract Documents; or

§ 3.10.10.5.2 If Project Coordinator determines Contractor has successfully complied with provisions of the recovery schedule, Project Coordinator shall direct Contractor to return to the use of the accepted Construction Schedule.

§ 3.10.10.6 Nothing herein alters the obligation of Project Coordinator to resolve coordination and scheduling issues in dispute between and amongst Contractors.

§ 3.10.11 SCHEDULE REVISIONS

§ 3.10.11.1 Should Contractor desire to or be otherwise required under the Contract Documents to make modifications or changes in his method of operation, his sequence of Work or the durations of the Work activities in the Construction Schedule, he shall do so in accordance with the requirements of this Paragraph, Division 01 Section "Construction Progress Documentation", and schedules. Proposed revisions to the accepted Construction Schedule must be presented to and reviewed by the Project Coordinator.

§ 3.10.11.2 Contractor shall submit requests for revisions to the Construction Schedule to the Project Coordinator, together with written rationale for revisions and description of logic for rescheduling Work and maintaining the dates for Substantial and Final Completion listed in the Contract Documents. Proposed revisions acceptable shall be incorporated into next update of the Construction Schedule. Separate contractors shall pay Owner for costs incurred by Project Coordinator for preparing the revised schedule.

§ 3.10.11.3 In all instances where a revision to the Construction Schedule will affect the construction activities of other Contractors, prior to the submission by Contractor of his proposed schedule revisions, he shall meet with and gain written acceptance of the Contractors to make the revisions which shall be evidenced by the signatures of said Contractors on the proposed schedule revisions. If accepted, the revisions, shall be binding upon Contractor and all separate Contractors on the Project.

§ 3.10.11.4 All proposed revisions to the Construction Schedule are subject to the Owner's review and approval.

§ 3.11 Documents and Samples at the Site

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 Shop Drawings, Product Data and Samples

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal

schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

§ 3.12.5.1 Unless otherwise set forth in the approved construction schedule or Contract Documents, the Contractor is to submit shop drawings within forty-five (45) days of the Notice to Proceed, and to work to achieve final review of shop drawings within ninety (90) days of the Notice to Proceed.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

§ 3.12.10.1 If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

§ 3.12.10.2 If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

§ 3.12.11 The Architect's review of Contractor's submittals will be limited to examination of an initial submittal and two (2) resubmittals. The Owner is entitled to obtain reimbursement from the Contractor for amounts paid to the Architect for evaluation of additional resubmittals.

§ 3.13 Use of Site

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 Cutting and Patching

§ 3.14.1 The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

§ 3.14.3 Patching of exposed Work shall only be performed by skilled workers of the required trade.

§ 3.15 Cleaning Up

§ 3.15.1 The Contractor shall keep the premises clean at all times of dirt, rubbish and debris resulting from the Work and shall remove all rubbish and debris in metal containers at the end of each Working day. The Contractor shall remove all rubbish cartons resulting from the installation of fixtures and equipment. If the premises are not kept clean at all times and if within 24 hours after verbal notice from the Owner the dirt, rubbish, and debris is not cleaned up by Contractor then Owner will arrange for such cleanup at the Contractor's expense. Prior to Substantial Completion of the Work the Contractor shall do the cleaning of the surfaces of all his installations as may be required by the various Specifications to the satisfaction of the Owner Representative or Architect.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

§ 3.15.3 In readiness for occupancy of the Owner, the Contractor, when directed by the Owner Representative, shall thoroughly clean all portions of the Work to be occupied and all applicable material and equipment surfaces suitable for occupancy. Cleaning of windows and other glass in the Project is a contractual requirement.

§ 3.15.4 The General Contractor shall make provisions for and be personally responsible for removing all mud and debris from all vehicles and equipment leaving the construction site onto Municipal streets adjoining the Project site and shall remove any mud, debris and litter which may fall upon Municipal streets or adjacent properties. If the same is not removed and properly washed down within 24 hours after verbal notice from the Municipality or the Owner then in that event, said mud, debris and litter shall be removed from the street by the Owner at the Contractor's expense.

§ 3.16 Access to Work

The Contractor shall provide the Owner, Owner Representative, and Architect with access to the Work in preparation and progress wherever located.

§ 3.17 Royalties, Patents and Copyrights

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

§ 3.18 Indemnification

§ 3.18.1 To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Owner Representative, Architect, Architect's consultants, any agents and employees of any of them from and against

claims, damages, losses and expenses, including but not limited to attorney's fees, arising out of or resulting from performance of the Work to the extent caused in whole or in part by the negligent act of omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations or indemnity which would otherwise exist as to a party or person described in this paragraph 3.18. Nothing contained herein shall be construed to require indemnification of any architect, engineer, or surveyor for damages or defense costs arising out of (1) the architect's, engineer's, or surveyor's preparation or approval of maps, drawings, opinions, reports, surveys, change orders, designs or specifications, or (2) the architect's, engineer's, or surveyor's giving or failing to give instructions or directions provided that failure or giving of directions or instructions is the primary cause of the damage.

§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 General

§ 4.1.1 The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

§ 4.1.2 Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 In case of termination of employment of the Architect, the Owner shall appoint a successor Architect whose status under the Contract Documents shall be that of the former Architect.

§ 4.2 Administration of the Contract

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

§ 4.2.2.1 The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for site visits made necessary by the fault of the Contractor or by defects and deficiencies in the Work.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 Communications

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect and Owner Representative about matters arising out of or relating to the Contract. Communications by and with the

Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.7.1 Architect's action on Shop Drawings will result in his making one of five notations on them, namely, NO EXCEPTION TAKEN, REVISE AND RESUBMIT, REJECTED/RESUBMIT, FURNISH AS CORRECTED or FURNISH AS CORRECTED/RESUBMIT. Such notations do not extend the responsibilities of the Architect beyond those described in 4.2.7.

§ 4.2.7.2 In no case will the Architect's review period on any submittal be less than fourteen (14) days after receipt of the submittal from the Contractor.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith. These provisions do not extend to deny normal discussion, recommendations, explanations, suggestions, approvals,

rejections, and similar activity in pursuit of the Work of the project on an oral basis, such as at project meetings and otherwise at the Project site. In such instances the written minutes, correspondence, Shop Drawings Records, Architect's Supplemental Instructions and other written data shall govern over personal claims regarding statements made contrary to the written data. Interpretations of Contract Documents, to be effective for claim purposes or for justification as to proper procedure in performing the Work, must be obtained in writing before such claim is made or such Work begun.

§ 4.2.12.1 Written or graphic interpretations by the Architect will be considered as minor changes in the Work. If the Contractor determines that an interpretation offered by the Architect will affect Contract Sum or time, then the Contractor must return the interpretation to the Architect and Owner Representative within 5 days, along with complete substantiation of the proposed changes in Contract Time and/or Contract Sum and the Architect will render a decision

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

§ 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Within five (5) days of the Owner's execution of the Contract, the Contractor shall furnish a completed copy of Division 00 Document "Subcontractors and Major Materials Suppliers List" to the Owner through the Architect. List shall include the name of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. In all cases, this list shall be submitted no less than seven (7) days prior to a Subcontractor starting work. Failure of the Owner or Architect to reply promptly within seven (7) days of submission shall constitute notice of no reasonable objection. Nothing herein shall obligate the Owner or Architect to conduct an investigation of any Contractor or Subcontractor.

§ 5.2.1.1 As soon as practical after the date of the Notice to Proceed, the Contractor shall furnish in writing to the Owner through the Architect the names of persons or entities proposed as manufacturers, fabricators or material suppliers for the products, equipment and systems identified in the Project Specifications and drawings and, where applicable, the name of the installing Subcontractor.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. There shall be no adjustment in the Contract Sum or Contract Time because of such substitution.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.3.2 Where Contractor sublets portions of the Work, the entire responsibility for the subdividing of Work rests with the Contractor. The Owner and the Architect are not responsible for the manner of the subdivision of the Work and neither will enter into nor settle disagreements or disputes between Contractor and Subcontractors. The arrangement of Specifications and the manner of graphic illustration of Drawings are for convenience of reference and do not comprise any exacting method of subdividing Work for purposes of subcontracting, except where the Contract Documents require an undivided responsibility for certain Work.

§ 5.3.3 Contractor shall require each Subcontractor to (1) Inspect surfaces and job conditions before beginning Work at Project site, (2) Accept or cite necessary corrections in surfaces and job conditions before beginning Work at Project site, and (3) Protect his own materials, equipment and Work from damage, injury or loss due to weather or due to Work of the Contractor, other Subcontractors, or other Contractors. The best means of protection shall be supplied, and removed when no longer required.

§ 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term “Contractor” in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 Neither the Owner, Owner Representative nor the Architect or its Consultants shall be responsible for the coordination of the Contractor’s Work. Coordination of the Contractor’s Work shall be governed by Division 01 Sections "Multiple Contract Summary" and "Project Management and Coordination.

§ 6.1.3.1 Reference subparagraph 3.3.7.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner’s own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

§ 6.2 Mutual Responsibility

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor’s construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor’s Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor’s Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner’s or Separate Contractor’s completed or partially completed construction is fit and proper to receive the Contractor’s Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 Cost attributed to delays or improperly timed activities or defective construction shall be borne by the parties responsible therefor. Owner, Owner Representative and Architect who shall not be liable to any Contractor, Subcontractor or Sub-subcontractor for claims or damages of monetary or other nature caused by or arising out of delays contemplated or not contemplated at the signing of the Contract, except for delays directly caused by the active interference of the Owner. The sole remedy against the Owner for delays, other than delays directly caused by the Owner’s active interference, shall be the allowance to a successful claimant of additional time for completion of Work. To the extent necessary to effectuate the terms and conditions of this subparagraph, the separate contractors are granted third party beneficiary status to this Contract between Owner and Contractor.

§ 6.2.4 The Contractor shall promptly remedy damage wrongfully caused by the Contractor to completed or partially completed construction or to property of the Owner or separate contractors.

§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.2.6 The Contractor shall indemnify and hold the Owner harmless from any claims or damages brought by a separate contractor against the Owner arising out of actions or omissions of the Contractor, its Subcontractors or suppliers in performing their Work under the Contract Documents.

§ 6.2.7 Should the Contractor wrongfully cause damage to the Work or property of any separate contractor, the Contractor shall, upon due notice, promptly attempt to settle with the separate contractor by agreement, or otherwise to resolve the dispute. Such dispute shall not delay the completion of the Work. Work shall be continued by the separate contractor claiming damages at his expense subject to his right to recover damages. If such separate contractor sues the Owner, Owner Representative, or the Architect on account of any damage alleged to have been caused by the Contractor, then the Owner or Architect shall notify the Contractor who shall defend such proceedings at the Contractor’s expense, and if any judgment or award against the Owner, Owner Representative, or Architect arises therefrom the Contractor shall pay or satisfy it and shall reimburse the Owner, Owner Representative, or Architect for all attorneys’ fees and court costs which the Owner, Owner’s Representative or Architect has incurred.

§ 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

§ 7.1.4 Matters involving extra Work and changes in the Work are subject to the following provisions:

§ 7.1.4.1 Owner reserves the right to accept or reject Contractor's quotation of cost, and to require more than one quotation, to accept one or more quotations or reject one, more, or all quotations. Contractor may not make a charge of any kind regarding proposed extra Work or proposed changes in the Work that were not accepted.

§ 7.1.4.2 Contractor agrees that quotations for changes in the Work and for extra Work will not include charges involving penalties or damages for assumed delays in the Work, charges for estimating, cancellation charges on prior rejected Work, and similar amounts which do not relate directly to costs of labor and material and equipment appurtenant to Work involved.

§ 7.1.4.3 Unless Contract Time must be unchanged and is so stated in Architect's Supplemental Instructions, extra time granted to Contractor because of extra Work or changes in the Work shall be final, without penalty regarding the essence of time in the Contract.

§ 7.1.4.4 No charges by Contractor for extra Work or changes in the Work, nor claims on account thereof, shall be valid unless duly authorized in the procedure herein described. Written authority to perform extra Work or changes in the Work must be in possession of Contractor before such Work commences in order that Contractor's right to payment on account thereof may be valid.

§ 7.1.4.5 In order to facilitate checking of quotations for adjustments in the Contract Sum, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by a complete itemization of costs including, labor, materials and subcontracted. Labor and materials shall be itemized in the manner prescribed above. When major cost items are subcontracted, these costs shall be itemized also.

§ 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, Owner Representative with input from the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Owner Representative with input from the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:

- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 The allowance for overhead and profit, included in the total cost to the Owner, shall not exceed a combined total of fifteen percent (15%). Overhead and profit shall include costs of premiums or all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work and additional costs of supervision and field office personnel directly attributable to the change.
- .4 The Contractor shall limit its profit and overhead, when combined with that of its Subcontractors and Sub-subcontractors, to a total of fifteen percent (15%) of the value of the related Work.
- .5 If the Work is paid for using a Contract allowance the cost of insurance and bonds will be deducted from the fifteen percent (15%) allowable for overhead and profit.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect in writing of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Owner Representative with input from the Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of the Contractor to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Owner Representative with input from the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 Minor Changes in the Work

§ 7.4.1 The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Owner Representative and Architect in writing and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior written notice to the Owner Representative and Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

§ 7.4.1.1 Minor changes to the Work may be made by meeting memos, or an Architect's Supplemental Instruction.

§ 7.4.1.2 The Work described therein shall be promptly executed in accordance with the Contract Documents. Proceeding with the Work indicates the Contractor's acknowledgment that there will be no change in the Contract Sum or the Contract Time.

§ 7.4.1.3 If it is the conclusion of the Contractor that the Work described therein requires an adjustment of the Contract Sum, or of the Contract Time, the Contractor shall issue a fully itemized proposal within five (5) Working days or shall notify the Owner Representative and Architect in writing of the date by which such proposal shall be received. When the Work alters the Contract Time or the Contract Sum, the Work described therein shall not be executed without a Change Order signed by the Architect and Owner. Failure to issue a proposal or written notification to the Architect and Owner Representative within the appropriate time shall indicate the Contractor's acknowledgment that there will be no change in the Contract Sum or the Contract Time.

ARTICLE 8 TIME

§ 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate qualified forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending any dispute resolution; or (5) by other causes that the Contractor asserts, and the

Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 Notwithstanding anything to the contrary in the Contract Documents, an extension in the Contract Time, to the extent permitted under this paragraph 8.3, shall be the sole remedy of the Contractor against Owner, Owner Representative or Architect for (1) delay in the commencement, prosecution or completion of the Work; (2) hindrance or obstruction in the performance of the Work; (3) loss of productivity; or (4) other similar claims (collectively referred to in this subparagraph as delays) whether or not such delays are foreseeable, unless a delay is directly caused by the acts of the Owner constituting active interference with the Contractor's performance of the Work, and only to the extent that such acts continue after the Contractor furnishes the Owner with written notice of such interference.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect and Owner Representative before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect or Owner Representative, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and Owner Representative and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect and Owner Representative, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment. The Schedule of Values shall allocate at least 10% of the Contract Sum to the final approval of PECO to operate the system.

§ 9.3 Applications for Payment

§ 9.3.1 The Contractor shall submit to the Owner Representative and Architect an itemized application for payment for operations completed in accordance with the Schedule of Values not later than the 25th day of each month for the Work of that month. The Owner shall make payment to the Contractor not later than 10 business days after the second regularly scheduled School Board meeting of the Owner following Architect's and Owner Representative approval of Application of Payment. Reference Division 01 Section "Payment Procedures."

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.1.3 Work applicable to the Contract Sum shall be kept separate from Work applicable to Change Orders. The Work of each shall contain a summary and a breakdown as stipulated by the Contract Documents.

§ 9.3.1.4 Contractor expressly waives any right to penalties, interest and attorney's fees pursuant to the prompt payment provisions of the Pennsylvania Commonwealth Procurement Code, 62 Pa. C.S. §3931 et seq..

§ 9.3.2 Payment on account of materials and equipment shall be made subject to the following:

§ 9.3.2.1 Materials Stored On Site. Materials properly stored at the construction site may be included in the Contractor's application for payment, subject to the following conditions: (1) All materials shall be stored in strict compliance with the manufacturer's recommendations in secure, dry, and where appropriate, temperature controlled enclosures; (2) Contractor shall provide property insurance covering materials stored at the construction site to the extent that Owner's property insurance does not provide coverage; (3) Contractor shall provide an accurate inventory of all materials included for payment with each application for payment. Contractor shall maintain the inventory until the materials are installed or otherwise incorporated into the Work; and (4) Payment for materials stored on the construction site shall be limited to the actual, invoiced cost to the Contractor, F.O.B. the construction site. Contractor shall warrant that all suppliers are promptly paid in full for all materials included for payment and that materials are not encumbered by any lien, claim or mortgage that would prevent the Owner from taking full possession of the materials. Contractor shall produce satisfactory evidence of same to Owner.

§ 9.3.2.2 Materials Stored Off Site. Materials stored off the construction site shall not be included for payment in the Contractor's application for payment unless prior approval of the Owner has been obtained. Payment for materials stored off the construction site shall be subject to the conditions in subparagraph 9.3.2.1 and the following additional conditions:

- .1 Contractor shall provide property insurance for the full cost of the materials stored off the construction site;
- .2 Contractor shall provide a bill of sale for the materials granting clear title to the materials to the Owner;
- .3 Contractor shall provide waivers of liens when applicable, encumbrances or claims relating to the bailment of the materials stored off site or as otherwise required by Owner;
- .4 Contractor shall provide Owner all information necessary for the filing of any notices under the Uniform Commercial Code relating to the materials stored off the construction site as may be required by Owner;
- .5 The materials stored off the construction site shall be clearly and conspicuously labeled so as to identify Owner's title to the materials and shall be segregated and not commingled with other materials at the storage location;
- .6 Contractor shall pay all storage costs, shall be responsible for any damage or deterioration of the materials while in storage or in transit to the construction site and shall pay the costs of inspection of the materials in storage by the Owner;
- .7 Contractor shall be responsible for and shall pay all costs of transportation of the materials to the construction site; and
- .8 Neither Owner's payment for materials stored off the construction site nor the transfer of title to Owner shall in any way reduce Contractor's liability for the complete installation and construction relating to said materials, the value of the materials or liability under any performance bond provided for the Project.

§ 9.3.2.3 No separate payment will be made for submittal preparation, unless approved by Architect.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

§ 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the

Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;
- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor;
- .6 reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual damages for the anticipated delay; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.
- .8 Failure to comply with government statutes, regulations and laws.

§ 9.5.2 When the Contractor disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, then the Contractor may submit a Claim in accordance with Article 15. If the Owner disputes the Architect's decision regarding a Certificate for Payment, then the Owner shall advise the Architect, the Contractor, and the Owner's Representative in writing within seven (7) days of the reason for the dispute and shall pay any undisputed portion of the Certificate for Payment in accordance with the Contract Documents. Upon resolution of any amount in dispute, the Owner will pay the amount determined by the resolution within 45 days.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

§ 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar

manner. Contractor and each Subcontractor shall comply with the payment obligations of Section 3933 of the Pennsylvania Commonwealth Procurement Act, 62 Pa.C.S. § 3933.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 To ensure satisfactory completion of the Work under the Contract Documents, the Owner shall withhold retainage from each progress payment in the amount of ten percent (10%) of the amount due the Contractor until fifty percent (50%) of the Work is completed. When fifty percent (50%) of the Work is completed, one-half (½) of the amount retained by Owner shall be returned to Contractor provided the Owner Representative with input from the Architect approves the Application for Payment and provided further that the Contractor is making satisfactory progress and there is no specific cause for greater withholding. Thereafter, the Owner shall withhold retainage from each progress payment in the amount of five percent (5%) of the value of the Work completed based on monthly progress payment requests until Substantial Completion. However, in the event a dispute arises between Owner and a separate contractor, which dispute is based upon increased costs claimed by the separate contractor occasioned by delays or other actions of the Contractor, additional retainage in the sum of one and a half (1-½) times the amount of any possible liability may be withheld until such time as a final resolution is agreed to by all parties directly or indirectly involved unless the Contractor furnishes a bond satisfactory to Owner to indemnify Owner against the claim.

§ 9.6.8 Contractor acknowledges that the project is for a public purpose and neither the Contractor, nor any subcontractor of any tier, nor any supplier of any tier may place a mechanic's lien on the Owner's property. Contractor will include a provision in each subcontract and supply contract acknowledging the absence of mechanic's lien rights. The Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor.

§ 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon thirty additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the entire Work or the Work of a separate Phase (as defined in Division 01 Section "Summary" or on Phasing Drawings) is substantially complete, the Contractor shall prepare and submit to the Architect and Owner Representative a comprehensive list of items to be completed or corrected (punch list) along with an application by the Contractor for Certification of Substantial Completion by the Architect. The Contractor shall proceed to promptly complete and correct items on the list. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list of items to be completed or corrected (Punch List) and Application for Certification of Substantial Completion, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete, Architect will conduct said inspection within thirty (30) days of receipt of the application of Contractor for Certification of Substantial Completion. If the Architect's inspection discloses any item, whether included in the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification of the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.3.1 The Architect will perform no more than two (2) inspections to determine whether the Work or a designated portion thereof has attained Substantial Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor for amounts paid to the Architect for any additional inspections.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion or Contract Documents. If Contractor fails to complete a comprehensive list of items to be completed or corrected as stipulated in subparagraph 9.8.2, the Architect or any of its consultants or representatives shall prepare such punch list(s) and the Contractor will be responsible for professional fees and services of the Architect and/or consultants incurred in this regard. Such costs will be back charged to Contractor and deducted from any existing retainage or subsequent Application for Payment.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.8.6 In no case shall the time established for the completion and correction of items on the list extend beyond sixty (60) days after Certification of Substantial Completion, except for delay beyond the Contractor's control. The Contractor shall pay for all architectural and consultant services incurred thereafter due to the failure of Contractor to complete and / or correct the Work on the list or to submit documentation and items required for final completion and final payment. Payment for additional architectural and consultant services shall be deducted from the Contract amount.

§ 9.8.7 Upon Substantial Completion of the Work or designated portion thereof, application by the Contractor and certification by the Architect, the Owner, shall within forty-five (45) days thereof, make Payment to the Contractor in the full Contract Sum less one and one half (1-1/2) time such amount that is required to complete and / or correct any then remaining items, which amount shall be certified by the Architect.

§ 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor

considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect. The Contractor shall not withhold Partial Occupancy or Use from the Owner due to failure by the Contractor to complete the Work in accordance with the Contract Documents in the time stipulated in the Agreement and approved Change Orders for extension of time.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.1.1 The Contractor shall perform and complete his Work according to the Contract Documents without fault or defect of any kind. In absence of more specific directives, and insofar as applicable the Work shall:

- .1 Be completed in a first-class manner;
- .2 Be placed in a thoroughly clean and unmarred condition.
- .3 Be checked out in a step-by-step manner to be certain that all fastenings, controls, valves, safety devices, operating devices and other required appurtenance have been provided in accordance with the Contract Documents.
- .4 Be free of previously condemned or rejected parts be properly restored to the extent thereof; and
- .5 Be balanced for proper operation wherever adjustments for balancing may exist in the Work.

§ 9.10.1.2 The Architect will perform no more than **two (2)** inspections to determine whether the Work or a designated portion thereof has attained Final Completion in accordance with the Contract Documents. The Owner is entitled to reimbursement from the Contractor(s) responsible for the need for additional inspections for amounts paid to the Architect for any additional inspections.

§ 9.10.1.3 The Architect shall make final inspection within thirty (30) days following receipt of the Contractor's request for final inspection and final Application for Payment.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor or its

surety shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall not constitute a waiver of Claims by the Owner.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract. Contractor shall incorporate into its safety plan and shall comply with all guidelines and requirements imposed or issued by federal, state and local government agencies related to the COVID-19 pandemic. Such requirements may include, but are not necessarily limited to, the creation of a safety plan, the identification of a pandemic safety officer, the use of personal protection equipment, etc. The Contractor shall review and update their plans to address any changes in the guidance or requirements. 0

§ 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- .1 employees on the Work, students and staff occupying and traveling to and from the existing building on site and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the

extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter. The Contractor shall provide and maintain in good operating condition suitable and adequate fire protection equipment and services and shall comply with all reasonable recommendations of the fire insurance company carrying insurance on the Work or by the local fire chief or fire marshal. The area within the site limits shall be kept orderly and clean and all combustible rubbish shall be promptly removed from the Project site.

10.2.9 The Contractor shall at all times protect excavations, trenches, buildings and materials from rainwater, ground water, back up or leakage of sewers, drainage or other piping, and from water of any other origin and shall remove promptly any accumulation of water. Contractor shall provide and operate all pumps, piping and other equipment necessary to this end.

10.2.10 The Contractor shall remove snow or ice which may result in damage, delay or hazardous conditions.

10.2.11 The Contractor shall take all precautions necessary to prevent loss or damage caused by vandalism, theft, burglary, pilferage, or unexplained disappearance of property of the Owner, whether forming part of the Work, located within those areas of the Project to which the Contractor has access. The Contractor shall have full responsibility for the security of such property of the Owner located in such areas and shall reimburse the Owner for any such loss, damage or injury, including Owner's deductible on Builder's Risk Insurance except such as may be directly caused by agents or employees of the Owner.

§ 10.3 Hazardous Materials and Substances

§ 10.3.1 In the event the Contractor encounters on the site material reasonably believed to be asbestos or polychlorinated biphenyl (PCB) or other hazardous or toxic substance which has not been rendered harmless or identified in the Contract Documents to be removed, the Contractor shall immediately stop the Work in the area affected and report the condition to the Owner and Architect in writing. The Work in the affected areas shall not thereafter be resumed, if in fact the material is asbestos or polychlorinated biphenyl (PCB) or other hazardous or toxic substance and has not been rendered harmless except as authorized by any governmental agency having jurisdiction over such matter (e.g. DEP, EPA...) and upon written recommendation of a properly licensed environmental consultant retained by Owner. The Work in the affected areas shall be resumed in the absence of asbestos or polychlorinated biphenyl (PCB) or other hazardous or toxic substance, or when it has been rendered harmless and removed, in accordance with any required determination of a governmental agency having jurisdiction over such matters and upon the written recommendation of a properly licensed environmental consultant retained by Owner. The Contract Time shall be extended appropriately. Contractor shall not be entitled to any compensation or recovery of any damages, in connection with any delay, as more fully set forth in Subparagraph 8.3.3.

§ 10.3.2 To the extent covered by the Owner's applicable insurance policies, the Owner shall indemnify and hold harmless the Contractor, Architect, Owner Representative, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorney's fees, arising out of or resulting from performance of the Work in the affected area if in fact the material is asbestos or polychlorinated biphenyl (PCB) or other hazardous or toxic substance and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused in whole or in part by

negligent acts or omissions of the Owner. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Paragraph 10.3.3.

§ 10.3.3 To the extent covered by the Owner's insurance policies, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Owner Representative, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

§ 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located and to which the Owner has no reasonable objection. All such policies shall waive subrogation in favor of the Owner, the Owner's Representative, and the Architect.

§ 11.1.1.1 The Owner, its officers, directors, and employees, Owner Representative, the Owner's Representative, the Architect, and Architect's consultants, and each of their officers, directors, and employees, shall be named as additional insureds under the Contractor's insurance policies required hereunder, other than Workers Compensation, on a primary and non-contributory basis, for losses arising from the negligence of the Contractor(s) or their Affiliates, or anyone for whom they may be liable. If coverage is written on a "claims made" basis, Contractor warrants the purchase of an extended reporting period of not less than three (3) years. Additional insured status shall include defense and shall apply to both ongoing and completed operations, for a period of not less than three (3) years after completion of services. Contractor shall be responsible for the payment of all deductibles or self-insured retentions applicable to its insurance coverages.

11.1.1.2 Certificates of Insurance acceptable to the Owner and on forms approved by the Insurance Commissioner of the Commonwealth of Pennsylvania shall be filed with the Owner (certificate holder) prior to commencement of the Work. Policies must provide for written notice to the Contractor or additional insureds prior to cancellation, reduction or non-renewal.

11.1.1.3 The minimum levels of insurance shall be as follows:

Workers Compensation

Amounts and coverage as required by Law and the
Excess Liability Insurance Company

Employer's Liability	\$1,000,000 per accident/\$1,000,000 per employee/\$1,000,000 policy limit
Commercial General Liability	\$1,000,000 per occurrence/\$3,000,000 aggregate for bodily injury and property damage
Automobile Liability	\$1,000,000 per accident for bodily injury, death of any person and property damage arising out of ownership, maintenance, and use of motor vehicles, plus other coverage as required by law
Owned and Non-Owned Aircraft.	If an aircraft, whether owned or non-owned by the Contractor or any Subcontractor, is used in connection with the Work by the Contractor or any Subcontractor of any tier, the Contractor or Subcontractor, as applicable, shall advise the Owner or its representatives, shall provide a written explanation of the planned use of the aircraft, and shall provide Aircraft Liability Insurance at its sole cost and expense, the conditions and limits to be established by the Owner. The Owner reserves the right to prohibit the use of any aircraft in connection with the Work under this Contract. The minimum limit will be Five Million Dollars (\$5,000,000). This insurance shall be primary to all other insurance.
Excess (Umbrella) Liability Insurance	Five million dollars (\$5,000,000) per occurrence over the general liability, employer's liability, automobile liability, and owned and non-owned aircraft liability coverages. In no event shall any excess or umbrella insurance provide narrower coverage than the underlying primary policies. The umbrella/excess policy shall not require exhaustion of the underlying limits only through the actual payment by the underlying insurers.
Professional Liability	Two million dollars (\$2,000,000) per occurrence and in the aggregate.

§ 11.1.2 The Contractor shall provide surety bonds in the forms and subject to such terms and conditions as required by the Contract Documents, each for 100% of the Contract Sum. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located with an AM Best Rating of "A-" or higher and a size category of IX or greater.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 Notice of Cancellation or Expiration of Contractor's Required Insurance. Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

§ 11.2 Owner's Insurance

§ 11.2.1 The Owner shall purchase and maintain property insurance (builder's risk) for the Project.

§ 11.2.2 **Failure to Purchase Required Property Insurance.** If the Owner fails to purchase and maintain the required insurance, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

§ 11.2.2.1 The property insurance deductible is identified below and the Contractor responsible for the damage shall pay any costs not covered because of such deductibles. If the Owner or insurer increases the required minimum deductibles above the amount still identified or if the Owner elects to purchase this insurance with voluntary deductible amounts, the Owner shall be responsible for payment of the additional costs not covered because of such increase or voluntary deductibles. Notwithstanding the above, Contractor shall be responsible and shall pay costs not covered because of deductibles for loss or damages caused by Contractor's negligence.

1 The property insurance is written with a deductible of \$25,000 per occurrence.

§ 11.2.3 **Notice of Cancellation or Expiration of Owner's Required Property Insurance.** Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

§ 11.3 Waivers of Subrogation

§ 11.3.1 The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

§ 11.3.2 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

§11.5 Adjustment and Settlement of Insured Loss

§ 11.5.1 A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

§ 11.5.2 Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 Uncovering of Work

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

§ 12.2 Correction of Work

§ 12.2.1 Before Substantial Completion

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.1.2 It shall be clearly understood that "Punch List" items and "Maintenance" items are different categories. All items called for by the Contract Documents to be installed, supplied or otherwise incorporated into the Project, but which, at the time of inspection, are found not to be in compliance with the Contract Documents, shall be considered punch list items. All items which, at any time after completion inspection, are found not to be in compliance with the Contract Documents, shall be considered maintenance items to be corrected by the Contractor under the two-year warranty terms of the Contract so as long as the Contractor has supplied the Owner with all required O & M manuals necessary for the Owner to perform its maintenance

§ 12.2.2 After Substantial Completion

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties

established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The two-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 An additional one-year period for correction of Work shall apply to any corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.2.4 This obligation under this Subparagraph 12.2.2 shall survive acceptance of the Work under the Contract and termination of the Contract. Nothing contained in this paragraph shall decrease the liability of Contractor and/or Surety as set forth in the Performance Bond.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.3.1 If the Contractor fails to correct non-conforming Work, the Owner may correct it in accordance with Paragraph 2.5. If the Contractor does not proceed with correction of such non-conforming Work within time required by Paragraph 2.5, then the Owner may remove it and, if appropriate under the circumstances, store the salvable materials or equipment at the Contractor's Expense. If the Contractor does not pay costs of such removal and storage within ten days' after written notice, the Owner may sell such materials and equipment at auction or at private sale and shall account for the proceeds thereof, after deducting costs and damages that should have been borne by the Contractor, including compensation for the Architect's services and expenses made necessary thereby. If such proceeds of sale do not cover costs which the Contractor should have borne, the Contract Sum shall be reduced by the deficiency. If payments entered thereafter due the Contractor are not sufficient to cover such amount, the Contractor shall pay the difference due the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

§ 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.1.1 The Contract shall be governed by the law of the Commonwealth of Pennsylvania.

§ 13.1.2 DISCRIMINATION PROHIBITED: According to Section 62 Pa. C.S.A. § 3701, the Contractor agrees that:

§ 13.1.2.1 In the hiring of employees for the performance of Work under this Contract, or any sub-contract, no Contractor, Subcontractor, or any person acting on behalf of the Contractor or Subcontractor shall, by reason of gender, sexual orientation, gender identity or expression, race, creed or color, discriminate against any citizen of this Commonwealth who is qualified and available to perform the Work to which the employment relates.

§ 13.1.2.2 No Contractor, Subcontractor, or any person acting on their behalf, shall in any manner discriminate against or intimidate any employee hired for the performance of Work under this Contract on account of gender, race, creed or color.

§ 13.1.2.3 The Contract may be canceled or terminated by the government agency, and all money due or to become due under the Contract may be forfeited, for violation of the terms or conditions of that portion of the Contract.

§13.1.3 HUMAN RELATIONS ACT

§13.1.3.1 The provisions of the Pennsylvania Human Relations Act, Act 222 of October 27, 1955 (P.L. 744) (43 P.S. Section 951, et .seq.) of the Commonwealth of Pennsylvania prohibit discrimination because of race, color, religious creed, ancestry, age, sex, national origin, handicap or disability by employers, employment agencies, labor organizations, Contractors and others. The Contractor shall agree to comply with the provisions of this Act as amended that is made part of this specification. Your attention is directed to the language of the Commonwealth's non-discrimination clause in 16 PA. Code 49.101.

§13.1.3.2 Contractor represents that it has and will maintain for the duration of this Agreement, a written nondiscrimination and sexual harassment policy that complies with the applicable law and these Nondiscrimination/Sexual Harassment provisions and shall inform its employees in writing of the policy. The policy must contain a provision that states that sexual harassment will not be tolerated and employees who practice it will be disciplined.

§13.1.3.3 For the entire period of this agreement, the Contractor shall: (1) post its written nondiscrimination and sexual harassment policy or these Nondiscrimination/ Sexual Harassment provisions conspicuously in easily accessible and well-lighted places customarily frequented by employees at or near where the grant activities are performed; or (2) provide electronic notice of the policy or this clause to its employees not less than annually.

§13.1.3.4 Contractor shall notify the Owner of any actions or occurrences that would result in violation of these provisions and Contractor acknowledges that the Owner or the Commonwealth may cancel or terminate this Agreement and all money due or to become due under this agreement may be forfeited for a violation of the terms and conditions of these Nondiscrimination/Sexual Harassment provisions.

§13.1.4 PROVISION FOR THE USE OF STEEL AND STEEL PRODUCTS MADE IN THE U.S.

§13.1.4.1 In accordance with Act 3 of the 1978 General Assembly of the Commonwealth of Pennsylvania, if any steel or steel products are to be used or supplied in the performance of the Contract, only those produced in the United States as defined therein shall be used or supplied in the performance of the Contract or any Subcontracts there under.

§13.1.4.2 In accordance with Act 161 of 1982, cast iron products shall also be included and produced in the United States. Act 144 of 1984 further defines "steel product" to include machinery and equipment. The act also provides clarifications and penalties.

§ 13.1.5 NO CASH ALLOWANCES

§13.1.5.1 Cash allowances are not included in these bid specifications.

§ 13.1.6 RIGHT TO KNOW ACT

§13.1.6.1 Contractor shall comply with all terms and conditions of the Pennsylvania Right to Know Act, Act No. 159 of 1984, 35 P.S. §7301 et. Seq., and its implementing regulations.

§13.1.7 INTENTIONALLY DELETED – See §3.4.4

§13.1.8 INTENTIONALLY DELETED – See §3.4.4

§13.1.9 BLASTING

§13.1.9.1 When blasting has been authorized in writing, comply with the following: All storage, handling and use of explosives for the purpose of excavation shall be performed by the Contractor in strict accordance with Title 25, Chapter 211, of the Pennsylvania Code, as well as any applicable local regulations. Strict control of blasting must be maintained to prevent fly rock and blasting mats must be used where conditions dictate their use. When blasting within 25 feet of utility lines, such blasting must be performed according to Section 211.52 of Title 25 of the Pennsylvania Code.

§13.1.10 SITE EXCAVATION

§13.1.10.1 Contractor agrees that, not less than three (3) business days or for complex projects, ten business days, prior to beginning excavation or demolition Work as defined in Act 181 of December 2006 of the Commonwealth of Pennsylvania, amending Act 287 of December 10, 1974, he shall contact the One Call System at 811 or 1-800-242-1776 and request the information required by Section 5 of the Act and shall inform each excavator employed at the Project site of the information received with respect to location of underground installations. Contractor shall agree to report immediately to the user of the underground installations and to the Owner and Architect, any break in its lines, or dent, gouge, groove or other damage to such lines, their coating or cathodic protection, made or discovered in the course of the excavation or demolition Work. Contractor shall comply with all other provisions of the Act, as amended including conducting pre-construction meeting when necessary and paying all associated fees.

§13.1.11 PREVENTION OF ENVIRONMENTAL POLLUTION

§13.1.11.1 Section 3301 of the Pennsylvania Commonwealth Procurement Code requires that all Invitations for Bids and requests for proposals for construction projects issued by any governmental agencies shall set forth any provision of Federal and State statutes, rules, and regulations dealing with prevention of environmental pollution and the preservation of public natural resources that affect the Project. In this regard, a Notice of said provisions prepared by the Pennsylvania Department of Environmental Resources under subsection 4.10 of the Code can be viewed at: <http://www.depweb.state.pa.us/oa/cwp/view.asp?a=1365&Q=482058&oaNav=324#410>

Contractor is hereby notified and agrees to comply with the terms of all statutes, rules and regulations enumerated in said Notice. Where any identified environmental statute, rule and/or regulation, has been revised, amended, supplemented, repealed and/or supplanted, Contractor shall comply with such statute, rule and/or regulation as so modified. Notwithstanding the foregoing, failure to include any applicable environmental statute, rule and/or regulation shall not relieve Contractor of its obligation to comply with same.

§ 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

§ 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

§ 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. **The Contractor shall make arrangements for such tests, inspections, and approvals with an independent**

testing laboratory or entity contracted by the Owner directly. Electric Contract is the one exception that will hire a third party Underwriter for the electrical inspections as part of their Contract. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.5.1 Progress payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate of 3% per annum, simple interest. Interest on final payment shall be governed by Section 3941 of the Pennsylvania Commonwealth Procurement Act, 62 Pa.C.S. § 3941.

§ 13.6 Compliance with Grant Requirements

§ 13.6.1 Because this Project is funded with a grant from an executive agency of the Commonwealth **§ 13.6.1**

1. The Contractor will not knowingly employ or knowingly permit any subcontractor to knowingly employ the labor services of an illegal alien and **§ 13.6.1 2** If the Contractor or any of its subcontractors are sentenced under Federal law for an offense involving knowing use of labor by an illegal alien on this Project or other activities funded in whole or in part by grants or loans issued by an executive agency of the Commonwealth of Pennsylvania, then to the extent that the Owner is required to repay grant funds to a Commonwealth agency, the Contractor shall forfeit any right to payment and repay the Owner so that the Owner shall be made whole.

§ 13.6.2 Contractor certifies that it complies with and will remain in compliance with all applicable federal, state, and local laws, regulations, and policies relating to nondiscrimination and sexual harassment for the term of the agreement. The Contractor shall, upon request and within the time periods requested by the Owner or the Commonwealth, furnish all necessary employment documents and records, including EEO-1 reports, and permit access to its books, records, and accounts by the Owner and/or the Commonwealth for the purpose of ascertaining compliance with provisions of this Nondiscrimination/ Sexual Harassment Clause.

§ 13.6.3 The Contractor shall maintain the highest standards of honesty and integrity. .

§ 13.6.3.1 For purposes of these Integrity Provisions, the following definitions apply:

- i. "Affiliate" means two or more entities where (a) a parent entity owns more than 50% of the voting stock of each of the entities; (b) a common shareholder or group of

shareholders owns more than 50% of the voting stock of each of the entities; or (c) the entities have a common proprietor or general partner.

- ii. “Related Parties” means any Affiliates of the Contractor and the Contractor’s executive officers, Pennsylvania officers and directors, or owners of five percent or more interest in the Contractor.
- iii. “Financial Interest” means ownership of more than a five percent interest in any business or holding a position as an officer, director, trustee, partner, employee, or holding any position of management.
- iv. “Gratuity” means tendering, giving, or providing anything of more than nominal monetary value including, but not limited to, cash, travel, entertainment, gifts, meals, lodging, loans, subscriptions, advances, deposits of money, services, employment, or contracts of any kind. The exceptions set forth in the Governor’s Code of Conduct, Executive Order 1980-18, as may be amended, 4 Pa. Code §7.153(b), apply.

13.6.3.2 The Contractor represents to the best of its knowledge and belief and warrants that within the last five years neither the Contractor nor Contractor Related Parties have:

- i. been indicted or convicted of a crime involving moral turpitude or business honesty or integrity in any jurisdiction;
- ii. been suspended, debarred, or otherwise disqualified from entering into any contract with any governmental agency;
- iii. had any business license or professional license suspended or revoked;
- iv. had any sanction or finding of fact imposed as a result of a judicial or administrative proceeding related to fraud, extortion, bribery, bid rigging, embezzlement, misrepresentation or anti-trust; and
- v. been, and are not currently, the subject of a criminal investigation by any federal, state, or local prosecuting or investigative agency or civil anti-trust investigation by any federal, state, or local prosecuting or investigative agency.

13.6.3.3 The Contractor agrees:

- .1 to take no action in violation of any applicable laws, regulations, or other requirements applicable to the Contractor that govern the Owner’ or the Commonwealth contracting or grant administration; .2 to establish and implement a written business integrity policy that includes, at a minimum, the requirements of this section as they relate to the Contractor’s activity with the Commonwealth and Commonwealth employees and ensure that its employees comply with the policy.
- .3 to not accept, agree to give, offer, confer, agree to confer, or promise to confer, directly or indirectly, any gratuity or pecuniary benefit to any person, or to influence or attempt to influence any person in violation of any federal or state law, regulation, executive order, statement of policy management directive, or bulletin applicable to the award of grants or the administration of this agreement.
- .4 to not have a financial interest in any other subgrantee, contractor, subcontractor, or supplier providing services, labor, or material under this agreement.
- .5 to comply with the requirements of the Lobbying Disclosure Act (65 Pa.C.S. § 13A01 et seq.) regardless of the method of award.
- .6 to comply with the requirements of Section 1641 of the Pennsylvania Election Code (25 P.S. § 3260a) if this agreement was awarded pursuant to a Non-Solicitation Award Process.
- .7 to immediately notify the Owner and either Commonwealth or the Office of the State Inspector General, in writing, when the Contractor has reason to believe that any breach of ethical standards as set forth in law, the Governor’s Code of Conduct, or these provisions has occurred or may occur, including, but not limited to, contact by a Commonwealth officer or employee, which, if acted upon, would violate the ethical standards.

- .8 That by submitting any bills, invoices, or requests for payment pursuant to the agreement, the Contractor further represents that it has not violated any of these Integrity Provisions during the term of the Agreement and that the Contractor shall immediately notify the Owner in writing if at any time during the term of the agreement it becomes aware of any event that would cause the Contractor's certification or explanation to change.
- .9 That the Commonwealth or the Owner may, in its sole discretion, terminate the Agreement for cause if it learns that any of the certifications made are currently false or misleading due to intervening factual circumstances or were false or misleading or should have been known to be false or misleading when entering into the agreement. In the event of such a termination, the Contractor shall forfeit all right to payments under this Agreement. Additionally, the Owner or the Commonwealth may (a) assess against the Contractor liquidated damages in an amount equal to the value of anything received in breach of these integrity provisions, (b) claim damages for all additional costs and expenses incurred in obtaining another contractor to complete performance under this agreement, and (c) debar or suspend the Contractor from doing business with the Owner and/or the Commonwealth. These rights and remedies are cumulative and the assessment of one does not preclude the assessment of additional remedies or any other remedies available under applicable contracts, laws, or regulations.
- .10 That if the Pennsylvania Inspector General initiates an investigation:
 - .1 and the investigation leads to the Contractor being suspended or debarred or the Owner being suspended or debarred because of the conduct of the Contractor or its subcontractors, then the Contractor will reimburse the Commonwealth and the Owner for the reasonable costs of the investigation;
 - .2 then the Contractor will cooperate with the investigation and make identified employees, agents, representative, and subcontractors available for interviews at reasonable times and places; and
 - .3 the Contractor will promptly make available for inspection and copying any information of any type or form (including, but not necessarily limited to business or financial records, and any other records related to this Agreement) deemed relevant by the Office of Inspector General.

§ 13.6.4 The Contractor will comply with the Americans With Disabilities Act as follows:

- .1 Pursuant to the Americans with Disabilities Act, 42 U.S. Code § 12101, et seq., no qualified individual with a disability may, on the basis of the disability, be excluded from participation in this contract or from activities provided for under this agreement
- .2 For all goods and services provided pursuant to this agreement, the Grantee shall comply with Title II of the Americans with Disabilities Act, the "General Prohibitions Against Discrimination" set forth in 28 C. F. R. § 35.130, and all other regulations promulgated under Title II of the Americans with Disabilities Act that apply to state and local governments.
- .3 Indemnification. The Contractor shall indemnify the Commonwealth and the Owner against all third-party claims, suits, demands, losses, damages, costs, and expenses, including without limitation, litigation expenses, attorneys' fees, and liabilities, arising out of or in connection with the Contractor's failure or its employee's or agent's failure to comply with these provisions as determined by the Commonwealth in its sole discretion.

§ 13.6.5 Right to Know. If the Commonwealth or the Owner needs the Contractor's assistance in any matter arising out of the RTKL related to this Agreement, the Commonwealth or the Owner shall notify the Contractor that it requires the Contractor's assistance, and the Contractor shall provide to the

Commonwealth or the Owner (1) access to, and copies of, any document or information in the Contractor's possession (Requested Information) arising out of this contract that the Owner or the Commonwealth reasonably believes is a public record under the RTKL, within ten calendar days after receipt of written notification; and (2) any other assistance as the Owner or the Commonwealth may reasonably request, in order to comply with the RTKL with respect to this contract.

- .1 Secret or Confidential Proprietary Information. If the Contractor considers the Requested Information to include a Trade Secret or Confidential Proprietary Information, as those terms are defined by the RTKL, or other information that the Contractor considers exempt from production under the RTKL, the Contractor shall notify the Commonwealth or the Owner and provide, within seven calendar days of receipt of the written notice a written statement, signed by a representative of the Owner, that explains why the requested material is exempt from public disclosure under the RTKL. If the Commonwealth or the Owner determines that the Requested Information is clearly not exempt from disclosure, the Contractor shall provide the Requested Information to the Commonwealth or the Owner within five business days of receipt of written notice of the determination.
- .2. Reimbursement.
 - .1 Reimbursement. If the Contractor fails to provide the Requested Information and the Owner or the Commonwealth is ordered to produce the Requested Information, the Contractor shall reimburse the Commonwealth and the Owner for any damages, penalties, or costs that the Commonwealth may incur as a result of the Grantee's failure, including any statutory damages assessed against the Commonwealth.
 - .2. Contractor Reimbursement. The Commonwealth or the Owner will reimburse the Contractor for any costs that the Contractor incurs as a direct result of complying with these provisions only to the extent allowed under the fee schedule established by the Office of Open Records or as otherwise provided by the RTKL.
 - .3 Challenges of Release. The Contractor may file a legal challenge to any decision to release a record to the public with the Office of Open Records, or in the Pennsylvania Courts, however, the Contractor shall reimburse the Commonwealth and the Owner for any legal expenses incurred by the Commonwealth and the Owner as a result of the challenge, including any damages, penalties or costs that the Commonwealth or the Owner may incur as a result of the Contractor's legal challenge, regardless of the outcome.
 - .4 Waiver. The Contractor waives all rights or remedies that may be available to it as a result of the Owner's Commonwealth's disclosure of Requested Information pursuant to the RTKL.
 - .5 Survival. The Contractor's obligations contained in this Section survive the termination or expiration of this contract.

§ 13.6.6 Contractor Representations.

- .1 The Contractor represents for itself and its subcontractors required to be disclosed or approved by the Commonwealth, that as of the date of its execution of this agreement, that neither the Contractor, nor any of its subcontractors, are under suspension or debarment by the Commonwealth or any governmental entity, instrumentality, or authority.
- .2 The Contractor represents that, as of the date of its execution of this agreement, it has no tax liabilities or other Commonwealth obligations, or has filed a timely administrative or judicial appeal, if any liabilities or obligations exist, or is subject to a duly approved deferred payment

- plan if any liabilities exist.
- .3 The Contractor shall notify the Commonwealth if, at any time during the term of the agreement, it becomes delinquent in the payment of taxes, or other Commonwealth obligations, or if it or, to the best of its knowledge, any of its contractors, or subcontractors are suspended or debarred by the Commonwealth, the federal government, or any other state or governmental entity. The Contractor shall provide this notification within 15 days of the date of suspension or debarment.
 - .4 The Contractor's failure to notify the Commonwealth of its suspension or debarment by the Commonwealth, any other state, or the federal government constitutes an event of default of the agreement with the Commonwealth.
 - .5 Reimbursement. The Contractor shall reimburse the Commonwealth for the reasonable costs of investigation incurred by the Office of State Inspector General for investigations of the Contractor's compliance with the terms of this agreement or any other agreement between the Contractor and the Commonwealth that results in the suspension or debarment of the Contractor. These costs include, but are not limited to, salaries of investigators, including overtime; travel and lodging expenses; and expert witness and documentary fees. The Contractor shall not be responsible for investigative costs for investigations that do not result in the Contractor's suspension or debarment.

§ 13.6.7 Interests of Parties and Others.

- .1 No officer, member, employee, independent contractor or elected official of the Commonwealth Financing Authority and no member of its governing body who exercises any functions or responsibilities in the review or approval of activities being performed under this Agreement shall participate in any decision relating to this Agreement which affects his/her personal interest or the interest of any corporation, partnership or association in which he/she is directly or indirectly interested. Nor shall any officer, member, elected official or employee of the Commonwealth or any member of its governing body have any interest direct or indirect in this Agreement.
- .2 The Contractor covenants that the Contractor (including directors, officers, members and employees of the Contractor) presently has no interest and shall not acquire any interest, directly or indirectly, which would conflict in any manner or degree with the performance of activities required to be performed under this Agreement. The Contractor further covenants that no person having any interest shall be employed in the performance of activities for this Contractor.
- .3 The Contractor represents and warrants that no elected state official, any employee of the Contractor, immediate family member (parent, spouse, domestic partner, child, brother or sister, daughter-in-law or son-in-law, or grandchild) of elected state official, or Contractor's employees, or any entity in which any above listed person shall have an ownership interest of 5% or greater, or in which entity above listed person has a controlling interest, has received or will receive a direct or indirect pecuniary benefit from or as a result of the full execution of this Agreement. Further, the Contractor represents and warrants that it has not and will not enter any contract for goods or services with the persons enumerated above using any funds made available to Contractor under this Agreement.

§ 13.6.8 The Contractor shall retain all records that may be required for the Owner to qualify for and obtain any available rebates, grants, tax credits, payments, or other incentives available for similar types of projects, including, but not necessarily limited to the Inflation Reduction Act rebate, sourcing requirements applicable to any such rebates or grants, and applications to PECO for its Commercial Solar Incentive for each solar PV system. Additionally, the Contractor shall assist the Owner in completing, or at the Owner's request, complete the applications for such rebates and incentives, and for setting up net metering accounts, including a virtual meter aggregation account.

§ 13.6.9 The Contractor shall provide the Owner with all licenses necessary for all software and applications applicable to the Project. Additionally, the Contractor shall provide training to the Owner's staff regarding operations and maintenance of the systems and operation of all software/applications applicable to the systems and either submit such applications or advise the Owner on the timing and manner of such submissions.

§ 13.6.10 The Contractor shall comply with the most recent version of the IRS's OBBA-Related Energy Credit Guidance, the August 25, 2025 version of which is attached as Exhibit 7.

§ 13.6.11 The Contractor shall comply with the Bipartisan Infrastructure Law and regulations and guidance promulgated thereunder, including, but not limited to, any applicable restrictions on sourcing of materials.

§ 13.6.12 All work shall be performed in a manner so as not to void or otherwise diminish or limit any applicable roof warranties.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 90 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon 30 days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 fails to comply with one or more Milestone Date, Completion Dates,
- .5 otherwise is guilty of material breach of a provision of the Contract Documents, or
- .6 is adjudged bankrupt or files for bankruptcy or creditor protection under the laws of this United States, Contractor shall provide Owner with thirty (30) days' written notice before filing.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and



- 3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished. If the Owner terminates the Contract for one of the reasons stated in Section 14.2.1 and it is later finally determined that cause for termination did not exist, then the Contractor shall be entitled to recover damages as set forth in Section 14.1.3.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.2.5 In the event the Owner terminates the Contract for cause, and such cause is determined to be valid and justified in addition and without prejudice to all other rights, remedies and relief which the Owner may obtain under this Agreement and pursuant to the law, the Owner shall be entitled to payment by Contractor of all reasonable professional fees, including attorneys' fees, architectural fees, engineering fees, expert witness fees and consulting fees (together with reasonable expenses and disbursements incurred in connection therewith) which the Owner may incur in connection with any legal proceedings or action (including professional fees rendered in anticipation of such proceedings or action). This provision shall create no rights to the Contractor or to any other person or entity for payment of such costs or expenses.

§ 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. No adjustment shall be made to the extent

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of termination or suspension for the Owner's convenience, the Contractor shall (1) cease operations as directed by the Owner in the Notice, (2) take actions necessary, or that the Owner may direct, for the protection and preservation of the Work, and (3) except for Work directed to be performed prior to the effective date of suspension or termination stated in the Notice, suspend or terminate as the case may be, all existing Subcontracts and purchase orders and enter into no further Subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment from the Owner for any work properly completed prior to the notice of termination, any work properly performed to protect the Work, and any reasonable termination costs incurred with respect to subcontracts and suppliers, provided that no allowance will be made for overhead and profit on any work not satisfactorily performed. The Contractor will fully cooperate with the Owner in ensuring that terminations of subcontracts and supply contracts are done in a reasonable and prudent manner so as not to waste resources and to minimize such termination costs.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 Claims

§ 15.1.1 Definition

A Claim is a demand or assertion by the Contractor seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The responsibility to substantiate Claims shall rest with the Contractor.

§ 15.1.2 Time Limits on Claims

The Contractor must initiate a Claim by written notice to the Owner and the Owner's Representative with a copy to the Architect as set forth in paragraph 15.1.3.

§ 15.1.3 Notice of Claims

§ 15.1.3.1 Claims by the Contractor shall be initiated by notice to the Owner, and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by the Contractor under this Section 15.1.3.1 shall be initiated within 10 days after occurrence of the event giving rise to such Claim or within 10 days after the Contractor first recognizes the condition giving rise to the Claim, whichever is later. An additional claim made after the initial claim has been implemented by Change Order will not be considered unless submitted in a timely manner.

§ 15.1.3.2 Any Claims not raised by the Contractor in accordance with these provisions shall be deemed waived.

§ 15.1.4 Continuing Contract Performance

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

§ 15.1.5 Claims for Additional Cost

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.6 Claims for Additional Time

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of the probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary the extension of time is the sole recourse.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction. No extension of time shall be granted because of seasonal variations in temperature, humidity or precipitation, which conditions shall be wholly at the risk of the Contractor, whether occurring within the time originally scheduled for completion or within the period of any extension granted. Any additional costs of operations or conditions shall be the responsibility of the Contractor.

§ 15.1.7 Waiver of Claims for Consequential Damages

Contractor waives claims against Owner for consequential damages arising out of or relating to this Contract, including, but not limited to, damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation and for loss of profit, except anticipated profit arising directly from the Work.

§ 15.2 Initial Decision

§ 15.2.1 Claims shall be referred to the Initial Decision Maker for initial decision. The Owner's Representative will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to further dispute resolution of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the Contractor may request that the Owner permit the matter to proceed to mediation, arbitration or litigation without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the Contractor or a response with supporting data from the Owner, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the Contractor unless the Contractor provides written notice to the Owner, the Initial Decision Maker and the Architect that the Contractor rejects the initial decision within 15 days of the Contractor's receipt of the initial decision, in which case, the Claim will be resolved in accordance with the Mediation, Arbitration, or Litigation provisions of this Contract. The initial decision will be binding on the Owner unless the Owner notifies the Contractor and the Architect in writing within thirty (30) days of the Owner's receipt of the initial decision that the Owner rejects the initial decision and the bases for such rejection. .

§ 15.2.6 Intentionally deleted.

§ 15.2.7 Intentionally deleted.

§ 15.2.8 Intentionally deleted. .

§ 15.3 Mediation

§ 15.3. The Owner shall have the sole and exclusive option to serve a written demand upon the Contractor for mediation, in which case, the parties will attempt to resolve such dispute by mediation under the Construction Industry Mediation Rules of the American Arbitration Association then in effect, before resorting to any other arbitration or judicial proceedings. Nothing contained in this paragraph is intended, or shall be construed, to entitle the Contractor to demand mediation, it being understood and agreed that such determination shall be at the sole election of the Owner.

§ 15.3.2 Unless otherwise mutually agreed in writing, the Contractor shall carry on with its duties and services under the Contract for Construction during any mediation proceedings, and the Owner shall continue to make payments to the Contractor in accordance with the Contract for Construction.

§ 15.3.3 Intentionally deleted.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 Arbitration

§ 15.4.1 The Owner shall have the sole and exclusive option to have all claims, disputes and other matters in question between the Contractor and the Owner arising out of, or relating to, the Contract for Construction or the breach thereof be decided by arbitration in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then in effect. The Owner's election to arbitrate shall be specifically enforceable under the prevailing arbitration law. The award rendered by the arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof. Nothing contained in this paragraph is intended, or shall be construed, to entitle the Contractor to demand arbitration, it being understood and agreed that such determination shall be at the sole election of the Owner.

§ 15.4.2 If the Owner elects arbitration, then Notice of the Demand for Arbitration shall be filed in writing with the Contractor and with the American Arbitration Association.

§ 15.4.3 Unless otherwise mutually agreed in writing, the Contractor shall carry on with its duties and services under the Contract for Construction during any arbitration proceedings, and the Owner shall continue to make payments to the Contractor in accordance with the Contract for Construction.

§ 15.4.4 If the Owner becomes a party to any arbitration with the: (a) the Architect, whether as a claimant or respondent, which involves a common question of fact or law with any claim, dispute or other matter in question between the Owner and the Contractor arising out of or relating to the Contract for Construction or the breach thereof; or (b) one or more separate contractors, whether as claimant or respondent, which involves a common question of fact or law with any claim, dispute or other matter in question between the Owner and the Contractor arising out of or relating to the Contract for Construction or the breach thereof, then the Owner, if it elects to do so, may require: (1) the Contractor to arbitrate such claim, dispute or other matter in question in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then in effect; (2) the Architect or the separate contractor(s), or all of them, to arbitrate such claim, dispute or other matter in question in accordance with the Construction Industry Arbitration Rules of the American Arbitration Association then in effect; and (3) that all such claims be heard in a single arbitration proceeding or that any separate arbitration proceedings involving such claims be consolidated.

§ 15.5 Litigation

§ 15.5 Any disputes not resolve by Mediation and any disputes that the Owner does not elect to refer to mediation or arbitration shall be resolved through litigation in the Delaware County Court of Common Pleas. The Contractor agrees that it will waive the right to a trial by jury if the Owner elects to waive that right.

§ 15.6 The Owner's Election

§ 15.6.1 The Owner may elect mediation at any time, regardless of whether arbitration or judicial proceedings have been commenced, and the Owner's commencement of or participation in such arbitration or judicial proceedings shall not waive the Owner's right to later elect mediation.

§ 15.6.2 The Owner may elect arbitration at any time, regardless of whether the Owner has previously elected mediation or whether judicial proceedings have been commenced, and the Owner's commencement of or participation in such mediation or judicial proceedings shall not waive the Owner's right to later elect arbitration.

§ 15.6.3 The Contractor may not commence any judicial proceedings against the Owner without first offering the Owner the opportunity to initially elect mediation or arbitration by notifying the Owner in writing of the nature of the dispute, the factual basis for its claims, and the amount or other relief claimed. If the Owner does not make its election within thirty (30) days after such notice, the Contractor may proceed to resolve such dispute through judicial proceedings. The Owner's failure to elect mediation or arbitration within such thirty (30) day period shall not, however, waive the Owner's right to later elect mediation or arbitration. The Owner may elect mediation and if no settlement is reached, thereafter elect arbitration or litigation.

§ 15.6.4 The Owner shall have the right to elect mediation and/or arbitration with the Contractor's Surety under the surety bonds to the same extent and in the same manner as the Owner's right to so elect with the Contractor under this Article 15. The Surety shall be bound by the terms of this Article 15 with respect to any mediation or arbitration elected by the Owner under the surety bonds and shall assume toward the Owner all of the duties, obligations and responsibilities which the Contractor assumes toward the Owner under this Article 15 in the event of such an

election. Any separate bond defenses or claims raised by the Surety may, at the Owner's election, be made part of such mediation or arbitration.

§ 15.7 Nullum Tempus

The Contractor acknowledges that the Project involves construction of a public school for a Pennsylvania public school district; therefore, the doctrine of *nullum tempus occurit regi* applies to any claims that the Owner may have against the Contractor relating to the Contractor's performance of the Work.



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SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
 - 1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
 - 2. Section 012215 "Unit Prices and Allowances" for administrative requirements governing the use of unit prices and Allowances.
 - 3. Section 01 29 00 "Payment Procedures"
 - 4. Section 01 32 00 "Construction Progress Documentation"
 - 5. Section 01 78 00 "Project Record Documents" for recording changes in the work.

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on form included in Project Manual.

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within 10 days 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.

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- 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 forms acceptable to Architect.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to the change.
 - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - 6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
 - 7. Proposal Request Form: Use forms acceptable to Architect.

1.5 ADMINISTRATIVE CHANGE ORDERS

- A. Allowance Adjustment: See Section 012100 "Allowances" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect actual costs of allowances.
 - 1. CASH Allowances are not included.
 - 2. Material Allowance Adjustment: If a material allowance is included in the work, prior to performing any work included in a material allowance, the Contractor shall review the work with the Owner Representative and Architect. No work shall be performed without prior approval of the Owner Representative and Architect. The Owner Representative and Architect will verify and adjust material allowance amounts, based on the quantity of work required and by final measurement of work-in-place. The Contractor shall provide the Owner Representative and Architect with the following information:
 - a. Include installation costs in purchase amount only where indicated as part of the allowance.
 - b. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
 - c. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to unit-cost allowances.
 - d. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.
- B. Unit-Price Adjustment: See Section 012200 "Unit Prices" for administrative procedures for preparation of Change Order Proposal for adjusting the Contract Sum to reflect measured scope of unit-price work.

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1.6 CHANGE ORDER PROCEDURES

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

1.7 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714 Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - 1. Owner and Architect will sign and date the Construction Change Directive as authorization for the Contractor to proceed with the changes.
 - 2. Contractor shall sign and date the Construction Change Directive to indicate agreement with the terms herein.
 - 3. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

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SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. RFIs.
 - 4. Digital project management procedures.
 - 5. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Requirements:
 - 1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.3 DEFINITIONS

- A. BIM: Building Information Modeling.
- B. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.4 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. Include the following information in tabular form:
 - 1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.

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3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
 1. Post copies of list in project meeting room, in temporary field office, on the project FTP site and in prominent location in the built facility. Keep list current at all times.

1.5 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.
 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
- B. Coordination: Each contractor shall cooperate with Project coordinator who shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its own operations with operations included in different Sections that depend on each other for proper installation, connection, and operation.
 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
 4. Where availability of space is limited, coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair of all components, including mechanical and electrical.
- C. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
 1. Prepare similar memoranda for Owner and Contractors if coordination of their Work is required.

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- D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities, and scheduled activities of other contractors, and direction of Project coordinator 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 Plan (all primes); Preparation of Construction Schedule (Project Coordinator)
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.

1.6 COORDINATION DRAWINGS

- A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated 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.

1.7 REQUEST FOR INFORMATION (RFI)

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

1. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

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

1. Project name.
2. Project number.
3. Date.
4. Name of Contractor.
5. Name of Architect
6. RFI number, numbered sequentially.
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 suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.

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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.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.
- C. RFI Forms: Form bound in Project Manual
1. Attachments shall be electronic files in PDF format.
 2. Identify each page of attachments with the RFI number and sequential page number.
- D. Architect's Action: Architect will review each RFI, determine action required, and respond. Allow ten working days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.
1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.
 2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by of additional information.
 3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 10 days of receipt of the RFI response.
- E. Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log Submit log bi-weekly Include the following:
1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect.
 4. RFI number including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's response was received.
 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
 9. Identification of related Field Order, Work Change Directive, and Proposal Request, as appropriate.

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- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within seven days if Contractor disagrees with response.

1.8 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Architect's Data Files Not Available: Architect will not provide Architect's BIM model digital data files for Contractor's use during construction.
- B. Use of Architect's Digital Data Files: Digital data files of Architect's CAD drawings will be provided by Architect for Contractor's use during construction.
 - 1. Digital data files may be used by Contractor in preparing coordination drawings, Shop Drawings, and Project record Drawings.
 - 2. Architect makes no representations as to the accuracy or completeness of digital data files as they relate to Contract Drawings.
 - 3. Digital Drawing Software Program: Contract Drawings are available in .dwg 13 or 18.
 - 4. Contractor shall execute a data licensing agreement in the form of Agreement included in Project Manual.
 - a. Subcontractors, and other parties granted access by Contractor to Architect's digital data files shall execute a data licensing agreement in the form of Agreement included in this Project Manual.
 - 5. A fee of \$100 will be required for each file.
 - 6. The following digital data files will be furnished for each appropriate discipline:
 - a. Floor plans.
 - b. Reflected ceiling plans.
- C. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:
 - 1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
 - 2. Name file with submittal number or other unique identifier, including revision identifier.
 - 3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.9 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 Owner and Architect of scheduled meeting dates and times a minimum of 10 working days prior to meeting.
 - 2. Agenda: Prepare the meeting agenda. Distribute the agenda to all invited attendees.

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3. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
1. Attendees: Authorized representatives of Owner, Architect, 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. Responsibilities and personnel assignments.
 - b. Tentative construction schedule.
 - c. Phasing.
 - d. Critical work sequencing and long lead items.
 - e. Designation of key personnel and their duties.
 - f. Lines of communications.
 - g. Use of web-based Project software.
 - h. Procedures for processing field decisions and Change Orders.
 - i. Procedures for RFIs.
 - j. Procedures for testing and inspecting.
 - k. Procedures for processing Applications for Payment.
 - l. Distribution of the Contract Documents.
 - m. Submittal procedures.
 - 1) Limitations on substitutions.
 - n. Preparation of Record Documents.
 - o. Use of the premises.
 - p. Work restrictions.
 - q. Working hours.
 - r. Owner's occupancy requirements.
 - s. Responsibility for temporary facilities and controls.
 - t. Procedures for moisture and mold control.
 - u. Procedures for disruptions and shutdowns.
 - v. Construction waste management and recycling.
 - w. Parking availability.
 - x. Office, work, and storage areas.
 - y. Equipment deliveries and priorities.
 - z. First aid.
 - aa. Security.
 - bb. Progress cleaning.
 3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.

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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 Architect of scheduled meeting dates.
 2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Sustainable design requirements.
 - i. Review of mockups.
 - j. Possible conflicts.
 - k. Compatibility requirements.
 - l. Time schedules.
 - m. Weather limitations.
 - n. Manufacturer's written instructions.
 - o. Warranty requirements.
 - p. Compatibility of materials.
 - q. Acceptability of substrates.
 - r. Temporary facilities and controls.
 - s. Space and access limitations.
 - t. Regulations of authorities having jurisdiction.
 - u. Testing and inspecting requirements.
 - v. Installation procedures.
 - w. Coordination with other work.
 - x. Required performance results.
 - y. Protection of adjacent work.
 - z. Protection of construction and personnel.
 3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- D. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 90 days prior to the scheduled date of Substantial Completion.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.

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3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Preparation of Record Documents.
 - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Procedures for completing and archiving web-based Project software site data files.
 - d. Submittal of written warranties.
 - e. Requirements for completing sustainable design documentation.
 - f. Requirements for preparing operations and maintenance data.
 - g. Requirements for delivery of material samples, attic stock, and spare parts.
 - h. Requirements for demonstration and training.
 - i. Preparation of Contractor's punch list.
 - j. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - k. Submittal procedures.
 - l. Coordination of separate contracts.
 - m. Obtain Certificate of Occupancy
 - n. Installation of Owner's furniture, fixtures, and equipment.
 - o. Responsibility for removing temporary facilities and controls.
 4. Minutes: Entity conducting meeting will record and distribute meeting minutes.
- E. Progress Meetings: Project Coordinator will conduct progress meetings once every two weeks.
1. Coordinate dates of meetings with preparation of payment requests.
 2. Attendees: In addition to representatives of Owner and Architect, 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.
 3. 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. Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to 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) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.

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- 7) Site use.
 - 8) Temporary facilities and controls.
 - 9) Progress cleaning.
 - 10) Quality and work standards.
 - 11) Status of correction of deficient items.
 - 12) Field observations.
 - 13) Status of ASIs.
 - 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.
4. Minutes: Architect will record and distribute to Owner's representative, all Prime Contractors and the attendees at the meeting.
 - a. When required by the Architect or Owner Representative, Project Coordinator shall record and distribute minutes to all prime contractors and the attendees at the meeting.
 - b. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.
 - c. 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.
- F. Coordination Meetings (Superintendent): Project Coordinator will conduct Project coordination meetings at weekly intervals Conduct Project coordination Meetings at no greater than once every two weeks, but in no case less than a frequency as required by the progress of the work. Where possible, schedule coordination meetings on alternate weeks as progress meetings. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.

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- c. Review present and future needs of each contractor present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Deliveries.
 - 4) Off-site fabrication.
 - 5) Access.
 - 6) Site use.
 - 7) Temporary facilities and controls.
 - 8) Work hours.
 - 9) Hazards and risks.
 - 10) Progress cleaning.
 - 11) Quality and work standards.
 - 12) Pending changes.
- 3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.
- G. Warranty Meeting: Prior to the expiration of the one (1) year project warranty, Architect will conduct and Contractor shall attend a meeting with the Owner to review the facility operations and performance.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

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SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Startup construction schedule.
 - 2. Contractor's Construction Schedule.
 - 3. Construction schedule updating reports.
 - 4. Daily construction reports.
 - 5. Material location reports.
 - 6. Site condition reports.
 - 7. Unusual event reports.
- B. Related Requirements:
 - 1. Section 012900 "Payment Procedures" for submitting the Schedule of Values.
 - 2. Section 013100 "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
 - 3. Section 013300 "Submittal Procedures" for submitting schedules and reports.
 - 4. Section 014000 "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 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. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.

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2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- C. Major Area: A story of construction, a separate building, or a similar significant construction element.
- D. Milestone: A key or critical point in time for reference or measurement.
- E. Resource Loading: The allocation of manpower and equipment necessary for completing an activity as scheduled.

1.4 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
1. Working electronic copy of schedule file, where indicated.
 2. PDF file.
 3. Two paper copies, of sufficient size to display entire period or schedule, as required.
- B. Startup construction schedule.
1. When requested by another prime contractor, or the Architect, or the Owner, provide construction schedule (preliminary, coordination version or final) in non-proprietary electronic data format, Data shall be exported in sufficient detail to permit replication of schedule and underlying assumptions in the same program or other programs of similar sophistication.
- C. Daily Construction Reports: Submit at monthly intervals.
- D. Material Location Reports: Submit at bi-weekly intervals.
- E. Site Condition Reports: Submit at time of discovery of differing conditions.
- F. Unusual Event Reports: Submit at time of unusual event.
- G. Qualification Data: For scheduling consultant.

1.5 QUALITY ASSURANCE

- A. Prescheduling Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's Construction Schedule, including, but not limited to, the following:
1. Review software limitations and content and format for reports.
 2. Verify availability of qualified personnel needed to develop and update schedule.
 3. Discuss constraints, including phasing, interim milestones, and partial Owner occupancy.

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4. Review delivery dates for Owner-furnished products.
5. Review schedule for work of Owner's separate contracts.
6. Review submittal requirements and procedures.
7. Review time required for review of submittals and resubmittals.
8. Review requirements for tests and inspections by independent testing and inspecting agencies.
9. Review time required for Project closeout and Owner startup procedures.
10. Review and finalize list of construction activities to be included in schedule.
11. Review procedures for updating schedule.

1.6 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.
 1. Secure time commitments for performing critical elements of the Work from entities involved.
 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.7 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.
- B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial 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.
- C. Activities: Treat each floor or separate area 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 30 days, unless specifically allowed by Architect.
 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.
 - a. Structural Steel Products.
 - b. Clay masonry products.
 - c. Operable partitions.
 - d. Institutional Casework.
 - e. Food Service Equipment.
 - f. Elevator.
 - g. Mechanical equipment.

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- h. Emergency generator.
 - i. Electrical switchgear.
 - 3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "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 fifteen days for startup and testing.
 - 5. Mechanical balancing: Include no fewer than 15 days for commissioning.
 - 6. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
 - 7. Punch List and Final Completion: Include not more than 20 days for completion of punch list items and final completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
- 1. Phasing: Arrange list of activities on schedule by phase.
 - 2. Work under More Than One Contract: Include a separate activity for each contract.
 - 3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 - 4. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 - 5. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 - 6. 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 site occupancy before Substantial Completion.
 - e. Use-of-premises restrictions.
 - 7. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.
 - f. Sample testing.
 - g. Deliveries.
 - h. Installation.
 - i. Tests and inspections.
 - j. Adjusting.
 - k. Curing.
 - l. Structural completion.

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- m. Temporary enclosure and space conditioning.
 - n. Permanent space enclosure.
 - o. Completion of mechanical installation.
 - p. Completion of electrical installation.
 - q. Substantial Completion.
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion, and the milestones listed in the Summary of work.
- F. 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 the Contract Time.
- G. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule 3 working days 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. Revise schedule for each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragments to demonstrate the effect of the proposed change on the overall project schedule.
 - 4.
 - 5. As the Work progresses, indicate final completion percentage for each activity.
- H. 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. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.
- I. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, 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.

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1.8 STARTUP CONSTRUCTION SCHEDULE

- A. Gantt-Chart Schedule: Submit startup, horizontal, Gantt-chart-type construction schedule within seven days of date established for the Notice to Proceed.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line. Outline significant construction activities for first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.

1.9 GANTT-CHART SCHEDULE REQUIREMENTS

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 20 days of date established for **Notice to Proceed**.
 - 1. Base schedule on the startup construction schedule and additional information received since the start of Project.
- 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.
- C. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall Project schedule.
- D. Initial Issue of Schedule: Prepare initial network diagram from a sorted activity list indicating straight "early start-total float." Identify critical activities. Prepare tabulated reports showing the following:
 - 1. Contractor or subcontractor and the Work or activity.
 - 2. Description of activity.
 - 3. Main events of activity.
 - 4. Immediately preceding and succeeding activities.
 - 5. Early and late start dates.
 - 6. Early and late finish dates.
 - 7. Activity duration in workdays.
 - 8. Total float or slack time.
 - 9. Average size of workforce.
 - 10. Dollar value of activity (coordinated with the schedule of values).
- E. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
 - 1. Identification of activities that have changed.
 - 2. Changes in early and late start dates.
 - 3. Changes in early and late finish dates.
 - 4. Changes in activity durations in workdays.

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5. Changes in the critical path.
6. Changes in total float or slack time.
7. Changes in the Contract Time.

1.10 REPORTS

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013200

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SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Preconstruction photographs.
 - 2. Periodic construction photographs.
 - 3. Final completion construction photographs.
- B. Related Requirements:
 - 1. Section 017700 "Closeout Procedures" for submitting photographic documentation as Project Record Documents at Project closeout.
 - 2. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.
 - 3. Section 024116 "Structure Demolition" for photographic documentation before building demolition operations commence.
 - 4. Section 311000 "Site Clearing" for photographic documentation before site clearing operations commence.

1.3 INFORMATIONAL SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- B. Digital Photographs: Submit image files weekly.
 - 1. Submit photos on CD-ROM or thumb-drive. Include copy of key plan indicating each photograph's location and direction.
 - 2. Identification: Provide the following information with each image description in file metadata tag.
 - a. Name of Project.
 - b. Name and contact information for photographer.
 - c. Name of Architect.
 - d. Name of Contractor.
 - e. Date photograph was taken.
 - f. Description of location, vantage point, and direction.

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- g. Unique sequential identifier keyed to accompanying key plan.

1.4 QUALITY ASSURANCE

- A. Construction Webcam Service Provider: A firm specializing in providing photographic equipment, web-based software, and related services for construction projects, with record of providing satisfactory services similar to those required for Project.

1.5 COORDINATION

- A. Auxiliary Services: Cooperate with photographer and provide auxiliary services requested, including access to Project site and use of temporary facilities, including temporary lighting required to produce clear, well-lit photographs without obscuring shadows.

1.6 USAGE RIGHTS

- A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

1.7 FORMATS AND MEDIA

- A. Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels. Use flash in low light levels or backlit conditions.
- B. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
- C. File Names: Name media files with date and Project area and sequential numbering suffix.

1.8 CONSTRUCTION PHOTOGRAPHS

- A. General: Take photographs with maximum depth of field and in focus.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- B. Preconstruction Photographs: Before starting construction, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect or Owner Representative.
- C. Periodic Construction Photographs: Take 20 photographs weekly. Select vantage points to show status of construction and progress since last photographs were taken.
- D. Time-Lapse Sequence Construction Photographs: Take 20 photographs as indicated, to show status of construction and progress since last photographs were taken.
 - 1. In emergency situations, take additional photographs within 24 hours of request.

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2. Circumstances that could require additional photographs include, but are not limited to, the following:
 - a. Special events planned at Project site.
 - b. Immediate follow-up when on-site events result in construction damage or losses.
 - c. Photographs to be taken at fabrication locations away from Project site. These photographs are not subject to unit prices or unit-cost allowances.
 - d. Substantial Completion of a major phase or component of the Work.
 - e. Extra record photographs at time of final acceptance.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013233

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SECTION 013300 - SUBMITTAL PROCEDURES (note anywhere that states the word "Architect" is the equivalent of "Solar Consultant".)

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Submittal schedule requirements.
 - 2. Administrative and procedural requirements for submittals.

- B. Related Requirements:

- 1. Section 012900 "Payment Procedures" for submitting Applications for Payment and the schedule of values.
 - 2. Section 013100 "Project Management and Coordination" for submitting coordination drawings and subcontract list.
 - 3. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
 - 4. Section 013233 "Photographic Documentation" for submitting preconstruction photographs, periodic construction photographs, and final completion construction photographs.
 - 5. Section 014000 "Quality Requirements" for submitting test and inspection reports, and schedule of tests and inspections.
 - 6. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
 - 7. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
 - 8. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 - 9. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

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Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.4 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, as an action submittal, a list 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 Architect and additional time for handling and reviewing submittals required by those corrections.
 - 1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 - 2. Initial Submittal: Submit concurrently with startup construction schedule. Include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 - 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
 - 4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal Category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's final release or approval.

1.5 SUBMITTAL FORMATS

- A. Submittal Information: Include the following information in each submittal:
 - 1. Project name.
 - 2. Date.
 - 3. Name of Architect.
 - 4. Name of Contractor.
 - 5. Name of firm or entity that prepared submittal.
 - 6. Names of subcontractor, manufacturer, and supplier.
 - 7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
 - a. Submittal number shall use Specification Section number, followed by an underscore, then a sequential submittal type number and a version number (e.g., 03 1000_100-01).
 - b. Resubmittals shall include the next sequential version number (e.g., 03 1000_100-02).
 - 8. Category and type of submittal.
 - 9. Submittal purpose and description.

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10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
 11. Drawing number and detail references, as appropriate.
 12. Indication of full or partial submittal.
 13. Location(s) where product is to be installed, as appropriate.
 14. Other necessary identification.
 15. Remarks.
 16. Signature of transmitter.
- B. Options: Identify options requiring selection by Architect.
- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
1. Transmittal for Submittals: Assemble each submittal individually and appropriately for transmittal and handling. Transmit each submittal using sample form included in Project Manual transmittal form.
- D. PDF Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

1.6 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Web-Based Submittal: Prepare submittals in PDF form, and email to the Solar Consultant and the Owner's Representative. If the file is too large forward a link that can be downloaded.
 2. An email transmittal shall be sent to the Solar Consultant, owner's representative, and consultants indicating that the submittal has been uploaded for review.
 3. Hard Copies: Prepare submittals for samples and deliver to Architect. All submittals for color are to be submitted in samples. No Colors will be chosen from a manufacturer's web-site.
- 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. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

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- C. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow 10 working days (no weekends or holidays) for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Resubmittal Review: Allow 10 working days for review of each resubmittal.
 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, Allow 14 working days for initial review of each submittal.
 - a. Other components requiring review by authorities having jurisdiction.
 - b. Other components requiring review by utility providers.
 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, Allow 14 working days for review of each submittal. Submittal will be returned to Architect, before being returned to Contractor.
 - a. Submit one copy of submittal to concurrent reviewer in addition to specified number of copies to Architect.
- D. 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 Architect's action stamp.
- E. 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.
- F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.7 SUBMITTAL REQUIREMENTS

- A. 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 unsuitable 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:

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- a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts (no reproductions or prints are acceptable). Architect reserves the right to request color chip on actual material being installed.
 - 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 that show 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 Shop Drawings, and before or concurrent with Samples.
- B. 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.
- C. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other materials.
1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.
 3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics, and identification information for record.

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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 Owner'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 1 full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
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 2 sets of Samples. Architect will Sample set; remainder will be returned.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least 3 sets of paired units that show approximate limits of variations.
- D. 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. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 2. Manufacturer and product name, and model number if applicable.
 3. Number and name of room or space.
 4. Location within room or space.
- E. 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 architects and owners, and other information specified.
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

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G. Certificates:

1. Certificates and Certifications Submittals: Submit 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. Provide a notarized signature where indicated.
2. 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.
3. 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.
4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
6. 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.

H. Test and Research Reports:

1. 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.
2. 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.
3. 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.
4. 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.
5. 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.
6. 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. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.
 - e. Description of product.
 - f. Test procedures and results.
 - g. Limitations of use.

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1.8 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 insufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file 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.

1.9 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include 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.
 - 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.10 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architects notations will not be made in contrasting color, but will be encircled or noted in some other way to distinguish from original submittal. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
 - 1. Final Unrestricted Release: Where submittal is marked "**NO EXCEPTIONS TAKEN**" the Work covered by the submittal may proceed provided it complies with the Contract Documents. Final acceptance will depend on that compliance.
 - 2. Final-but-Restricted Release: Where submittal is marked "**FURNISH AS CORRECTED**," the work covered by the submittal may proceed provided it complies with both Architect's notations and corrections on the submittal and the Contract Documents. Final acceptance will depend on that compliance.
 - 3. Restricted Release: Where submittal is marked "**FURNISH AS CORRECTED/RESUBMIT**," the work covered by the submittal may proceed expeditiously, provided it complies with both Architect's notations and corrections on the submittal and the Contract Documents. Revise submittal for record according to Architect's

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notations and corrections and resubmit for Architect's action. Final acceptance will depend on final unrestricted release action and compliance stated above. Where noted additionally as **"FOR RECORD ONLY,"** provide record copy of submittal revised according to Architect's notations. Architect's action in requesting record copy shall be Final-But-Restricted Release, as noted above.

4. Returned for Resubmittal: Where submittal is marked **"REVISE AND RESUBMIT,"** do not proceed with the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity for the product submitted. Revise or prepare a new submittal according to Architect's notations and corrections.
 5. Rejected: Where the submittal is marked **"REJECTED/RESUBMIT,"** do not proceed with the Work covered by the submittal. Prepare a new submittal for a product or system that complies with the Contract Documents.
-
- B. Architect will review each submittal and will return it if it does not comply with requirements. Architect will upload the returned submittal and forward a transmittal to appropriate party.
 - C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
 - D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
 - E. Architect will return without review submittals received from sources other than Contractor.
 - F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-assurance and quality-control requirements for individual work results are specified in their respective Specification Sections. Requirements in individual Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-assurance and quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.
 - 4. Specific test and inspection requirements are not specified in this Section.

1.3 DEFINITIONS

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

- D. Mockups: Full-size physical assemblies that are constructed on-site either as freestanding temporary built elements or as part of permanent construction. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.
1. Laboratory Mockups: Full-size physical assemblies constructed and tested at testing facility to verify performance characteristics.
 2. Integrated Exterior Mockups: Mockups of the exterior envelope constructed on-site as freestanding temporary built elements consisting of multiple products, assemblies, and subassemblies.
 3. Room Mockups: Mockups of typical interior spaces complete with wall, floor, and ceiling finishes; doors; windows; millwork; casework; specialties; furnishings and equipment; and lighting.
- E. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- F. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- G. Source Quality-Control Tests: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.
- H. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- I. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- J. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.

1.4 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 Architect.

1.5 CONFLICTING REQUIREMENTS

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

1.6 ACTION SUBMITTALS

- A. Shop Drawings: For integrated exterior mockups.
 - 1. Include plans, sections, and elevations, indicating materials and size of mockup construction.
 - 2. Indicate manufacturer and model number of individual components.
 - 3. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.
- B. Delegated-Design Services Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement 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, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.7 INFORMATIONAL SUBMITTALS

- A. Contractor's Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Qualification Data: For Contractor's quality-control personnel.
- C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility submitted to authorities having jurisdiction before starting work on the following systems:
 - 1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections.
 - 2. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
- D. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

- E. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
 - 1. Specification Section number and title.
 - 2. Entity responsible for performing tests and inspections.
 - 3. Description of test and inspection.
 - 4. Identification of applicable standards.
 - 5. Identification of test and inspection methods.
 - 6. Number of tests and inspections required.
 - 7. Time schedule or time span for tests and inspections.
 - 8. Requirements for obtaining samples.
 - 9. Unique characteristics of each quality-control service.
- F. Reports: Prepare and submit certified written reports and documents as specified.
- G. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.8 CONTRACTOR'S QUALITY-CONTROL PLAN

- A. Quality-Control Plan, General: Submit quality-control plan within 10 days of Notice to Proceed, and not less than five days prior to preconstruction conference. Submit in format acceptable to Architect. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's Construction Schedule.
- B. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
 - 1. Project quality-control manager may also serve as Project superintendent.
- C. Submittal Procedure: Describe procedures for ensuring compliance with requirements through review and management of submittal process. Indicate qualifications of personnel responsible for submittal review.
- D. Testing and Inspection: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
 - 1. Contractor-performed tests and inspections including Subcontractor-performed tests and inspections. Include required tests and inspections and Contractor-elected tests and inspections. Distinguish source quality-control tests and inspections from field quality-control tests and inspections.
 - 2. Special inspections required by authorities having jurisdiction and indicated on the Statement of Special Inspections.
 - 3. Owner-performed tests and inspections indicated in the Contract Documents.
- E. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and

inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups.

- F. Monitoring and Documentation: Maintain testing and inspection reports including log of approved and rejected results. Include work Architect has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.

1.9 REPORTS AND DOCUMENTS

- A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, telephone number, and email address of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.
 - 7. Identification of product and Specification Section.
 - 8. Complete test or inspection data.
 - 9. Test and inspection results and an interpretation of test results.
 - 10. Record of temperature and weather conditions at time of sample taking and testing and inspection.
 - 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 - 12. Name and signature of laboratory inspector.
 - 13. Recommendations on retesting and reinspecting.
- B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
 - 1. Name, address, telephone number, and email address of technical representative making report.
 - 2. Statement on condition of substrates and their acceptability for installation of product.
 - 3. Statement that products at Project site comply with requirements.
 - 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 - 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 - 6. Statement whether conditions, products, and installation will affect warranty.
 - 7. Other required items indicated in individual Specification Sections.
- C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Name, address, telephone number, and email address of factory-authorized service representative making report.
2. Statement that equipment complies with requirements.
3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
4. Statement whether conditions, products, and installation will affect warranty.
5. Other required items indicated in individual Specification Sections.

1.10 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- G. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E 329 and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
- H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

- I. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- J. Preconstruction Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:
 - 1. Contractor responsibilities include the following:
 - a. Provide test specimens representative of proposed products and construction.
 - b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
 - c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
 - d. Build site-assembled test assemblies and mockups using installers who will perform same tasks for Project.
 - e. Build laboratory mockups at testing facility using personnel, products, and methods of construction indicated for the completed Work.
 - f. When testing is complete, remove test specimens and test assemblies, and mockups do not reuse products on Project.
 - 2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect with copy to Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.
- K. Mockups: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish required to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups of size indicated.
 - 2. Build mockups in location indicated or, if not indicated, as directed by Architect.
 - 3. Notify Architect seven days in advance of dates and times when mockups will be constructed.
 - 4. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed to perform same tasks during the construction at Project.
 - 5. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 6. Obtain Architect's approval of mockups before starting corresponding work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 - 7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 8. Demolish and remove mockups when directed unless otherwise indicated.
- L. Integrated Exterior Mockups: Construct integrated exterior mockup as directed by the architect. Coordinate installation of exterior envelope materials and products for which mockups are required in individual Specification Sections, along with supporting materials. Comply with requirements in "Mockups" Paragraph.

- M. Laboratory Mockups: Comply with requirements of preconstruction testing and those specified in individual Specification Sections.

1.11 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 - 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of types of testing and inspection they are engaged to perform.
 - 2. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.
 - 1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 - 2. Engage a qualified testing agency to perform quality-control services.
 - a. Contractor shall not employ same entity engaged by Owner, unless agreed to in writing by Owner.
 - 3. Notify testing agencies at least 48 hours in advance of time when Work that requires testing or inspection will be performed.
 - 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 - 5. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 - 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- D. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
 - 1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 - 2. Determine the locations from which test samples will be taken and in which in-situ tests are conducted.
 - 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.

4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform duties of Contractor.
- E. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."
- F. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.
- G. Associated Contractor Services: Cooperate with agencies and representatives performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.
 5. Delivery of samples to testing agencies.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency.
 7. Security and protection for samples and for testing and inspection equipment at Project site.
- H. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality-control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspection.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- I. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents. Coordinate and submit concurrently with Contractor's Construction Schedule. Update as the Work progresses.
1. Distribution: Distribute schedule to Owner, Architect testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.12 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 6. Retesting and reinspecting corrected work.
- B. Special Tests and Inspections: Conducted by a qualified testing agency as required by authorities having jurisdiction, as indicated in individual Specification Sections, and as follows:
1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
 2. Notifying Architect and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 3. Submitting a certified written report of each test, inspection, and similar quality-control service to Architect with copy to Contractor and to authorities having jurisdiction.
 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 6. Retesting and reinspecting corrected work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to Architect.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's reference during normal working hours.
1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Contractor to provide the following:
 - 1. Temporary porte-john bathroom and hand washing facilities as required for their workers. Existing facilities are not to be used by the Contractor workers.
 - 2. Provide dumpsters as required for all Contractor's trash. Use of the Owner's dumpsters is prohibited.
 - 3. Contractor can use power from the building as required. There will be no metering of the power used to complete the project. Any generators that may be required for temporary power shall be provided by this Contractor.
 - 4. Contractor to provide temporary construction fencing as per the site logistics plan for their laydown area. Fencing to be 6 ft chain link on ballasted pedestals. Contractor is responsible for security of all their equipment, tools, materials, etc. stored on site. Contractor is responsible to protect the existing pavement from any damage while in use.
 - 5. There is an existing roof hatch to the roof the Contractor can use as needed. Any ladders or scaffolding needed to access the roof shall be provided under this contract.
 - 6. Contractor to provide any equipment needed to hoist materials on to the roof.
 - 7. Contractor's workers are allowed to use the existing parking lot to park during construction

End of Section 015000

SECTION 01 7329 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes procedural requirements for cutting and patching.
 - 1. Cutting and patching shall not relieve the Contractor from meeting the requirements of Division 01 Sections for coordination of the Work.
- B. Related Sections include the following:
 - 1. Division 01 Section "Multiple Contract Summary" for coordination of cutting and patching.
 - 2. Division 01 Section "Selective Structure Demolition" for demolition of selected portions of the building.
 - 3. Divisions 02 through 49 Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.
 - 4. Division 07 Section "Penetration Firestopping" for patching fire-rated construction.

1.3 DEFINITIONS

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

1.4 SUBMITTALS

- A. Cutting and Patching Proposal: Submit a proposal describing procedures at least 10 days before the time cutting and patching will be performed, requesting approval to proceed. Include the following information:
 - 1. Extent: Describe cutting and patching, show how they will be performed, and indicate why they cannot be avoided.
 - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building's appearance and other significant visual elements.
 - 3. Products: List products to be used and firms or entities that will perform the Work.
 - 4. Dates: Indicate when cutting and patching will be performed.

5. Utility Services and Mechanical/Electrical Systems: List services/systems that cutting and patching procedures will disturb or affect. List services/systems that will be relocated and those that will be temporarily out of service. Indicate how long services/systems will be disrupted.
 6. Structural Elements: Where cutting and patching involve adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with original structure.
 7. Architect's Approval: Obtain approval of cutting and patching proposal before cutting and patching. Approval does not waive right to later require removal and replacement of unsatisfactory work.
- B. Qualified Tradesmen: Submit qualifications of tradesmen performing cutting and patching of specified exposed work listed in "Quality Assurance".

1.5 QUALITY ASSURANCE

- A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.
- B. 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. Operating elements include the following:
1. Primary operational systems and equipment.
 2. Air or smoke barriers.
 3. Fire-suppression systems.
 4. Mechanical systems piping and ducts.
 5. Control systems.
 6. Communication systems.
 7. Conveying systems.
 8. Electrical wiring systems.
 9. Operating systems of special construction in Division 13 Sections.
- C. Moisture Envelope Elements: Do not cut and patch moisture envelope elements or related components in a manner that could diminish their weather resistive capacity that results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety. Moisture envelop elements include the following:
1. Roofing.
 2. Waterproofing.
 3. Other water, moisture, or vapor barriers.
 4. Membranes and flashings.
 5. Exterior curtain-wall or storefront construction.
 6. Exterior Insulation Finish Systems.
- D. Miscellaneous Elements: Do not cut and patch miscellaneous elements or related components in a manner that could change their load-carrying capacity that results in reducing their capacity to perform as intended, or that result in increased maintenance or decreased operational life or safety. Miscellaneous elements include the following:
1. Equipment supports.

2. Piping, ductwork, vessels, and equipment.
 3. Noise- and vibration-control elements and systems.
- E. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- F. When possible, retain original Installer or fabricator to cut and patch exposed Work listed below. When original installer or fabricator cannot be identified or located, employ fabricator or installer authorized by original manufacturer or experienced in the installation, cutting and patching of same materials.
1. Processed concrete finishes, including cast stone and simulated stone.
 2. Roofing.
 3. Firestopping.
 4. Storefronts.
 5. Window wall systems.
 6. Exterior Insulation Finish Systems.
- G. Cutting and Patching Conference: Before proceeding, meet at Project site with parties involved in cutting and patching, including mechanical and electrical trades and masonry trade contractor. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.
- 1.6 WARRANTY
- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible. Use only materials that will maintain existing warranties.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
 - 1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with in-place finishes or primers.
 - 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Temporary Support: Provide temporary support of Work to be cut.
- B. 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.
- C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- D. 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 minimize interruption to occupied areas.

3.3 PERFORMANCE

- A. 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. 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 as small as possible, neatly to 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. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.

5. 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.
 6. Proceed with patching after construction operations requiring cutting are complete.
- C. 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 possible. Provide materials and comply with installation requirements specified in other Sections.
1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate 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 eliminate evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform elevation, plane, color and appearance.
 - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over the patch and apply final paint coat over entire unbroken surface plane containing the patch. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.
- D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

END OF SECTION 01 7329

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final completion procedures.
 - 3. Warranties.
 - 4. Final cleaning.
 - 5. Repair of the Work.
- B. Related Requirements:
 - 1. Section 013233 "Photographic Documentation" for submitting final completion construction photographic documentation.
 - 2. Section 017823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
 - 3. Section 017839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 4. Section 017900 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

1.3 ACTION SUBMITTALS

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

1.4 CLOSEOUT SUBMITTALS

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

- C. Field Report: For pest control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

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

1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Where phases or portions of the Work are indicated with completion dates as indicated in Division 01 Section "Summary" and/or on the drawings, the provisions of this article shall apply to each phase or portion of the work so identified.
- B. 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.
- C. 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 Owner 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 01 Sections, including project record documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
 - 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Owner Representative. Label with manufacturer's name and model number.
 - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner Representative signature for receipt of submittals.
 - 5. Submit testing, adjusting, and balancing records.
 - 6. Submit sustainable design submittals not previously submitted.
 - 7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- D. 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 Owner of pending insurance changeover requirements.

2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner'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 Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
 6. Advise Owner of changeover in utility services.
 7. Participate with Owner 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.
 10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- E. 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, Architect and Owner Representative will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 - a. If more than one reinspection is required for Substantial Completion, the Owner will deduct from the Contract Sum, the Architects fees for additional services.
 2. Results of completed inspection will form the basis of requirements for final completion.

1.7 FINAL COMPLETION PROCEDURES

- A. Where phases or portions of the Work are indicated with completion dates as indicated in Division 01 Section "Summary" and/or on the drawings, the provisions of this article shall apply to each phase or portion of the work so identified.
- B. Submittals Prior to Final Completion: Before requesting final inspection for determining final completion, complete the following:
1. Submit a final Application for Payment according to Section 012900 "Payment Procedures."
 2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. 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.
 5. Submit final completion photographic documentation.

- C. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the work will be completed and ready for final inspection and tests. On receipt of request, Architect and Owner Representative will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 - 1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 - a. If more than one reinspection is required for Final Completion, the Owner will deduct from the Contract Sum, the Architects fees for additional services.

1.8 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. Include the following information at the top of each page:
 - a. Project name.
 - b. Date.
 - c. Name of Architect and Owner Representative.
 - d. Name of Contractor.
 - e. Page number.
 - 4. Submit list of incomplete items in the following format:
 - a. MS Excel electronic file. Architect, through Owner Representative, will return annotated file.
 - b. PDF electronic file. Architect, through Owner Representative, will return annotated file.
 - c. Web-based project software upload. Utilize software feature for creating and updating list of incomplete items (punch list).
 - d. Three paper copies. Architect, through Owner Representative, will return two copies.

1.9 SUBMITTAL OF PROJECT WARRANTIES

- A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

- B. Partial Occupancy: Submit properly executed warranties within 15 days of completion of designated portions of the Work that are completed and occupied or used by Owner during construction period by separate agreement with Contractor.
- C. Organize warranty documents into an orderly sequence based on the table of contents of Project Manual.
- D. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.
 - 1. Submit by email to Architect.
- E. Warranties in Paper Form:
 - 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.
- F. 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 not planted, mulched, or 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.
 - 1) Use sweeping compounds to control dust.
 - 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. 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 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 ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection.
 - 1) Clean HVAC system in compliance with NADCA ACR. Section 230130.51 "HVAC Air-Distribution System Cleaning." Provide written report on completion of cleaning.
 - p. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency.
 - q. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.

- D. Construction Waste Disposal: Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls." Section 017419 "Construction Waste Management and Disposal."
- E. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

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 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 017700

Contractor Laydown area on paved playground. Provide temporary construction fencing. Contractors can park in the parking lot on site. Laydown area can be there from 6/17/26 through 8/14/26. Paving must be protected from any damage.

Site plan details include:

- Proposed Building Additions:** Elementary School Building (46,982 Sq. Ft.), Proposed Building Addition (17,256.10 Sq. Ft.), Proposed Building Addition (17,256.10 Sq. Ft.), Proposed Building Addition (17,256.10 Sq. Ft.).
- Parking:** Existing Parking, Proposed Parking, Parent Drop Off, Bus Loop Drop Off.
- Site Restoration (Laydown Areas):** 0.15 AC (TOTAL LOD = 2.78 AC), 0.66 AC (TOTAL LOD = 2.78 AC), 0.03 AC (TOTAL LOD = 2.78 AC), 0.10 AC (TOTAL LOD = 2.78 AC), 0.75 AC (TOTAL = 2.78 AC).
- Other Features:** Ball Field, Iron Pin (Found), Iron Pin, Bent (Found), Roadway Maintenance Activities = 0.83 AC, Twin Oaks Drive, Allston Road, Glen Arbor Road.
- Annotations:** CO-1, CO-2, CO-3, CO-4, CO-5, CO-6, CO-7, CO-8, CO-9, CO-10, CO-11, CO-12, CO-13, CO-14, CO-15, CO-16, CO-17, CO-18, CO-19, CO-20, CO-21, CO-22, CO-23, CO-24, CO-25, CO-26, CO-27, CO-28, CO-29, CO-30, CO-31, CO-32, CO-33, CO-34, CO-35, CO-36, CO-37, CO-38, CO-39, CO-40, CO-41, CO-42, CO-43, CO-44, CO-45, CO-46, CO-47, CO-48, CO-49, CO-50, CO-51, CO-52, CO-53, CO-54, CO-55, CO-56, CO-57, CO-58, CO-59, CO-60, CO-61, CO-62, CO-63, CO-64, CO-65, CO-66, CO-67, CO-68, CO-69, CO-70, CO-71, CO-72, CO-73, CO-74, CO-75, CO-76, CO-77, CO-78, CO-79, CO-80, CO-81, CO-82, CO-83, CO-84, CO-85, CO-86, CO-87, CO-88, CO-89, CO-90, CO-91, CO-92, CO-93, CO-94, CO-95, CO-96, CO-97, CO-98, CO-99, CO-100.

Chatham Park Elementary Solar Array Project

Roofing Requirements 11/7/25

Contractor to coordinate all requirements with Johns Manville (JM) prior to doing any work on the roof and obtain written approval from JM to submit to the owner/architect for review. This coordination must be done and written approval must be submitted no later than 90 days after the Notice to Proceed is issued.

The below document from JM's website:

PV Installation and Reference Guide

https://www.jm.com/content/dam/jm/global/en/commercial-roofing/Installation-Application_Guides/rs-9346-jm-photovoltaic-installation-and-reference-guide.pdf

A few keys points from the document:

- Ballasted PV arrays often use concrete pavers or blocks to create wind uplift resistance. Use high density concrete that has been tested to not break down under the stress of sunlight and freeze/thaw. **Check ballasted systems to determine that the point load at each roof interface is appropriate for the type of roof system.**
- On ballasted PV array installations, install a **compatible protection sheet at PV mounting contact points** to protect the primary waterproofing membrane from premature wear and degradation. Recommended protection sheet materials include **JM DynaTred® walkway pads** or DynaLastic® polyester reinforced modified bitumen cap sheets for bituminous systems and **JM walkpad material or a minimum 60 mil single ply membrane of the same type as the primary waterproofing membrane for single ply systems.** The color of the protection sheet should match the primary membrane
- Ballasted systems should not impede the flow of drainage. A minimum height of 1"-2" above the roof surface is recommended. All systems should allow water to drain completely within 48 hours of a precipitation event.
- Projections through the roof system should not be located within 2' of valleys or drainage collection points adjacent to drains, scuppers or gutters.

- On single ply membranes, thoroughly examine and **strip in all seams with a membrane appropriate cover strip in areas where the PV array will conceal access.**
- JM recommends the weight at the point of contact on single ply roofs over standard polyisocyanurate insulation and bituminous systems **not exceeding 25 pounds per square foot.**
- When a PV system is being installed, review and understand your responsibilities as outlined in JM's Peak Advantage® Guarantee Photovoltaic Overburden Waiver, which includes but is not limited to the following:
 - The JM Guarantee does not cover any leaks, changes in appearance, damage or loss of performance in the roofing system resulting from the installation, operation or presence of a PV system on the roofing system.
 - JM is not responsible for any claims related to the JM Guarantee that are attributable, either in whole or in part, to the installation, operation and/or presence of a PV system. Should the removal of any part of the PV system be required to complete repairs, whether covered by the JM Guarantee or not, these costs shall be the owner's responsibility and are not covered.
 - JM does not guarantee or approve the suitability, installation or performance of any PV system or component.

**VOLUME II
PROJECT MANUAL**

CHATHAM ELEMENTARY PARK SCHOOL

**SOLAR ARRAY PROJECT
ELECTRICAL CONSTRUCTION**

**PREPARED FOR:
HAVERFORD TOWNSHIP SCHOOL DISTRICT
DELAWARE COUNTY, PENNSYLVANIA**

ELECTRICAL CONSTRUCTION

**ISSUED FOR BID
NOVEMBER 7, 2025**

**PREPARED BY:
CELENTANO ENERGY SERVICES
7821 FLOURTOWN AVE.
WYNDMOOR, PA 19038**

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481500 SOLAR ENERGY ELECTRICAL POWER GENERATION SYSTEM

BID FORM - ELECTRICAL CONSTRUCTION - CONTRACT

DATED: _____
(Bidder to insert date bid submitted)

Bidder's Name | Address (Print or Type)

Antony Testa | Business Manager

School District of Haverford Township

50 East Eagle Road

Havertown, PA 19083

POC Email Address

POC Phone Number

To Whom It May Concern:

This Bid is submitted in accordance with your Advertisement inviting Bids to be received for the he Chatham Park Elementary Solar Array Project School District of Haverford Township, Havertown, PA.

Having carefully examined the Contract Documents as defined in Article 1 of the Agreement, bound in the Specifications, and including the Addenda enumerated in the Bid, which are incorporated with these documents indicating various conditions affecting this Contract, the undersigned herein agrees to furnish all materials, perform all labor and do all else necessary to complete the Contract for the above named Project in accordance with said Contract Documents for:

Total Base Bid Project Cost for 400 kW_{dc} Solar PV System

_____ DOLLARS (\$_____).

If the actual size of the system approved by PECO and installed by the Bidder is smaller or larger than 400 kW_{dc}, then the Contract Sum will be adjusted by the unit price per / kW_{dc} larger or smaller.

The Unit Price for this Base Bid is the Bid total shown above divided by 400 kW_{dc} Solar PV System capacity, which equals:

_____ DOLLARS /kW_{dc} (\$_____).

ALTERNATES: The Instructions to Bidders and the Contract Documents comprising the plans and specifications, and all documents bound therewith, together with all Addenda thereto, shall apply to all Alternate Bids as listed in Division 1 Section "Alternates", and as listed below:

Accompanying this Bid is a certified check, or Bid Bond required by the Instructions to Bidders which is deposited as a bid guarantee and is to be retained by you and applied as provided in the Instructions to Bidders in case the undersigned shall default in its obligations following receipt of a Notice of Intent to Award.

The undersigned hereby certifies that this Bid is genuine, and is not a sham or collusive, or made in the interest of, or on behalf of any person, firm or corporation not herein named, and that the undersigned has not directly or indirectly induced or solicited any bidder to refrain from bidding and that the undersigned has not in any manner sought by collusion to secure for itself, any advantages over any other bidder.

The undersigned, intending to be legally bound, agrees that this Bid shall be irrevocable and shall remain subject to your acceptance for 60 days after the date set for bid opening, except as provided by the Commonwealth Procurement Code, which provides for possible extensions of the holding period.

It is understood that the School District of Haverford Township reserves the right to reject any or all Bids or Proposals, or parts thereof, or items thereof, and to waive technicalities required for the best interests of the Owner.

The undersigned submits this Bid with the full knowledge of the Contract requirements and hereby agrees that Work of the Project, under this Contract shall **be started by June 30, 2026 and substantially completed by December 31, 2026 by having the final electrical inspection approval (Milestone #8).** Completion of each of the project phases by the Milestone dates designated in the Contract Documents are considered milestones to the overall schedule and are subject to the provisions of Article 8 - "Time" of the AIA A201 General Conditions of the Contract for Construction. **The contract durations stated herein shall be the essence of the Contract.**

The Bidder agrees that it will not assign its Bid or any of its rights or interests hereunder without written consent of the Owner.

THE BID FORM AND THE FOLLOWING ATTACHMENTS SHALL BE SUBMITTED:

- | | | |
|----|---------|---|
| 1. | One (1) | Bid Security |
| 2. | Two (2) | Non-Collusion Affidavit |
| 3. | Two (2) | Affidavit Accepting Provisions of the Workman's Compensation Acts |
| 4. | Two (2) | Contractor's Qualification Statement (AIA Document A305) |

SIGNATURES

IN WITNESS WHEREOF, the undersigned has caused this Bid to be executed as of the day and year indicated on the first page hereof.

For Individual Bidder

Name of Bidder (Printed)

Witness By: _____
(Signature of Individual)

Trading and doing business as * _____

Business Address _____

*If a fictitious or trade name is employed in the conduct of business, insert name here:

Next, complete, by deletion as appropriate, the following statement:

Foregoing fictitious or trade name (has) (has not) been registered by the individual proprietorship under Pennsylvania Law.

For Partnership Bidder

* _____
(Name of Partnership)

Name of General Partner (Printed)

Witness By: _____
(Signature of General Partner)

Business

Address _____

The Partners constituting the Partnership herein named are:

Partner _____ Address _____

SIGNATURES

IN WITNESS WHEREOF, the undersigned has caused this Bid to be executed as of the day and year indicated on the first page hereof.

Partner _____ Address _____

Partner_____Address_____

Partner_____Address_____

[Add additional lines for the names and addresses of additional Partners, if there are more than four Partners in the Partnership, by attaching an additional page or pages to this Bid.]

*If a fictitious or trade name is employed by the Partnership in conduct of its business, insert name here:

Next, complete, by deletion as appropriate, the following statement:

Foregoing fictitious or trade name (has) (has not) been registered by the partnership under Pennsylvania Law.

For Corporate Bidder

(Name of Corporation)

By:_____Attest:_____

____ Signature of President, Vice President,
or other authorized representative *

Signature of Secretary, Assistant Secretary,
Treasurer, Assistant Treasurer or other
authorized representative **

(CORPORATE SEAL)

Business

Address_____

* If a representative other than the President or a Vice President of the Corporation signs this Bid on its behalf, then attach a valid corporate resolution or other appropriate proof, dated prior to or as of the date of the Bid, evidencing authority to execute this Bid on behalf of the Corporation.

** If a representative other than the Secretary, an Assistant Secretary, the Treasurer or an Assistant Treasurer attests to the signature of the corporate representative, then attach a valid corporate

resolution or other appropriate proof, dated prior to or as of the date of the Bid, evidencing authority to attest to the execution of this Bid on behalf of the Corporation.

(1) Complete the following statement:

The Corporation has been organized and is existing under laws of the State/Commonwealth of

(2) If the Corporation has been organized under laws of a State other than those of the Commonwealth of Pennsylvania, complete, by deletion as appropriate, the following statement:

The Corporation (has) (has not) been granted a certificate of authority to do business in the Commonwealth of Pennsylvania under applicable laws.

(3) If the Corporation has been organized under laws other than those of the Commonwealth of Pennsylvania and has NOT been granted a certificate of authority, complete, by deletion as appropriate, the following statement:

The Corporation (has) (has not) applied for a certificate of authority to do business in the Commonwealth of Pennsylvania and (has) (has not) attached a copy of the pending application to this Bid.

For Limited Liability Company (LLC) Bidder

[Name of Contractor]

(Print Name of Limited Liability Company)

Attest: _____ By: _____
Signature of an authorized representative* Signature of an authorized representative**

* The individual attesting verifies and represents that the person whose signature is affixed to this Bid on behalf of the Limited Liability Company (LLC) is duly authorized in accordance with the representations hereafter set forth.

** Check the box which applies to this Bid:

☐ The Certificate of Organization provides that the LLC is to be managed by managers, and this Bid has been executed by a Manager fully authorized by the Certificate, by the Operating Agreement and by

Resolutions of the LLC. Copies of the relevant documents are provided with the Bid or can be provided upon request within three (3) working days.

- ☐ The Certificate of Organization does not provide that LLC is to be managed by managers, and this Bid has been executed by a Member fully authorized by the Certificate, by the Operating Agreement and by Resolutions of the LLC. Copies of the relevant documents are provided with the Bid or can be provided upon request within three (3) working days.
- ☐ This Bid has been executed by a representative of the LLC who is not a Manager or a Member of the LLC, and instead who holds the office of _____ (insert title), and the execution of this Bid is fully authorized by the Certificate, by the Operating Agreement and by Resolutions of the LLC. Copies of the relevant documents are provided with the Bid or can be provided upon request within three (3) working days.

The Bidder and the individuals signing and attesting to the execution of this document further represent that (1) execution of the Bid is carrying on business in the usual way; (2) the LLC authorizes the execution of this Bid even if execution and submission of this Bid is not carrying on business in the usual way for the LLC; and (3) to the best of the individuals' information and belief, the Owner has no knowledge of the Member's or the Manager's lack of actual authority, or of any applicable and relevant restriction on his or her authority.

Complete the following statement:

The LLC has been organized and is existing under laws of the State/Commonwealth of:

If the LLC has been organized under laws of a State other than those of the Commonwealth of Pennsylvania, complete, by deletion as appropriate, the following statement:

The LLC (has) (has not) been granted a certificate of authority to do business in the Commonwealth of Pennsylvania under applicable laws.

If the LLC has been organized under laws other than those of the Commonwealth of Pennsylvania and has NOT been granted a certificate of authority, complete, by deletion as appropriate, the following statement:

The LLC (has) (has not) applied for a certificate of authority to do business in the Commonwealth of Pennsylvania and (has) (has not) attached a copy of the pending application to this Bid.

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Project information.
 2. Work covered by Contract Documents.
 3. List of Drawings
 4. Milestone Schedule.
 5. Work under Owner's separate contracts.
 6. Contractor's use of site and premises.
 7. Coordination with occupants.
 8. Work restrictions.
 9. Specification and Drawing conventions.
- B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
2. Section 017300 "Execution" for coordination of Owner-installed products.

1.3 PROJECT INFORMATION

The following is information related to the Project.

Project Location: Chatham Park Elementary School
400 Allston Road, Havertown, PA 19083

Owner: School District of Haverford Township
East Eagle Road, Havertown, PA 19083

Contact: Anthony R. Testa, PCSBO
Business Manager/Board Secretary
O 610-853-5900 x7106
atesta@haverfordsd.net

Owner's Representative: C.B. Development Services, Inc.
Aldan Ave. FRNT
PO Box 1127
Glen Mills, PA 1934

Contact: Ken Matthews
Kmatthews@cbdsi.com
M 610-453-0469

Project Consultants:

Solar Consultant
Celentano Energy Services
7821 Flourtown Road.
Wyndmoor, PA 19038

Contact: Ron Celentano
ron.celentano55@gmail.com
M 215)-740-0439

Structural Engineer
KCBA Solar Consultants
8 East Broad Street
Hatfield, PA 19440-2401

1.4 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:

1. General Overview

The project encompasses the design, furnishing, installation, connection, testing, and commissioning of a complete solar energy electrical power generation system at Chatham Park Elementary School. The Contractor shall assume full Design-Build responsibility for the complete installation, testing, commissioning, and start-up of a grid-tied, interactive, net-metered solar photovoltaic (PV) system to be located on the school's roof.

2. Basis of Design

The basis of design is a solar array intended to utilize all available roof space, resulting in an estimated system capacity of 400,710 watts DC. The proposed design includes 703 Q-CELL 570-watt PV modules mounted on the Iron Ridge BX System 5° racking with 10-inch interrow spacing. The Contractor's final design shall provide an installed capacity

ranging from 300 kW DC to 400 kW DC, incorporating all required engineering, permitting, and utility coordination. If the PECO-approved and installed system is larger or smaller than the awarded size, then the Contract Sum will be adjusted up or down by the Unit Price to reflect the actual approved and installed system size.

3. Design and Documentation Requirements

The scope of work includes preparation of:

- Final design drawings and calculations
- Utility interconnection and net-metering applications
- Municipal permitting documents and coordination with reviewing agencies

All work shall comply with applicable codes, standards, and manufacturer requirements, ensuring that the installation maintains the existing roof warranty.

4. Equipment and System Components

The Contractor shall furnish and install all major components required for a fully functional PV system, including:

- PV modules, racking systems, and inverters
- Inverter combiner panels and interconnection wiring
- A local monitoring system with a web-based interface at no cost for the life of the system.

Additionally, the Contractor shall complete all necessary electrical modifications to the existing distribution system—such as conduit, wiring, and protective devices—to safely integrate the PV system.

5. Utility Coordination and Interconnection

The Contractor shall coordinate directly with the serving Utility to establish the net-metering connection. All system components, installation methods, and documentation shall conform to utility interconnection standards and requirements for approval. If the utility requires additional payments for engineering studies and/or equipment upgrade, these cost will be paid by the Owner.

6. Incentive and Grant Documentation

The Contractor shall provide the Owner with all required documentation to:

- Support rebate processing under the Inflation Reduction Act (IRA)
- Ensure full compliance with the PA Solar for Schools Grant Program
- Facilitate grant approval, reimbursement, and payment

7. Permits, Fees, and Approvals

The Contractor is responsible for obtaining all required utility application fees, permits, inspections for the code compliant installation and commissioning of the system.

Owner shall pay directly or reimburse the Contractor with no mark up for all required permits and utility interconnection application fees.

8. Testing, Commissioning, and Project Closeout

Upon completion, the Contractor shall perform all testing and commissioning required to verify the PV system's proper operation. The Contractor shall provide:

- As-built drawings
- Operation and maintenance manuals
- Warranty certificates and system documentation

The system shall be fully operational, code-compliant, and capable of delivering reliable renewable energy to Chatham Park Elementary School.

9. Base Bid

The Bidder shall provide a Total Base Bid representing the complete cost of all labor, materials, equipment, services, and documentation required to furnish and install a 400 kWdc solar photovoltaic (PV) system as described in this Scope of Work. The Base Bid shall include all costs necessary for a fully operational, code-compliant, grid-tied PV system.

The Total Base Bid does NOT include electrical upgrades required by the utility provider, state of installation, and/or other authority having jurisdiction.

The Total Base Bid Project Cost shall be clearly stated in both words and numerals, representing the lump sum price for the total installation. For cost evaluation and potential adjustment based on final system size, the Bidder shall also provide a unit price per installed kWdc. This unit price shall be determined by dividing the total based bid amount by 400, establishing a standardized \$/kWdc rate applicable to any variation in final system capacity resulting from the approved design.

The final payment to the selected Contractor will be calculated based on the final approved design capacity (in kWdc) multiplied by the accepted unit price. This ensures that compensation accurately reflects the as-built system size and provides a transparent basis for cost verification.

10. Alternate Bid EC-1 Bid

In addition to the Base Bid, the Bidder shall submit an Alternate EC-1 Bid representing the amount by which the Base Bid will be reduced to furnish and install a 300 kWdc solar PV system in lieu of the 400 kWdc system.

DEDUCT Alternate EC-1 shall also be expressed in both words and numerals, covering all equipment, labor, materials, and related work for the reduced-capacity system. The Bidder shall calculate and provide a corresponding unit price per kWdc, determined by dividing the sum of the base bid minus the deduct alternate by 300.

As with the Base Bid, the final lump-sum payment under this alternate will be based on the final design capacity multiplied by the approved unit price. This approach ensures consistency, fairness, and proportional pricing should the Owner elect to proceed with the alternate system size.

11. Alternates

Alternate EC-1: 300 kWdc Solar PV System

- Base Bid: 400 kWdc Solar PV System
- Alternate Bid: 300 kWdc Solar PV System

Scope: This alternate reduces the total system capacity from 400 kWdc to 300 kWdc, including the corresponding reduction of solar array modules, racking, inverter capacity, and associated AC conductors and devices required for system interconnection on the line side of the electrical service.

References: As specified in Divisions 26 and 48.

Drawings: Refer to “Alternate EC-1” shown on Base Bid Solar Array Layout Drawing PV.1.

12. Drawings

The drawings are a Basis of Design for the Contractor to use in developing the PECO Utility Interconnection and Township Permit application. The following drawings are included:

Chatham Park ES ARRAY LAYOUT PV.1 110725

The array layout shows a complete build-out of the roof, excluding sections with extensive shade. The drawing includes two clouds on several roofs where PV modules are to be removed to reduce the array from 400 kWdc to 300 kWdc for the EC-1 Alternate.

Chatham Park ES SLD PV.2 110725

The single line diagram (SLD) drawing shows a basis of design line side interconnection to the electric service. The SLD shows a possible 480 / 277v array schematic design.

Additions and Renovations Project Drawings

The school completed an Additions and Renovations Project in August 2025. The construction drawings listed below are included as reference.

Chatham Park ES_RENOVATION_Overall Roof Plan_A1.7

Chatham Park ES_RENOVATION_Site Plan Electrical_E0.2

Chatham Park ES_RENOVATION_Power Riser Plan_E9.2

13. Solar PV Monitoring

The Solar PV Monitoring System shall provide a complete, web-based platform for tracking, recording, and reporting the performance of the photovoltaic power system installed on the facility rooftop. The system will be designed to ensure accurate data collection, long-term reliability, and easy access for the Owner and maintenance personnel.

The monitoring system will collect real-time and historical performance data from the array, inverters, production meters, and array groupings. It will measure parameters including DC and AC voltage, current, power, energy production (kWh), and system efficiency. Optional sensors will record solar irradiance and module temperature to provide enhanced performance analysis and fault detection. The system will automatically identify and report inverter errors, communication losses, and other operational anomalies through visual dashboards and email notifications.

1.5 Type of Contract:

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

1.6 LIST OF DRAWINGS

A. Drawings of the separately bound drawing set.

1. Chatham_PV.1_Array Layout_400KW
2. Chatham_PV.2_SLD_400KW

B. Reference Building Drawings Additions and Renovations to Chatham Park
Elementary School Issued May 3, 2024

1. 3691_Chatham Park ES_Arch Combined Conformed
2. 3691_Chatham Park ES_Electrical Drawings

1.7 WORK MILESTONES AND TIME OF COMPLETION

A. The Work shall be conducted with **Milestone Dates**. Contractor to provide dates to assure work Commences prior to July 1, 2026 and Permission to Operate issued no later than December 31, 2026.

B. Milestone Dates - Work to be complete no later than date listed, unless otherwise noted

Milestones based on Notice to Proceed date of December 5

1. Milestone 1: Submit Interconnection Application to PECO - 1/2/26
2. Milestone 2 – Receive PECO Approval to Install Letter – 3/1/26
3. Milestone 3: Submit Permit to Haverford Township – 4/1/26
4. **Milestone 4: Commence Physical Work On Site NO LATER THAN June 19, 2026**
5. Milestone 6: Shutdown for interconnection to Utility 8/1/26
6. Milestone 6- The entire system including all components installed and ready waiting on final commissioning and start up no later than August 14, 2026.
7. Milestone 7: System Start-up, Testing and Commissioning 11/1/26

8. Milestone 8: Electrical Inspection / Certification 11/15/26- This Milestone defines when the project is Substantially Complete.
9. Milestone 9: PECO Part 2 Application Submitted 11/16/26
10. **Milestone 10: PECO Meter Installation / Permission to Operate – 12/15/26
NO LATER THAN December 31, 2026**

1.8 CONTRACTOR’S USE OF SITE AND PREMISES

- A. Limits on Use of Site: Limit use of Project site to Work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
 1. Limits on Use of Site: Confine construction operations to Work areas and designated staging or laydown areas coordinated with the Owner and occupants.
 2. Driveways, Walkways and Entrances: Keep driveways loading areas, and entrances serving premises clear and available to Owner, Owner’s employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.
 - 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.
- B. 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.
- C. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.9 COORDINATION WITH OCCUPANTS

- A. Full Owner Occupancy: Owner will occupy Project site and building(s) during entire construction period. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner’s day-to-day operations. Maintain existing exits unless otherwise indicated.
 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 Owner and approval of authorities having jurisdiction.

2. Notify Owner not less than 72 hours in advance of activities that will affect Owner's operations.

1.10 WORK RESTRICTIONS

- A. Comply with restrictions on construction operations.
 1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work to between 6:00 a.m. to 5:00 p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction. Off hour work or weekend work may be required for shutdowns. Contractor to assume shut downs are off hours for base bid
- C. Existing Utility Shutdown / Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:
 1. Notify Owner not less than 1week in advance of proposed utility interruptions.
 2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.
 1. Notify Owner not less than two days in advance of proposed disruptive operations.
 2. Obtain Owner's written permission before proceeding with disruptive operations.
- E. Smoking and Controlled Substance Restrictions: Use of tobacco products, alcoholic beverages, and other controlled substances on Project site is not permitted.
- F. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.
 1. Maintain list of approved screened personnel with Owner's representative.

1.11 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:

1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
 3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
 4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 01 General Requirements: Requirements of Sections in Division 01 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 scheduled on Drawings and published as part of the U.S. National CAD Standard.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012215 - UNIT PRICES AND ALLOWANCES

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for unit prices and allowances.
 - 1. Selected materials and equipment and their installation are listed in this section. Allowances have been established to address changes resulting from unforeseen conditions requiring field modifications or additional work. No allowances are to be utilized without approval from Owner's Representative. Quantity Allowances shall include the cost of the material, fabrication, shop finishing and installation. The allowances are to be based on the quantities listed in this section and the established unit prices elsewhere. Additional requirements, if necessary, will be issued by Change Order.
- B. Include in the Contract Sum quantity allowances specified herein.
 - 1. Quantity allowances shall cover the cost to the Contractor material and equipment delivered at the site and costs for related labor for unloading, handling, installation, overhead, profit and other expenses contemplated for the stated quantities.
 - 2. Whenever required quantities are less than or greater than the specified amount, the Contract Sum shall be adjusted by change order using appropriate unit prices.
- C. Types of allowances include the following:
 - 1. Quantity allowances.
- D. Related Sections include the following:
 - 1. Divisions 26 and 48 Sections for items of Work covered by unit prices and allowances.

1.3 DEFINITIONS

- A. Unit price is an amount proposed by bidders, stated on the Bid Form, as a price per unit of measurement for materials or services added to or deducted from the Contract Sum by appropriate modification, if estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 QUANTITY ALLOWANCES

- A. Use the quantity allowance only as directed by Solar Consultant for Owner's purposes and only by written authorization that indicates amounts to be charged to the allowance.

- B. Contractor's overhead, profit, and related costs for products and equipment covered under the quantity allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.
- C. Materials covered by quantity allowances may only be incorporated into the work by written authorization from the Owner's Representative. Value of unused quantities shall be returned to Owner by Change Order before substantial completion.

1.5 PROCEDURES

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

1.6 SUBMITTALS

- A. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.
- B. Coordinate and process submittals for quantity allowance items in same manner as for other portions of the Work.

1.7 COORDINATION

- A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.7 EXAMINATION

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

3.8 PREPARATION

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

3.9 LIST OF UNIT PRICES AND ALLOWANCES FOR ELECTRICAL CONSTRUCTION CONTRACT

- A. Unit Price No. 1: Reduction in Solar PV Array Modules for base bid 400 kW
 - 1. Description: Base bid divided by 400
 - 2. Unit of Measurement: Dollars / kWdc based on Base Bid
- B. Unit Price No. 2: Reduction in Solar PV Array Modules for alternate 300 kW
 - 1. Description: Provide unit price for the deduct alternate 300 KW system. Should be the base bid minus the deduct alternate divided by 300.
 - 2. Unit of Measurement: Dollars/Kwdc

END OF SECTION 012215

SECTION 012300 - ALTERNATES

PART 1 - GENERAL

1.7 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.8 SUMMARY

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

1.9 DEFINITIONS

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

1.10 TIMING

- A. Selected alternates shall be accomplished within the same time frames established for the Work as defined in the Division 01 Section "Summary".
- B. Where indicated in alternate schedule, some alternate prices may be required after contract award. For each alternate so indicated, include in the amount proposed on the bidding form, costs necessary to hold the alternate price for time period indicated. Agreement shall include provision to allow Owner to elect, and include in Contract sum by Change Order, such alternates within time limits indicated.

1.11 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Notification: Immediately following award of the Contract, notify each party involved, in writing, of the status of each alternate. Indicate if alternates have been accepted, rejected, or deferred for later consideration. Include a complete description of negotiated modifications to alternates.
- C. Execute accepted alternates under the same conditions as other work of the Contract.
- D. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.
- E. Each prime contractor shall consider each alternate and provide a response on the bid form as indicated on the bid form and instructions to bidders. If a bidder indicates "Not Applicable" and the Owner accepts that alternate, the prime contractor indicating "Not Applicable" shall support the alternate scope without change in contract sum or time.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 SCHEDULE OF ALTERNATES

A. Deduct Alternate EC-1: 300 kWdc Solar PV System

1. Base Bid: 400 kWdc Solar PV System
2. Alternate Bid: 300 kWdc Solar PV System
3. Scope This alternate reduces from 400kWdc to 300kWdc the solar array and all associated racking, inverter size and AC conductors and devices associated with the systems interconnection to the line side of the electric service.
4. As specified in Division 26 and 48
5. Reference Alternate 1 roof area shown on Base Bid Solar Array Layout Drawing PV.2

This deduct should be the reduction of cost from the base bid to the cost to provide a 300 kWdc solar array.

END OF SECTION 012300

SECTION 017836 – WARRANTIES

PART 1 – GENERAL

1.1 SUMMARY

A. This Section specifies requirements for warranties, guarantees applicable to the Solar Photovoltaic (PV) System and related Work.

1. Provide warranties covering materials, equipment, and workmanship for the complete solar photovoltaic (PV) system installation.
2. Warranties shall include all labor, parts, transportation, and associated costs required to correct defects during the warranty period.
3. All warranties shall be in the Owner's name and commence upon final acceptance of the system.

B. The intent is to ensure correction of defects and satisfactory performance during the warranty period following Substantial Completion

3.1 CONTRACTOR'S WARRANTY

A. The Contractor shall warrant all Work to be free from defects in materials and workmanship for a period of two (2) years from the date of Substantial Completion unless otherwise specified.

B. The Contractor shall promptly repair or replace defective Work, materials, equipment, or workmanship, including any damage to other parts of the Work resulting from such defects.

C. The warranty shall cover, but not be limited to:

1. PV system electrical components, conduit, and wiring;
2. Structural and mounting assemblies;
3. Premature inverter replacement, balance-of-system components, interconnection devices, and labeling;
4. Any roof penetrations and associated flashing details.

D. The warranty period shall not begin until:

1. Final electrical inspection approval; and
2. Delivery of manufacturer warranties for all PV modules, inverters, and racking systems.

3.2 MANUFACTURER WARRANTIES

A. The Contractor shall provide manufacturer warranties as follows:

1. PV Modules – Minimum 25-year performance warranty, and minimum 10-year product warranty.
2. Inverters – Minimum 10-year warranty, extendable to 15 or 20 years if offered by manufacturer.
3. Racking System – Minimum 10-year warranty against structural failure or corrosion.
4. Power output - 25 year manufacturer s power output warranty, with the first 10 years at 90% minimum rated power output and the balance of the 25 years at 80% minimum rated power output.

B. All manufacturer warranties shall be issued in the name of the Owner and transferred upon project closeout.

C. WARRANTY DOCUMENTATION

1. Submit all warranty certificates, manufacturer contacts, and serial-number lists in the project closeout submittal package.
2. Include warranty start and end dates for each component and system type.
3. Provide Owner with digital copies of all manufacturer registration confirmations.

3.4 WARRANTY ADMINISTRATION

A. Submit a Warranty and Bond Log at project closeout listing all warranties, expiration dates, and responsible parties.

B. Provide the Owner with contact information for warranty service and emergency support.

C. Coordinate manufacturer field inspections or commissioning verification as required to validate warranties.

END OF SECTION 017836

SECTION 260000 – DESIGN ENGINEER QUALIFICATIONS

PART 1 – GENERAL

1.1 SUMMARY

A. This Section specifies minimum qualification requirements for the Design Engineer responsible for design, engineering, and certification of the solar photovoltaic (PV) system.

B. The Design Engineer shall serve as the Engineer of Record (EOR) and shall provide professional services necessary to prepare, seal, and certify all design documents required for permitting, interconnection, and construction of the solar PV system.

PART 2 – QUALIFICATIONS

2.1 PROFESSIONAL REGISTRATION

A. Design Engineer shall be a Professional Engineer (PE) currently licensed in the Commonwealth of Pennsylvania.

B. The PE shall seal all electrical and structural drawings, calculations, and related design documents submitted for building permit and utility interconnection.

C. The engineering firm shall hold a Certificate of Authorization to practice engineering in Pennsylvania.

2.2 EDUCATION AND EXPERIENCE

A. Design Engineer shall possess a Bachelor of Science in Electrical or Mechanical Engineering from an ABET-accredited institution.

B. A minimum of five (5) years of professional experience in electrical power system design, including at least three (3) years of demonstrated experience in photovoltaic system design, is required.

C. Design experience shall include work on roof-mounted or ground-mounted PV systems ≥ 250 kW DC, preferably for public-sector or K-12 educational facilities.

2.3 TECHNICAL COMPETENCE

A. Engineer shall demonstrate detailed working knowledge of applicable codes and standards, including:

1. Pennsylvania Uniform Construction Code (UCC).
2. NFPA 70 – National Electrical Code (NEC 2017).
3. IBC 2018 or 2021 (as adopted by AHJ).
4. ASCE 7-16 for structural loading.

5. IEEE 1547, UL 1741 SA, and the serving utility's interconnection standards (e.g., PECO "Gray Book").

B. Engineer shall prepare and seal all system design drawings, including one-line diagrams, conduit and wiring schedules, grounding and bonding details, protection and coordination studies, and interconnection documentation.

2.4 CERTIFICATIONS AND TRAINING

A. The following certifications are desirable but not mandatory:

1. NABCEP PV Design Specialist (PVDS) or PV Installation Professional (PVIP).
2. LEED Accredited Professional (AP BD+C).
3. OSHA 30-Hour Construction Safety training.

B. Engineer shall demonstrate proficiency with design and analysis software such as AutoCAD, PVsyst, HelioScope, or equivalent.

2.5 INSURANCE

A. Engineering firm shall maintain Professional Liability (Errors and Omissions) insurance with minimum limits of \$1,000,000 per claim / \$2,000,000 aggregate.

PART 3 – SUBMITTALS

3.1 QUALIFICATION DOCUMENTATION

A. Submit resumes of proposed Design Engineer(s) and firm, including evidence of current Pennsylvania licensure.

B. Submit documentation of relevant project experience demonstrating at least two (2) successfully completed solar PV projects of comparable scope (≥ 250 kW DC).

C. Submit copies of applicable certifications and proof of insurance coverage.

SECTION 260500 - GENERAL REQUIREMENTS FOR ELECTRICAL WORK

PART 1 GENERAL

1.1 STIPULATIONS

- A. General provisions of the Contract Documents including General and Supplementary Conditions and Division 1 Specifications Sections apply to all work in this section.

1.2 WORK INCLUDED

- A. Every Section of Division 26 described herein is binding upon each Contractor as it applies to the work.
- B. This Contractor shall furnish, install and connect an operating solar photovoltaic system in accordance with these specifications and accompanying Contract Drawings. This shall include all required labor, materials, apparatus and supervision.

1.3 DEFINITIONS

- A. Contractor: Contractor, this Contractor or Electrical Contractor when used in this specification refers to the Contractor responsible for all work under this Section.
- B. Sub Contractor: Any references to, or letting of work contained in these specifications to any Sub Contractor or manufacturer does not relieve this Contractor of his responsibility for all work, material and equipment in this specification.
- C. Provide: The term Provide when used separately shall mean to Furnish and Install.
- D. Furnish: The term Furnish when used separately shall mean to obtain and deliver to the project site for installation by others.
- E. Install: The term Install when used separately shall mean to mount in place, connect and make operable.
- F. Gauge of Materials: The sizes of copper conductors and thickness of metals shown on the drawings or mentioned herein shall be understood to be American Wire Gauge for conductors and US Gauge for sheet metal.
- G. Singular Number: Any reference made to an item in the singular number shall apply equally to as many identical items that work may require.

1.4 REGULATIONS AND CODES

- A. All applicable laws, ordinances, rules and regulations of public bodies bearing on the conduct of the work, including but not limited to, the State Department of Health,

Department of Labor and Industry, the National Fire Protection Association, the Americans with Disabilities Act and the Owner's insuring agency are hereby incorporated and made a part of these specifications.

- B. Should any change in the drawings and/or specifications be required to conform to the codes, ordinances, regulations or laws mentioned above, the Solar Consultant shall be notified prior to the time of submitting bids. After signing the Contract, each Contractor will be responsible for the completion of all work necessary to meet the above-mentioned requirements without additional expense to the Owner.
- C. The Contractor shall comply with all rules, regulations and recommendations of any public utility serving this project.
- D. The entire electrical system shall be installed in accordance with the 2017 National Electric Code, approved by the governmental body having jurisdiction, including amendments thereto.

1.5 DRAWINGS AND SPECIFICATIONS

- A. The drawings are generally diagrammatic and indicative of the work to be installed. Exact locations of equipment and points of termination shall be reviewed and approved by the Solar Consultant. Should it be found that any system or equipment cannot be installed as shown on the Contractor's drawings, the Solar Consultant shall be consulted before installing or making changes to the layout.
- B. The drawings and specifications are intended to function as a common set of documents. Anything shown on the drawings but not in the specifications, or mentioned in the specifications and not shown on drawings, shall be equally binding as if both noted on the drawings and called for in the specifications.
- C. No measurement of a drawing by scale shall be used as a working dimension. Working measurements shall be taken from figured dimensions and through cooperation with all other Contractors.
- D. This Contractor shall carefully examine the Design Build Drawings and Specifications. If any discrepancies occur between the drawings or between the drawings and specifications, The Contractor shall report such discrepancies to the Solar Consultant in writing and obtain written instructions as to the manner in which to proceed. No departures from the Contract Drawings shall be made without prior written approval of the Solar Consultant.

1.6 FAMILIARITY WITH CONTRACT REQUIREMENTS

- A. It is the responsibility of the Contractor, prior to submitting his bid on this Project, to satisfy himself as to the nature and location of the work, the character, quality and quantity of the materials which will be required, the character equipment and facilities needed preliminary to and during the prosecution of the work, the general and local conditions and of all other matters which can in any way affect the work under this Contract.
- B. Failure to make onsite inspections prior to submitting a bid, or failure to comply with any or all of the above requirements will not relieve this Contractor from the responsibilities of

properly estimating the requirements or costs of successful completion of the work nor from the responsibility for the faithful performance of the provisions of this Contract.

1.7 STANDARDS AND REFERENCES

- A. Products of workmanship that are specified by association, trade or federal standards shall comply with the requirements of the following reference standards except when more rigid requirements are specified or are required by applicable codes.
 - 1. ANSI - American National Standard Institute.
 - 2. ASTM - American Society for Testing and Materials.
 - 3. FM - Factory Mutual System.
 - 4. FS - Federal Specification.
 - 5. IEEE - Institute of Electrical and Electronics Engineers.
 - 6. MIL - Military Specification.
 - 7. NEMA - National Electrical Manufacturers Association.
 - 8. NFPA - National Fire Protection Association.
 - 9. UL - Underwriters Laboratories, Inc.

1.8 SUBMITTALS

A. Approval of Materials

- 1. The Contractor shall submit to the Solar Consultant for approval, a complete list of materials, equipment and Sub Contractors proposed for use on this Project.
- 2. List shall include, in itemized form, the name and address of the Manufacturer, equipment or Sub Contractor and when required, the trade name or catalog number of the proposed material.
- 3. Submit electronic copies for approval.

B. Shop Drawings:

- 1. The Contractor shall submit to the Solar Consultant shop drawings, catalog cuts, data sheets, manufacturer s instructions, etc. of all materials and equipment as called for herein and/or as called for in the individual sections of Division 26 under submittals.
- 2. Shop drawings submitted for review shall identify the Project. Contractor, Sub Contractor or Supplier, pertinent drawing number, detail and specification section number as appropriate.
- 3. Shop drawings shall bear the Contractor s approval stamp, signed or initialed certifying that review, verification of the material required, dimensions and coordination of the information is in accordance with the requirements of the work and Contract Documents. Drawings submitted without the Contractor s approval stamp will not be considered and will be returned for resubmission.

4. No work shall be executed, no orders placed, no material shall be installed until final review has been received.
5. Submit electronic copies for review.

C. Electrical Inspection Certificate:

1. The electrical work on this Project shall be inspected by an approved inspection agency. All inspection costs shall be paid by the Electrical Contractor. Any work failing to pass inspection shall be corrected and re-inspected at no additional cost to the Owner. The Electrical Contractor shall formally file for this inspection as soon as possible to expedite the Utility and Township close requirements.
2. Submit electronic copies of final inspection certificates to the Solar Consultant.

D. Testing:

1. Upon completion of the work, all parts of the electrical installation shall be tested by this Contractor and proved free of unwanted grounds and other defects. Preliminary testing with magneto will be permitted but will not be accepted in obtaining final results. Final tests shall be accomplished by use of a megger or as covered in this specification. The values of all secondary materials and equipment insulation shall meet or exceed the aforementioned regulatory bodies.
2. All connections at panels and switches and all splices must be made, all fuses shall be in place and all circuits continuous from point of service connections to switches, receptacles and outlets at the time of final inspection.
3. All overload devices, including equipment furnished under other contracts shall be set and adjusted to suit the load conditions.
4. Submit electronic copies of the completed report to the Solar Consultant.

E. Operation and Maintenance Manuals:

1. This Contractor shall carefully compile, during process of work, all operation and maintenance manuals including all approved electrical shop drawings. Methods of care of all types of materials and descriptions of all systems and equipment and methods of operation thereof shall be provided. Descriptions shall give pertinent diagrams, identifying charts, color-coding, connections, lubricating instructions and single-line and detailed wiring diagrams. These instructions shall contain detailed operating and maintenance instructions and complete parts lists for each piece of equipment and diagrams of control wiring so arranged that the maintenance staff may easily trace the control in case of operating difficulties. Use Manufacturer's printed information where possible; otherwise, obtain written instructions prepared by Sub Contractors. Include names, addresses and phone numbers of all Sub Contractors and of service firms for each item, for Owners use after expiration of the guarantee period. The list shall be located immediately inside the front cover. Before completion of the work, submit a rough draft of the manual in a loose-leaf binder for approval.

2. After approval and before final payment, furnish 2 corrected bound copies, properly identified, to Solar Consultant for transmittal to the Owner.

F. Guarantee:

1. Written two (2) year full warranty guarantee shall be submitted for the entire solar photovoltaic electrical system installed under this Project. Where Manufacturers' standard guarantee provides for a longer period, the longer period shall apply.
2. Where defects in the material, equipment and/or workmanship become evident within this guarantee period, the Contractor shall be responsible for replacing such material and equipment with the approved type of new items; and/or correcting the defective workmanship without any costs to the Owner.

G. Construction Record Drawings:

1. The Contractor shall keep at the job site one (1) complete set of drawings which shall be used by the Contractor for the purpose of recording all changes that occur during the construction. The Contractor shall accurately record on these drawings all changes in the electrical work.
2. Upon completion of this Project, these drawings shall be turned over to the Solar Consultant.

H. Final Wiring Certificates:

1. Submit electronic copies of final wiring inspection certificates to the Solar Consultant.

1.9 SUBSTITUTIONS AND SAMPLES

- A. All material specified hereinafter shall be of the Manufacturer's catalog number as specified. If the Contractor desires to substitute, Contractor must submit catalog cuts of the substituted materials to the Solar Consultant ten (10) calendar days in advance of the bid date to allow ample time for consideration. A decision will be rendered and an addendum will be issued to all Contractors listing any acceptable substitutes.
- B. No substitutions shall be made without approval. The words approved equal and equal shall mean equal in all respects in the opinion of the Solar Consultant.
- C. The Electrical Contractor shall furnish, for review by the Solar Consultant, all samples specified or called for by the Solar Consultant. Finished work shall match approved samples and shop drawings.
- D. When shop drawings are submitted on equipment different from the equipment specified hereinafter, this Contractor shall relate each item of the submitted equipment to its specified equivalent.
- E. All costs involved in changes in the building, to the equipment, to the arrangement of equipment, or to the work performed or to be performed under other sections of the

specifications, due to the substitution of equipment in lieu of that shown on the drawings or specified, shall be borne by this Contractor making such substitutions and shall include but not necessarily be limited to, costs or fees in connection with resubmission of drawings for approval, if required, by the Commonwealth of Pennsylvania, local authorities or insuring agencies or insuring agencies having jurisdiction over the work.

1.10 QUALITY OF WORKMANSHIP

A. All work shall be installed in a first class, neat and workmanship shall be subject to the approval of the Solar Consultant. Any work found by the Solar Consultant to be of inferior quality and/or workmanship shall be replaced and/or reworked until approval of the Solar Consultant is obtained. Any cost involved in obtaining said approval shall be the responsibility of the Electrical Contractor.

1.11 PERFORMANCE OF EQUIPMENT

- A. All materials, equipment and appurtenances of any kind, shown on the drawings, hereinafter specified or required for the completion of the work in accordance with the intent of these specifications, shall be completely satisfactory and acceptable in operation, performance and capacity. No approval, either written or verbal, of any drawings, descriptive data of samples of such material, equipment and/or appurtenances, shall relieve the Electrical Contractor of his responsibility to turn over the same to the Owner in perfect working order at the completion of the work.
- B. Any material, equipment or appurtenances, the operation capacity performance of which does not comply with the drawings and/or specification requirements, or which is not new, or which is damaged prior to acceptance by the Owner, will be held to be defective material and shall be removed and replaced with proper acceptable materials, equipment and/or appurtenance or put in proper acceptable working order, satisfactory to the Solar Consultant without additional cost to the Owner.
- C. All details of the installation of all equipment shall be electrically and mechanically correct. All equipment shall operate without objectionable noise or vibration as determined by the Solar Consultant and Owner. If objectionable noise or vibration is produced and transmitted to occupied portions of the building by apparatus, conduit or other parts of a system, any corrections to eliminate noise and vibration shall be made without cost to the Owner.

1.12 TEMPORARY FACILITIES

- A. Electrical Contractor shall furnish, install, connect and maintain temporary electrical services to the building, if needed, until new, permanent services are installed. Complete installation and maintenance of temporary services shall meet all NEC and OSHA requirements.

1.13 METHODS AND MATERIALS

- A. The Electrical Contractor shall confer with all other Contractors and shall apply for detailed and specific information regarding the location of all equipment as the final location may differ from that indicated on the drawings. Equipment or wiring improperly placed because

of the Electrical Contractor's failure to obtain this information shall be relocated and reinstalled by the Electrical Contractor without additional expenses to the Owner.

- B. Each Contractor, upon request of the Solar Consultant shall expedite the work of a specific area, section or part of the project to make provision for, or protect equipment or to permit the installation of another part of the work.
- C. All materials and equipment supplied by this Contractor shall be new, of the best of their respective kinds, without imperfections and blemishes and shall be protected from the elements prior to installation in the building.
- D. All conduits, wire, cable, wiring devices and equipment shall be installed in such a manner as to preserve access to any existing equipment or to any new equipment installed under this specification or under other specifications or contracts for this building and with sufficient space provided for proper operation and maintenance.
- E. The drawings are generally indicative of the work to be installed but do not indicate all bends, fittings, boxes, etc., which may be required. Contractor shall carefully investigate the structure and finish conditions affecting his work, arrange his work accordingly and furnish such fittings as may be required to meet such conditions.
- F. This Contractor shall coordinate his work with that of other trades so that all work may be installed in the most direct manner and so that no interference or fouling results, the Solar Consultant shall decide which work is to be relocated, regardless of which is first installed. Such relocation shall be at no additional cost to the Owner.
- G. All materials and equipment installed by the Contractor shall be firmly supported and secured to the building construction where required.
- H. All items of labor, material and equipment not specified in detail or shown on the drawings but incidental to or necessary for the complete and proper installation and proper operation of the several branches of the work described herein or reasonably implied in connection therewith, shall be furnished as if called for in detail by the specifications or drawings.
- I. Major items of equipment shall be the best grade and quality used for the purpose in commercial practice and shall have the Manufacturer's name, address and catalog number on a plate securely affixed in a prominent place. All electrical equipment or apparatus of any 1 system must be the product of 1 Manufacturer, or equivalent products of a number of Manufacturers, which are suitable for use in a unified system.
- J. When available, all materials and equipment shall bear the label of approval of the Underwriters Laboratory, Inc.

1.14 SCAFFOLDING

- A. The Electrical Contractor shall furnish and erect all scaffolding and ladders required in the installation of wiring, equipment and devices.

1.15 EQUIPMENT FOUNDATIONS

- A. The provision of all concrete equipment foundations required for the equipment furnished under these electrical specifications shall be the responsibility of the Electrical Contractor. Foundations shall be of sufficient mass to suit the equipment furnished.

1.16 CLEAN-UP

- A. Upon completion of the electrical work this Contractor shall remove all dirt, foreign materials, stains, fingerprints, etc., from all lighting fixtures, panels, plates, etc., installed under this project and shall leave the electrical work in such a condition that no cleaning by the Owner is required. Internal areas of all equipment must be cleaned of all construction dust, etc., prior to pre-final and/or final inspection.
- B. Periodically and at the completion of the work contemplated under these specifications, the Contractor shall remove from the building site and construction areas as rubbish and accumulated materials of whatever nature and shall leave the work in a clean, orderly and acceptable condition at all times.

1.17 PROTECTION OF WORK, MATERIALS AND EQUIPMENT

- A. This Contractor shall effectually protect at his own expense all existing facilities and such of his new work, materials or equipment as is liable to injury during the construction period. All openings into any part of the conduit system as well as all associated fixtures, equipment, etc., both before and after being set in place must be securely covered or otherwise protected to prevent obstruction, damage or injury due to carelessly or maliciously dropped tools or materials, grit, dirt, moisture, water or any foreign matter. This Contractor shall be held responsible for all damage so done, until his work is fully accepted by the Solar Consultant. Conduit ends shall be covered with capped bushings.
- B. All surfaces either finished or in preparation for finishing or finish material application, shall be protected against damage from welding, cutting, burning, soldering or similar construction functions. The protection shall be accomplished by care in operations, covering and shielding. Special care shall be directed to exposed finish masonry, metal or wood surfaces and painted surfaces.
- C. Any damage caused by neglect on the part of this Contractor or his representatives, either to the existing work or to his work or to the work of any other Contractor shall be repaired at his expense to the Solar Consultant's satisfaction.

1.21 PROTECTION OF SERVICES AND EQUIPMENT

- A. The Contractor shall, at his own expense, repair, replace and maintain in service any utilities, facilities or services (underground, over ground, interior or exterior) damaged, broken or otherwise rendered inoperative during the course of construction by him or his representatives. The method used by the Contractor in repairing, replacing or maintaining the services shall be approved by the Solar Consultant.

1.18 INSTRUCTIONS

- A. After all tests and adjustments have been made, the Electrical Contractor shall fully instruct the representatives of the Owner in all details of operation and maintenance of equipment installed under this Contract. Allow 16 manhours for instructions.

PART 2 - PRODUCTS - Not Used.

PART 3 - EXECUTION - Not Used.

END OF SECTION 260500

SECTION 260519 - LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Copper building wire rated 600 V or less.
 - 2. Metal-clad cable, Type MC, rated 600 V or less.
 - 3. Connectors, splices, and terminations rated 600 V and less.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Product Schedule: Indicate type, use, location, and termination locations.

1.4 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Member company of NETA.
 - 1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.

- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. American Bare Conductor.
2. Cerro Wire LLC.
3. Encore Wire Corporation.
4. General Cable Technologies Corporation.
5. Southwire Company.

C. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Comply with UL1569
3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

D. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 and ASTM B 496 for stranded conductors.

E. Conductor Insulation:

1. Type THHN and Type THWN-2: Comply with UL 83.
2. Type XHHW-2: Comply with UL 44.

F. Shield:

1. Type TC-ER: Cable designed for use with VFCs, with oversized crosslinked polyethylene insulation, spiral-wrapped foil plus 85 percent coverage braided shields and insulated full size ground wire or dual spirally wrapped copper tape shields and three bare symmetrically applied ground wires, and sunlight- and oil-resistant outer PVC jacket.

2.2 METAL-CLAD CABLE, TYPE MC

- A. Description: A factory assembly of one or more current-carrying insulated conductors in an overall metallic sheath.
- B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Alpha Wire Company.
2. American Bare Conductor.
3. Belden Inc.

4. [Encore Wire Corporation.](#)
5. [General Cable Technologies Corporation.](#)

C. Standards:

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
2. Comply with UL 1569.
3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."

D. Circuits:

1. Single circuit and Mult circuit with color-coded conductors.
2. Power-Limited Fire-Alarm Circuits: Comply with UL 1424.

E. Conductors: Copper, complying with ASTM B 3 for bare annealed copper and with ASTM B 8 for stranded conductors.

F. Ground Conductor: Insulated.

G. Conductor Insulation:

1. Type TFN/THHN/THWN-2: Comply with UL 83.
2. Type XHHW-2: Comply with UL 44.. H. Armor:

Aluminum, interlocked.

I. Jacket: PVC applied over armor.

2.3 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.

B. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:

1. [3M Electrical Products.](#)
2. [AFC Cable Systems; a part of Atkore International.](#)
3. [Gardner Bender.](#)
4. [Hubbell Power Systems, Inc.](#)

5. [Ideal Industries, Inc.](#)
 6. [ILSCO.](#)
 7. [O-Z/Gedney; a brand of Emerson Industrial Automation.](#)
 8. [Thomas & Betts Corporation; A Member of the ABB Group](#)
- C. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.
- D. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
1. Material: Copper.
 2. Type: Two hole with long barrels.
 3. Termination: Crimp.

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. Feeders: Copper. Conductors shall be solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- C. Branch Circuits: Copper. Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- D. Branch Circuits: Copper. Solid for No. 12 AWG and smaller; stranded for No. 10 AWG and larger.
- E. VFC Output Circuits Cable: Extra-flexible stranded for all sizes.
- F. Power-Limited Fire Alarm and Control: Solid for No. 12 AWG and smaller.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

- A. Service Entrance: Type THHN/THWN-2, single conductors in raceway Type XHHW-2, single conductors in raceway.
- B. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway Type XHHW-2, single conductors in raceway.

- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN/THWN-2, single conductors in raceway.
- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway Type XHHW-2, single conductors in raceway.
- E. Exposed Branch Circuits, Including in Crawlspace: Type THHN/THWN-2, single conductors in raceway.
- F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway; Metal-clad cable, Type MC.
- G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway Type XHHW-2, single conductors in raceway.
- H. Cord Drops and Portable Appliance Connections: Type SO, hard service cord with stainless-steel, wire-mesh, strain relief device at terminations to suit application.
- I. VFC Output Circuits: Type XHHW-2 in metal conduit Type TC-ER cable with braided shield Type TC-ER cable with dual tape shield.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

3.4 CONNECTIONS

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inches of slack.

3.5 IDENTIFICATION

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor and identify as spare conductor.

3.6 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 Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

3.7 FIRESTOPPING

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

3.8 FIELD QUALITY CONTROL

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
 - 1. After installing conductors and cables and before electrical circuitry has been energized, test service entrance and feeder conductors for compliance with requirements.
 - 2. After installing conductors and cables and before electrical circuitry has been energized, test feeder conductors and conductors feeding the following critical equipment and services for compliance with requirements:
 - 3. Perform each of the following visual and electrical tests:

- a. Inspect exposed sections of conductor and cable for physical damage and correct connection according to the single-line diagram.
 - b. Test bolted connections for high resistance using one of the following:
 - 1) A low-resistance ohmmeter.
 - 2) Calibrated torque wrench.
 - 3) Thermographic survey.
 - c. Inspect compression-applied connectors for correct cable match and indentation.
 - d. Inspect for correct identification.
 - e. Inspect cable jacket and condition.
 - f. Insulation-resistance test on each conductor for ground and adjacent conductors. Apply a potential of 500-V dc for 300-V rated cable and 1000-V dc for 600-V rated cable for a one-minute duration.
 - g. Continuity test on each conductor and cable.
 - h. Uniform resistance of parallel conductors.
4. Initial Infrared Scanning: After Substantial Completion, but before Final Acceptance, perform an infrared scan of each splice in conductors No. 3 AWG and larger. Remove box and equipment covers so splices are accessible to portable scanner. Correct deficiencies determined during the scan.
- a. Instrument: Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.
 - b. Record of Infrared Scanning: Prepare a certified report that identifies switches checked and that describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.
5. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each switch 11 months after date of Substantial Completion.
- C. Cables will be considered defective if they do not pass tests and inspections.
- D. Prepare test and inspection reports to record the following:
- 1. Procedures used.
 - 2. Results that comply with requirements.
 - 3. Results that do not comply with requirements, and corrective action taken to achieve compliance with requirements.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section includes grounding and bonding systems and equipment.
- B. Section includes grounding and bonding systems and equipment, plus the following special applications:
 - 1. Underground distribution grounding.
 - 2. Ground bonding common with lightning protection system.
 - 3. Foundation steel electrodes.

1.3 ACTION SUBMITTALS

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

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For grounding to include operation, and maintenance manuals.
 - 1. In addition to items specified in Section 01700 "Contract Close-out," include the following:
 - a. Plans showing as-built, dimensioned locations of grounding features specified in "Field Quality Control" Article, including the following:
 - 1) Test wells.
 - 2) Ground rods.
 - 3) Ground rings.
 - 4) Grounding arrangements and connections for separately derived systems.

b. Instructions for periodic testing and inspection of grounding features at test wells ground rings grounding connections for separately derived systems based on NETA MTS NFPA 70B.

- 1) Tests shall determine if ground-resistance or impedance values remain within specified maximums, and instructions shall recommend corrective action if values do not.
- 2) Include recommended testing intervals.

1.5 QUALITY ASSURANCE

Testing Agency Qualifications: Certified by NETA.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

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

Comply with UL 467 for grounding and bonding materials and equipment.

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Burndy; Part of Hubbell Electrical Systems.
2. ERICO International Corporation.
3. ILSCO.
4. O-Z/Gedney; a brand of Emerson Industrial Automation.
5. Thomas & Betts Corporation; A Member of the ABB Group

2.3 CONDUCTORS

A. Insulated Conductors: Copper or tinned-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.
- C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 4 inches minimum or as noted on the drawings in cross section, with 9/32-inch holes spaced 1-1/8 inches apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V and shall be Lexan or PVC, impulse tested at 5000 V.

2.4 CONNECTORS

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. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
- C. Bus-Bar Connectors: Mechanical type, cast silicon bronze, solderless exothermic-type wire terminals, and long-barrel, two-bolt connection to ground bus bar.
- D. Bus-Bar Connectors: Compression type, copper or copper alloy, with two wire terminals.
- E. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.
- F. Cable-to-Cable Connectors: Compression type, copper or copper alloy.
- G. Cable Tray Ground Clamp: Mechanical type, zinc-plated malleable iron.
- H. Conduit Hubs: Mechanical type, terminal with threaded hub.
- I. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt or socket set screw.
- J. Ground Rod Clamps: Mechanical type, copper or copper alloy, terminal with hex head bolt.
- K. Lay-in Lug Connector: Mechanical type, aluminum copper rated for direct burial terminal with set screw.

- L. Service Post Connectors: Mechanical type, bronze alloy terminal, in short- and long-stud lengths, capable of single and double conductor connections.
 - M. Signal Reference Grid Clamp: Mechanical type, stamped-steel terminal with hex head screw.
 - N. Straps: Solid copper, copper lugs. Rated for 600 A.
 - O. Tower Ground Clamps: Mechanical type, copper or copper alloy, terminal one-piece clamp.
 - P. U-Bolt Clamps: Mechanical type, copper or copper alloy, terminal listed for direct burial.
 - Q. Water Pipe Clamps:
 - 1. Mechanical type, two pieces with stainless-steel bolts.
 - a. Material: Tin-plated aluminum.
 - b. Listed for direct burial.
 - 2. U-bolt type with malleable-iron clamp and copper ground connector rated for direct burial.
- 2.5 GROUNDING ELECTRODES

Ground Rods: Copper-clad steel; 3/4 inch by 10 feet or 5/8 by 96 inches as noted on the drawings. B. Ground Plates: 1/4 inch thick, hot-dip galvanized.

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.
 - 1. Bury at least 24 inches below grade.
 - 2. Duct-Bank Grounding Conductor: Bury 12 inches above duct bank when indicated as part of duct-bank installation.
- 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. Grounding Bus: Install in electrical equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
1. Install bus horizontally, on insulated spacers 2 inches minimum from wall, 6 inches above finished floor unless otherwise indicated.
 2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down; connect to horizontal bus.
- E. 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 GROUNDING AT THE SERVICE

- A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.3 GROUNDING SEPARATELY DERIVED SYSTEMS

Transformer: Install grounding electrode(s) at the transformer location. The electrode shall be connected to the equipment grounding conductor.

3.4 EQUIPMENT GROUNDING

- A. Install insulated equipment grounding conductors with all feeders and branch circuits.
- B. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
1. Feeders and branch circuits.
 2. Lighting circuits.
 3. Receptacle circuits.
 4. Single-phase motor and appliance branch circuits.
 5. Three-phase motor and appliance branch circuits.
 6. Flexible raceway runs.
 7. Metal-clad cable runs.
 8. 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.

- C. Water Heater, Heat-Tracing, and Anti-frost 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. Isolated Grounding Receptacle Circuits: Install an insulated equipment grounding conductor connected to the receptacle grounding terminal. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service unless otherwise indicated.
- E. 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.
- F. Metallic Fences: Comply with requirements of IEEE C2.
 - 1. Grounding Conductor: Bare copper, not less than No. 8 AWG.
 - 2. Gates: Shall be bonded to the grounding conductor with a flexible bonding jumper.
 - 3. Barbed Wire: Strands shall be bonded to the grounding conductor.

3.5 FENCE GROUNDING

- A. Fence Grounding: Install at maximum intervals of 1500 feet except as follows:
 - 1. Fences within 100 Feet of Buildings, Structures, Walkways, and Roadways: Ground at maximum intervals of 750 feet.

- a. Gates and Other Fence Openings: Ground fence on each side of opening.
 - 1) Bond metal gates to gate posts.
 - 2) Bond across openings, with and without gates, except at openings indicated as intentional fence discontinuities. Use No. 2 AWG wire and bury it at least 18 inches below finished grade.
- B. Protection at Crossings of Overhead Electrical Power Lines: Ground fence at location of crossing and at a maximum distance of 150 feet on each side of crossing.
- C. Fences Enclosing Electrical Power Distribution Equipment: Ground as required by IEEE C2 unless otherwise indicated.
- D. Grounding Method: At each grounding location, drive a grounding rod vertically until the top is 6 inches below finished grade. Connect rod to fence with No. 6 AWG conductor. Connect conductor to each fence component at grounding location.
- E. Bonding Method for Gates: Connect bonding jumper between gate post and gate frame.
- F. Bonding to Lightning-Protection System: If fence terminates at lightning-protected building or structure, ground the fence and bond the fence grounding conductor to lightning-protection down conductor or lightning-protection grounding conductor, complying with NFPA 780.

3.6 INSTALLATION

- A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- B. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.
- C. 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. Use exothermic welds for all below-grade connections.

3. 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.
- D. Test Wells: Ground rod driven through drilled hole in bottom of handhole. Handholes are specified in Section 260543 "Underground Ducts and Raceways for Electrical Systems," and shall be at least 12 inches deep, with cover.
1. 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.
- E. 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.
- F. Grounding and Bonding for Piping:
1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
 2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
 3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
- G. 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.
- H. Ground Ring: Install a grounding conductor, electrically connected to each building structure ground rod and to each indicated item, extending around the perimeter of building.
1. Install tinned-copper conductor not less than No. 2/0 AWG for ground ring and for taps to building steel.

2. Bury ground ring not less than 24 inches from building's foundation.
- I. Concrete-Encased Grounding Electrode (Ufer Ground): Fabricate according to NFPA 70; use a minimum of 20 feet of bare copper conductor not smaller than No. 4 AWG.
 1. If concrete foundation is less than 20 feet long, coil excess conductor within base of foundation.
 2. Bond grounding conductor to reinforcing steel in at least four locations. Extend grounding conductor below grade and connect to building's grounding grid or to grounding electrode external to concrete.
- J. Concrete-Encased Grounding Electrode (Ufer Ground): Fabricate according to NFPA 70; using electrically conductive coated steel reinforcing bars or rods, at least 20 feet long. If reinforcing is

in multiple pieces, connect together by the usual steel tie wires or exothermic welding to create the required length.
- K. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.
 1. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
 2. Make connections with clean, bare metal at points of contact.
 3. Make aluminum-to-steel connections with stainless-steel separators and mechanical clamps.
 4. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
 5. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.

3.7 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. 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 individual ground rods. Make tests at ground rods before any conductors are connected.
 - a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
 - b. Perform tests by fall-of-potential method according to IEEE 81.
 4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
- D. Grounding system will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.
- F. 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.
- G. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Solar Consultant 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 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Steel slotted support systems.
2. Aluminum slotted support systems.
3. Nonmetallic slotted support systems.
4. Conduit and cable support devices.
5. Support for conductors in vertical conduit.
6. Structural steel for fabricated supports and restraints.
7. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
8. Fabricated metal equipment support assemblies.

1.3 ACTION SUBMITTALS

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

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
 - a. Slotted support systems, hardware, and accessories.
 - b. Clamps.
 - c. Hangers.
 - d. Sockets.
 - e. Eye nuts.
 - f. Fasteners.
 - g. Anchors.
 - h. Saddles.

- i. Brackets.
- 2. Include rated capacities and furnished specialties and accessories.
- B. Welding certificates.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch diameter holes at a maximum of 8 inches o.c. in at least one surface.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allied Tube & Conduit; a part of Atkore International.
 - b. B-line, an Eaton business.
 - c. ERICO International Corporation.
 - d. Thomas & Betts Corporation; A Member of the ABB Group.
 - e. Unistrut; Part of Atkore International.
 - 2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
 - 3. Material for Channel, Fittings, and Accessories: Galvanized steel Plain steel Stainless steel, Type 304.
 - 4. Channel Width: 1-5/8 inches.
 - 5. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA4.
 - 6. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
 - 7. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
 - 8. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Conduit and Cable Support Devices: Steel and Stainless-steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored 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 made of malleable iron.

- D. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M steel plates, shapes, and bars; black and galvanized.
- E. 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. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) Hilti, Inc.
 - 2) ITW Ramset/Red Head; Illinois Tool Works, Inc.
 - 2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated stainless steel, for use in hardened Portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1) B-line, an Eaton business.
 - 2) Empire Tool and Manufacturing Co., Inc.
 - 3) ITW Ramset/Red Head; Illinois Tool Works, Inc.
 - 3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
 - 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
 - 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 - 6. Toggle Bolts: All Stainless-steel springhead type.
 - 7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Section 055000 "Metal Fabrications" for steel shapes and plates.

2.3. ROOF-MOUNTED CONDUIT SUPPORTS

A. Description

- 1. Provide factory-fabricated, non-penetrating support assemblies designed specifically for rooftop electrical raceways. Supports shall distribute weight uniformly and prevent damage to roofing membranes.

B. Basis of Design Product

- 1. Cope ERICO Caddy Rooftop Support
- 2. Cooper B-Line Dura-Blok
- 3. MIRO Industries 20-Series
- 4. Or approved equal.

C. Performance Requirements

- 1. Maintain conduit a minimum of 1-1/2 inches above roof surface.
- 2. Designed for continuous outdoor exposure to ultraviolet light, temperature extremes, and moisture.
- 3. Load capacity not less than 50 pounds per support or as required by conduit size and spacing.
- 4. Resist movement caused by wind uplift, vibration, or thermal expansion.
- 5. Comply with applicable portions of NECA 1 and NEC Article 300.

D. Materials

- 1. Base: Recycled rubber, EPDM, or UV-resistant polymer compatible with the roofing membrane.
- 2. Strut Channel: Hot-dip galvanized or stainless-steel Unistrut type, conforming to ASTM A123 or ASTM A240.
- 3. Hardware: Stainless steel, Type 304 or 316, with locknuts and neoprene washers.
- 4. Isolation Pad: Non-penetrating rubber or EPDM pad between base and roof membrane to prevent abrasion or puncture.

E. Installation

- 1 Set supports on clean roof surface without puncturing or penetrating the roofing membrane.
- 2 Space supports per manufacturer's recommendations, conduit size, and load rating.
- 3 Provide expansion fittings or flexible couplings for conduit runs exceeding 100 feet.
- 4 Maintain roof drainage paths and do not obstruct scuppers, drains, or gutters.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
 1. NECA 1.
 2. NECA 101
 3. NECA 102.
 4. NECA 105.
 5. NECA 111.
- B. Comply with requirements for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- C. Comply with requirements for raceways and boxes specified in Section 260533 "Raceways and Boxes for Electrical Systems."
- D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacings that are less than those stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
- E. 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.
- F. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2inch 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, according to 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: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP69 Spring-tension clamps.
 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 the need for reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

- A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M.

3.4 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. Concrete materials, reinforcement, and placement requirements are specified in Section 033000 "Cast-in-Place Concrete."
- C. Anchor equipment to concrete base as follows:
 - 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.

3.5 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: Comply with requirements in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting" for cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal.
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

1. Metal conduits and fittings.
 2. Nonmetallic conduits and fittings.
 3. Metal wireways and auxiliary gutters.
 4. Nonmetal wireways and auxiliary gutters.
 5. Surface raceways.
 6. Boxes, enclosures, and cabinets.
 7. Handholes and boxes for exterior underground cabling.
- B. Related

Requirements:

1. Section 260543 "Underground Ducts and Raceways for Electrical Systems" for exterior ductbanks, manholes, and underground utility construction.

1.3 DEFINITIONS

- A. GRC: Galvanized rigid steel conduit.
- B. IMC: Intermediate metal conduit.

1.4 ACTION SUBMITTALS

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

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

A. Metal Conduit:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AFC Cable Systems; a part of Atkore International.
 - b. Allied Tube & Conduit; a part of Atkore International.
 - c. O-Z/Gedney; a brand of Emerson Industrial Automation.
 - d. Republic Conduit.
 - e. Southwire Company.
 - f. Thomas & Betts Corporation; A Member of the ABB Group.
 - g. Western Tube and Conduit Corporation.
2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. GRC: Comply with ANSI C80.1 and UL 6.
4. IMC: Comply with ANSI C80.6 and UL 1242.
5. EMT: Comply with ANSI C80.3 and UL 797.
6. FMC: Comply with UL 1; zinc-coated steel or aluminum.
7. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360. B.

Metal Fittings:

1. Comply with NEMA FB 1 and UL 514B.
2. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. Fittings, General: Listed and labeled for type of conduit, location, and use.
4. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.
5. Fittings for EMT:
 - a. Material: Steel.
 - b. Type: compression.
6. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
7. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch, with overlapping sleeves protecting threaded joints.

- C. Joint Compound for IMC, GRC: 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. Nonmetallic Conduit:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AFC Cable Systems; a part of Atkore International.
 - b. CertainTeed Corporation.
 - c. RACO; Hubbell.
 - d. Thomas & Betts Corporation; A Member of the ABB Group.
2. Listing and Labeling: Nonmetallic conduit shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
3. RNC: Type EPC-80-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
4. LFNC: Comply with UL 1660. B. Nonmetallic Fittings:
 1. Fittings, General: Listed and labeled for type of conduit, location, and use.
 2. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
 - a. Fittings for LFNC: Comply with UL 514B.
3. Solvents and Adhesives: As recommended by conduit manufacturer.

2.3 BOXES, ENCLOSURES, AND CABINETS

- ### A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Crouse-Hinds, an Eaton business.
 2. EGS/Appleton Electric.
 3. Hoffman; a brand of Pentair Equipment Protection.
 4. Hubbell Incorporated.
 5. Hubbell Incorporated; Wiring Device-Kellems.
 6. Milbank Manufacturing Co.
 7. O-Z/Gedney; a brand of Emerson Industrial Automation.
 8. RACO; Hubbell.
 9. Spring City Electrical Manufacturing Company.
 10. Thomas & Betts Corporation; A Member of the ABB Group.

- B. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
- C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
- D. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy aluminum, Type FD, with gasketed cover.
- E. Nonmetallic Outlet and Device Boxes: Comply with NEMA OS 2 and UL 514C.
- F. Metal Floor Boxes:
 - 1. Material: Cast metal or sheet metal.
 - 2. Type: Fully adjustable.
 - 3. Shape: Rectangular.
 - 4. Listing and Labeling: Metal floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- G. Nonmetallic Floor Boxes: Nonadjustable, round rectangular.
 - 1. Listing and Labeling: Nonmetallic floor boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- H. Luminaire Outlet Boxes: Nonadjustable, designed for attachment of luminaire weighing 50 lb. Outlet boxes designed for attachment of luminaires weighing more than 50 lb. shall be listed and marked for the maximum allowable weight.
- I. Paddle Fan Outlet Boxes: Nonadjustable, designed for attachment of paddle fan weighing 70 lb.
 - 1. Listing and Labeling: Paddle fan outlet boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- J. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
- K. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminum with gasketed cover.
- L. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
- M. Device Box Dimensions: 4 inches square by 2-1/8 inches deep.
- N. Gangable boxes are prohibited.

- O. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, Type 1 Type 3R Type 4 Type 12 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: Fiberglass.
 - 3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.
- P. Cabinets:
 - 1. NEMA 250, Type 1 Type 3R Type 12 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.

2.4 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

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.

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. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. [Armorcast Products Company.](#)
 - b. [Hubbell Power Systems, Inc - Quazite](#)
 - c. [NewBasis.](#)
 - d. [Oldcastle Enclosure Solutions.](#)
 - e. [Oldcastle Precast, Inc.](#)
- 2. Standard: Comply with SCTE 77.

3. Configuration: Designed for flush burial with closed 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, "ELECTRIC."
7. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.
8. Handholes: Have inserts for cable racks and pulling-in irons installed before concrete is poured.

2.5 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

A. Handhole and Pull-Box Prototype Test: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.

1. Tests of materials shall be performed by an independent testing agency.
2. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified Solar Consultant shall certify tests by manufacturer.
3. Testing machine pressure gages shall have current calibration certification complying with ISO 9000 and ISO 10012 and traceable to NIST standards.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed Conduit: GRC IMC RNC, Type EPC-80-PVC.
2. Concealed Conduit, Aboveground: GRC IMC RNC, Type EPC-80-PVC.
3. Underground Conduit: RNC, Type EPC-80-PVC, direct buried or concrete encased as indicated.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC or LFNC.
5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R or Type 4.

B. Indoors: Apply raceway products as specified below unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed, Not Subject to Severe Physical Damage: EMT.

3. Exposed and Subject to Severe Physical Damage: GRC IMC. Raceway locations include the following:
 - 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.
5. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
6. Damp or Wet Locations: GRC, IMC or RNC.
7. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel or nonmetallic 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. Comply with NEMA FB 2.10.
 2. EMT: Use compression, steel fittings. Comply with NEMA FB 2.10.
 3. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.
- E. Install nonferrous conduit or tubing for circuits operating above 60 Hz. Where aluminum raceways are installed for such circuits and pass through concrete, install in nonmetallic sleeve.
- F. Install surface raceways only where indicated on Drawings.
- G. Do not install nonmetallic conduit where ambient temperature exceeds 120 deg F.

3.2 INSTALLATION

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
- B. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.

- C. Do not install raceways or electrical items on any "explosion-relief" walls or rotating equipment.
- D. Do not fasten conduits onto the bottom side of a metal deck roof.
- E. 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.
- F. Complete raceway installation before starting conductor installation.
- G. Arrange stub-ups so curved portions of bends are not visible above finished slab.
- H. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.
- I. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.
- J. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
- K. Support conduit within 12 inches of enclosures to which attached.
- L. Raceways Embedded in Slabs:
 - 1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.
 - 2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
 - 3. Arrange raceways to keep a minimum of 1 inch of concrete cover in all directions.
 - 4. Do not embed threadless fittings in concrete unless specifically approved by Solar Consultant for each specific location.
 - 5. Change to RNC, Type EPC-80-PVC, GRC or IMC before rising above floor.
- M. Stub-Ups to Above Recessed Ceilings:
 - 1. Use EMT, IMC, or RMC for raceways.
 - 2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

- N. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
- O. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors including conductors smaller than No. 4 AWG.
- P. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to 1-1/4-inch trade size and insulated throat metal bushings on 1-1/2-inch trade size and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
- Q. Install raceways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus 1/4 turn more.
- R. 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.
- S. Cut conduit perpendicular to the length. For conduits 2-inch trade size and larger, use roll cutter or a guide to make cut straight and perpendicular to the length.
- T. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.
- U. Surface Raceways:
 - 1. Install surface raceway with a minimum 2-inch radius control at bend points.
 - 2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.
- V. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings according to NFPA 70.
- W. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
 - 1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
 - 2. Where an underground service raceway enters a building or structure.

3. Conduit extending from interior to exterior of building.
 4. Conduit extending into pressurized duct and equipment.
 5. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
 6. Where otherwise required by NFPA 70.
- X. Comply with manufacturer's written instructions for solvent welding RNC and fittings.
- Y. 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.
 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.
- Z. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 36 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.

- AA. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- BB. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box.
- CC. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- DD. Locate boxes so that cover or plate will not span different building finishes.
- EE. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.
- FF. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.
- GG. Set metal floor boxes level and flush with finished floor surface.
- HH. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Section 312000 "Earth Moving" for pipe less than 6 inches in nominal diameter.
2. Install backfill as specified in Section 312000 "Earth Moving."
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. 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 as specified in Section 312000 "Earth Moving."
4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through floor unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
5. 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.
- 6. Warning Planks: Bury warning planks approximately 12 inches above direct-buried conduits but a minimum of 6 inches below grade. Align planks along centerline of conduit.
- 7. 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. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch sieve to No. 4 sieve and compacted to same density as adjacent undisturbed earth.
- C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch above finished grade.
- D. Install handholes with bottom below frost line.
- E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables but short enough to preserve adequate working clearances in enclosure.
- F. Field-cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

3.5 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 Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways 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 and deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

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

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 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. Penetration firestopping installed in fire-resistance-rated walls, horizontal assemblies, and smoke barriers, with and without penetrating items.

1.3 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. PVC-Pipe Sleeves: ASTM D 1785, Schedule 80.
- D. Molded-PE or -PP Sleeves: Removable, tapered-cup shaped, and smooth outer surface with nailing flange for attaching to wooden forms.
- E. 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.
 - 2. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
 - 3. Pressure Plates: Stainless steel.
 - 4. Connecting Bolts and Nuts: Stainless steel 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.

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. Comply with requirements in Section 079200 "Joint Sealants."
 - 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.
- 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 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:

- 1. Color and legend requirements for raceways, conductors, and warning labels and signs.
 - 2. Labels.
 - 3. Bands and tubes.
 - 4. Tapes and stencils.
 - 5. Tags.
 - 6. Signs.
 - 7. Cable ties.
 - 8. Paint for identification.
 - 9. Fasteners for labels and signs.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.
- B. Samples: For each type of label and sign to illustrate composition, size, colors, lettering style, mounting provisions, and graphic features of identification products.
- C. Identification Schedule: For each piece of electrical equipment and electrical system components to be an index of nomenclature for electrical equipment and system components used in identification signs and labels. Use same designations indicated on Drawings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with ASME A13.1 and IEEE C2.
- 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. Comply with NFPA 70E requirements for arc-flash warning labels.
- F. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.
- G. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change: 120 deg F, ambient; 180 deg F, material surfaces.

2.2 COLOR AND LEGEND REQUIREMENTS

- A. Raceways and Cables Carrying Circuits at 600 V or Less:
 - 1. Black letters on an orange field.
 - 2. Legend: Indicate voltage and system or service type.
- B. Color-Coding for Phase- and Voltage-Level Identification, 600 V or Less: Use colors listed below for ungrounded feeder and branch-circuit conductors.
 - 1. Color shall be factory applied.
 - 2. Colors for 208/120-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.
 - c. Phase C: Blue.
 - 3. Colors for 240-V Circuits:
 - a. Phase A: Black.
 - b. Phase B: Red.

4. Colors for 480/277-V Circuits:

- a. Phase A: Brown.
- b. Phase B: Orange.
- c. Phase C: Yellow.

5. Color for Neutral: White or gray.

6. Color for Equipment Grounds: Bare copper Green with a yellow stripe.

7. Colors for Isolated Grounds: Green with white stripe.

C. Warning Label Colors:

- 1. Identify system voltage with black letters on an orange background.

D. Warning labels and signs shall include, but are not limited to, the following legends:

- 1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
 - 2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 48 INCHES."
- E. Equipment Identification Labels:

- 1. Black letters on a white field.

2.3 LABELS

A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.
 - b. Panduit Corp.

B. Self-Adhesive Wraparound Labels: Preprinted, 3-mil-thick, vinyl flexible label with acrylic pressure-sensitive adhesive.

- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Brady Corporation.

- b. [Panduit Corp.](#)
 - 2. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over the legend. Labels sized such that the clear shield overlaps the entire printed legend.
 - 3. Marker for Labels: Permanent, waterproof, black ink marker recommended by tag manufacturer.
 - 4. Marker for Labels: Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.
- C. Self-Adhesive Labels: Vinyl, thermal, transfer-printed, 3-mil-thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.
- 1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [Brady Corporation.](#)
 - b. [Panduit Corp.](#)
 - 2. Minimum Nominal Size:
 - a. 1-1/2 by 6 inches for raceway and conductors.
 - b. 3-1/2 by 5 inches for equipment.
 - c. As required by authorities having jurisdiction.

2.4 BANDS AND TUBES

- A. Snap-around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeves, 2 inches long, with diameters sized to suit diameters and that stay in place by gripping action.
- 1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [Brady Corporation.](#)
 - b. [Marking Services, Inc.](#)
- B. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tubes with machine-printed identification labels, sized to suit diameter and shrunk to fit firmly. Full shrink recovery occurs at a maximum of 200 deg F. Comply with UL 224.
- 1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:

- a. [Brady Corporation.](#)

2.5 TAGS

- A. Metal Tags: Brass or aluminum, 2 by 2 by 0.05 inch, with stamped legend, punched for use with self-locking cable tie fastener.
 - 1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [Brady Corporation.](#)
 - b. [Carlton Industries, LP.](#)
- B. Nonmetallic Preprinted Tags: Polyethylene tags, 0.023 inch thick, color-coded for phase and voltage level, with factory printed permanent designations; punched for use with self-locking cable tie fastener.
 - 1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [Brady Corporation.](#)
 - b. [Carlton Industries, LP.](#)
 - c. [Panduit Corp.](#)

2.6 SIGNS

- A. Baked-Enamel Signs:
 - 1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:
 - a. [Carlton Industries, LP.](#)
 - 2. Preprinted aluminum signs, high-intensity reflective, punched or drilled for fasteners, with colors, legend, and size required for application.
 - 3. 1/4-inch grommets in corners for mounting.
 - 4. Nominal Size: 7 by 10 inches.
- B. Laminated Acrylic or Melamine Plastic Signs:
 - 1. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:

- a. [Brady Corporation.](#)
 - b. [Carlton Industries, LP.](#)
- 2. Engraved legend.
- 3. Thickness:
 - a. For signs up to 20 sq. in., minimum 1/16 inch thick.
 - b. For signs larger than 20 sq. in., 1/8 inch thick.
 - c. Engraved legend with black letters on white face.
 - d. Punched or drilled for mechanical fasteners with 1/4-inch grommets in corners for mounting.
 - e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

2.7 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain 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 PREPARATION

- A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

3.2 INSTALLATION

- A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
- B. Install identifying devices before installing acoustical ceilings and similar concealment.
- C. Verify identity of each item before installing identification products.

- D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- E. Apply identification devices to surfaces that require finish after completing finish work.
- F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- G. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.
 - 1. Secure tight to surface of conductor, cable, or raceway.
- H. System Identification for Raceways and Cables over 600 V: Identification shall completely encircle cable or conduit. Place adjacent identification of two-color markings in contact, side by side.
 - 1. Secure tight to surface of conductor, cable, or raceway.
- I. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- J. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.
- K. Accessible Fittings for Raceways: Identify the covers of each junction and pull box of the following systems with the wiring system legend and system voltage. System legends shall be as follows:
 - 1. "EMERGENCY POWER." 2. "POWER." 3. "UPS."
- L. Vinyl Wraparound Labels:
 - 1. Secure tight to surface of raceway or cable at a location with high visibility and accessibility.
 - 2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.
- M. Snap-around Labels: Secure tight to surface at a location with high visibility and accessibility.
- N. Self-Adhesive Wraparound Labels: Secure tight to surface at a location with high visibility and accessibility.

O. Self-Adhesive Labels:

1. On each item, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 1 1/2-inch-high label; where two lines of text are required, use labels 2 inches high.

P. Snap-around Color-Coding Bands: Secure tight to surface at a location with high visibility and accessibility.

Q. Heat-Shrink, Preprinted Tubes: Secure tight to surface at a location with high visibility and accessibility.

R. Marker Tapes: Secure tight to surface at a location with high visibility and accessibility.

S. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.

1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.

T. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.

U. Floor Marking Tape: Apply stripes to finished surfaces following manufacturer's written instructions.

V. Underground Line Warning Tape:

1. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches below finished grade. Use multiple tapes where

width of multiple lines installed in a common trench or concrete envelope exceeds 16 inches overall.
2. Limit use of underground-line warning tape to direct-buried cables.
3. Install underground-line warning tape for direct-buried cables and cables in raceways.

W. Metal Tags:

1. Place in a location with high visibility and accessibility.

2. Secure using UV-stabilized plenum-rated cable ties. X.

Nonmetallic Preprinted Tags:

1. Place in a location with high visibility and accessibility.
2. Secure using UV-stabilized plenum-rated cable ties. Y. Baked-

Enamel Signs:

1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on minimum 1-1/2-inch-high sign; where two lines of text are required, use signs minimum 2 inches high.

Z. Metal-Backed Butyrate Signs:

1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 11/2-inch-high sign; where two lines of text are required, use labels 2 inches high.

AA. Laminated Acrylic or Melamine Plastic Signs:

1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch-high letters on 11/2-inch-high sign; where two lines of text are required, use labels 2 inches high.

BB. Cable Ties: General purpose, for attaching tags, except as listed below:

1. Outdoors: UV-stabilized nylon.
2. In Spaces Handling Environmental Air: Plenum rated.

3.3 IDENTIFICATION SCHEDULE

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.

- C. Accessible Raceways and Metal-Clad Cables, 600 V or Less, for Service, Feeder, and Branch Circuits, More Than 30 A and 120 V to Ground: Identify with self-adhesive raceway labels vinyl tape applied in bands.
 - 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- D. Accessible Fittings for Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive labels containing the wiring system legend and system voltage. System legends shall be as follows:
 - 1. "EMERGENCY POWER." 2. "POWER." 3. "UPS."
- E. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use self-adhesive vinyl tape to identify the phase.
 - 1. Locate identification at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.
- F. Control-Circuit Conductor Identification: For conductors and cables in pull and junction boxes, manholes, and handholes, use self-adhesive labels with the conductor or cable designation, origin, and destination.
- G. Control-Circuit Conductor Termination Identification: For identification at terminations, provide heat-shrink preprinted tubes self-adhesive labels with the conductor designation.
- H. Conductors to Be Extended in the Future: Attach marker tape to conductors and list source.
- I. Auxiliary Electrical Systems Conductor Identification: Self-adhesive vinyl tape that is uniform and consistent with system used by manufacturer for factory-installed connections.
 - 1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.
- J. Locations of Underground Lines: Underground-line warning tape for power, lighting, communication, and control wiring and optical-fiber cable.
- K. Concealed Raceways and Duct Banks, More Than 600 V, within Buildings: Apply floor marking tape to the following finished surfaces:

1. Floor surface directly above conduits running beneath and within 12 inches of a floor that is in contact with earth or is framed above unexcavated space.
 2. Wall surfaces directly external to raceways concealed within wall.
 3. Accessible surfaces of concrete envelope around raceways in vertical shafts, exposed in the building, or concealed above suspended ceilings.
- L. Workspace Indication: Apply floor marking tape to finished surfaces. Show working clearances in the direction of access to live parts. Workspace shall comply with NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
- M. Instructional Signs: Self-adhesive labels, including the color code for grounded and ungrounded conductors.
- N. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive labels Baked-enamel warning signs.
1. Apply to exterior of door, cover, or other access.
 2. 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.
- O. Arc Flash Warning Labeling: Self-adhesive labels.
- P. Operating Instruction Signs: Self-adhesive labels Laminated acrylic or melamine plastic signs.
- Q. Emergency Operating Instruction Signs: Self-adhesive labels Laminated acrylic or melamine plastic signs with white legend on a red background with minimum 3/8-inch-high letters for emergency instructions at equipment.
- R. Equipment Identification Labels:
1. Indoor Equipment: Self-adhesive label Laminated acrylic or melamine plastic sign.
 2. Outdoor Equipment: Laminated acrylic or melamine sign.
 3. Equipment to Be Labeled:

- a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be in the form of a engraved, laminated acrylic or melamine label.
- b. Enclosures and electrical cabinets.
- c. Access doors and panels for concealed electrical items.
- d. Switchgear.
- e. Switchboards.
- f. Transformers: Label that includes tag designation indicated on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
- g. Motor-control centers.
- h. Enclosed switches.
- i. Enclosed circuit breakers.
- j. Enclosed controllers.
- k. Variable-speed controllers.
- l. Push-button stations.
- m. Power-transfer equipment.
- n. Contactors.
- o. Remote-controlled switches, dimmer modules, and control devices.
- p. Monitoring and control equipment.

END OF SECTION 260553

SECTION 260913 – SOLAR PHOTOVOLTAIC (PV) MONITORING SYSTEM

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section includes the requirements for furnishing, installing, configuring, and commissioning a web-based Solar PV monitoring system for the rooftop solar photovoltaic installation.
- B. The monitoring system shall collect, display, and record performance data for all inverters, arrays, and total system output.
- C. The system shall support Owner access via secure web portal and provide automatic data archiving.

PART 2 – PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Provide an integrated monitoring system capable of recording and displaying:
 - Real-time and historical solar power output (kW, kWh).
 - Irradiance, temperature, and system efficiency (optional sensors).
 - Inverter status, DC and AC voltages, currents, and power factor.
 - Alarm notifications for system faults, communication loss, or inverter errors.
 - System shall allow web access through a password-protected dashboard accessible from standard browsers and mobile devices.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Coordinate network cabling and power requirements with the electrical contractor.
- B. Mount equipment in a clean, dry, and accessible location.
- C. Label all components per Division 26 labeling requirements.
- D. Install per manufacturer's recommendations and in compliance with NEC Articles 690 and 705.

3.2 FIELD TESTING

- A. Verify communication between all devices, meters, and inverters.
- B. Confirm data accuracy by comparing to inverter display and test meters.
- C. Demonstrate real-time data updates on Owner's interface.

3.3 TRAINING

- A. Provide on-site or remote training for Owner's staff, minimum two (2) hours.
- B. Training shall include dashboard navigation, reporting, and alarm acknowledgement.

3.4 COMMISSIONING

- A. Perform final verification of data accuracy and system integrity.
- B. Submit commissioning report including screenshots and validation data for Owner approval.

END OF SECTION 260913

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary q

1.2 SUMMARY

- A. Section Includes:
 - 1. Distribution panelboards.
 - 2. Lighting and appliance branch-circuit panelboards.

1.3 DEFINITIONS

- A. ATS: Acceptance testing specification.
- B. GFCI: Ground-fault circuit interrupter.
- C. GFEP: Ground-fault equipment protection.
- D. MCCB: Molded-case circuit breaker.
- E. SPD: Surge protective device.
- F. VPR: Voltage protection rating.

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of panelboard.
 - 1. Include materials, switching and overcurrent protective devices, SPDs, accessories, and components indicated.
 - 2. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.
- B. Shop Drawings: For each panelboard and related equipment.
 - 1. Include dimensioned plans, elevations, sections, and details.
 - 2. Show tabulations of installed devices with nameplates, conductor termination sizes, equipment features, and ratings.

3. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
4. Detail bus configuration, current, and voltage ratings.
5. Short-circuit current rating of panelboards and overcurrent protective devices.
6. Include evidence of NRTL listing for series rating of installed devices.
7. Include evidence of NRTL listing for SPD as installed in panelboard.
8. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
9. Include wiring diagrams for power, signal, and control wiring.
10. Key interlock scheme drawing and sequence of operations.
11. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards. Submit on translucent log-log graph paper; include selectable ranges for each type of overcurrent protective device. Include an Internet link for electronic access to downloadable PDF of the coordination curves.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For testing agency.
- B. Panelboard Schedules: For installation in panelboards. Submit final versions after load balancing.

1.6 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For panelboards and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 1. Manufacturer's written instructions for testing and adjusting overcurrent protective devices.
 2. Time-current curves, including selectable ranges for each type of overcurrent protective device that allows adjustments.

1.7 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Keys: Two spares for each type of panelboard cabinet lock.
 2. Circuit Breakers Including GFCI and GFEP Types: Two spares for each panelboard.

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: ISO 9001 or 9002 certified.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Remove loose packing and flammable materials from inside panelboards; install temporary electric heating (250 W per panelboard) to prevent condensation.
- B. Handle and prepare panelboards for installation according to NECA 407 NEMA PB 1.

1.10 FIELD CONDITIONS

- A. Environmental Limitations:
 - 1. Do not deliver or install panelboards until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above panelboards is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.
 - 2. Rate equipment for continuous operation under the following conditions unless otherwise indicated:
 - a. Ambient Temperature: Not exceeding minus 22 deg F to plus 104 deg F.
 - b. Altitude: Not exceeding 6600 feet.
- B. Service Conditions: NEMA PB 1, usual service conditions, as follows:
 - 1. Ambient temperatures within limits specified.
 - 2. Altitude not exceeding 6600 feet.
- C. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
 - 1. Notify Owner no fewer than ten days in advance of proposed interruption of electric service.
 - 2. Do not proceed with interruption of electric service without Owner's written permission.
 - 3. Comply with NFPA 70E.

1.11 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to repair or replace panelboards that fail in materials or workmanship within specified warranty period.

1. Panelboard Warranty Period: 36 months from date of Substantial Completion.
- B. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace SPD that fails in materials or workmanship within specified warranty period.
 1. SPD Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PANELBOARDS COMMON REQUIREMENTS

- A. Fabricate and test panelboards according to IEEE 344 to withstand seismic forces.
- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for panelboards including clearances between panelboards and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- C. 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.
- D. Comply with NEMA PB 1.
- E. Comply with NFPA 70.
- F. Enclosures: Flush and Surface-mounted, dead-front cabinets.
 1. Rated for environmental conditions at installed location.
 - a. Indoor Dry and Clean Locations: NEMA 250, Type 1.
 - b. Outdoor Locations: NEMA 250, Type 3R.
 - c. Other Wet or Damp Indoor Locations: NEMA 250, Type 4.
 - d. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 12.
 2. Height: 84 inches maximum.
 3. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box. Trims shall cover all live parts and shall have no exposed hardware.
 4. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover. Trims shall cover all live parts and shall have no exposed hardware.
 5. Skirt for Surface-Mounted Panelboards: Same gage and finish as panelboard front with flanges for attachment to panelboard, wall, and ceiling or floor.

6. Gutter Extension and Barrier: Same gage and finish as panelboard enclosure; integral with enclosure body. Arrange to isolate individual panel sections.
7. Finishes:
 - a. Panels and Trim: Steel and galvanized steel, factory finished immediately after cleaning and pretreating with manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat.
 - b. Back Boxes: Galvanized steel Same finish as panels and trim.
 - c. Fungus Proofing: Permanent fungicidal treatment for overcurrent protective devices and other components.

G. Incoming Mains:

1. Location: Convertible between top and bottom.
2. Main Breaker: Main lug interiors up to 400 amperes shall be field convertible to main breaker.

H. Phase, Neutral, and Ground Buses:

1. Material: Hard-drawn copper, 98 percent conductivity.
 - a. Plating shall run entire length of bus.
 - b. Bus shall be fully rated the entire length.
2. Interiors shall be factory assembled into a unit. Replacing switching and protective devices shall not disturb adjacent units or require removing the main bus connectors.
3. Equipment Ground Bus: Adequate for feeder and branch-circuit equipment grounding conductors; bonded to box.
4. Isolated Ground Bus: Adequate for branch-circuit isolated ground conductors; insulated from box.
5. Full-Sized Neutral: Equipped with full-capacity bonding strap for service entrance applications. Mount electrically isolated from enclosure. Do not mount neutral bus in gutter.
6. Extra-Capacity Neutral Bus: Neutral bus rated 200 percent of phase bus and listed and labeled by an NRTL acceptable to authority having jurisdiction, as suitable for nonlinear loads in electronic-grade panelboards and others designated on Drawings. Connectors shall be sized for double-sized or parallel conductors as indicated on Drawings. Do not mount neutral bus in gutter.
7. Split Bus: Vertical buses divided into individual vertical sections..

I. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: Hard-drawn copper, 98 percent conductivity.
2. Terminations shall allow use of 75 deg C rated conductors without derating.
3. Size: Lugs suitable for indicated conductor sizes, with additional gutter space, if required, for larger conductors.

4. Main and Neutral Lugs: Mechanical type, with a lug on the neutral bar for each pole in the panelboard.
 5. Ground Lugs and Bus-Configured Terminators: Mechanical type, with a lug on the bar for each pole in the panelboard.
 6. Feed-Through Lugs: Mechanical type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
 7. Subfeed (Double) Lugs: Mechanical type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.
- J. NRTL Label: Panelboards or load centers shall be labeled by an NRTL acceptable to authority having jurisdiction for use as service equipment with one or more main service disconnecting and overcurrent protective devices. Panelboards or load centers shall have meter enclosures, wiring, connections, and other provisions for utility metering. Coordinate with utility company for exact requirements.
- K. Future Devices: Panelboards or load centers shall have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.
1. Percentage of Future Space Capacity: 20 percent.
- L. Panelboard Short-Circuit Current Rating: Rated for series-connected system with integral or remote upstream overcurrent protective devices and labeled by an NRTL. Include label or manual with size and type of allowable upstream and branch devices listed and labeled by an NRTL for series-connected short-circuit rating.
1. Panelboards rated 240 V or less shall have short-circuit ratings as shown on Drawings, but not less than 10,000 A rms symmetrical.
 2. Panelboards rated above 240 V and less than 600 V shall have short-circuit ratings as shown on Drawings, but not less than 14,000 A rms symmetrical.

2.2 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Panelboards shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
- B. Surge Suppression: Factory installed as an integral part of indicated panelboards, complying with UL 1449 SPD Type 1.

2.3 POWER PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. [Eaton.](#)
2. [General Electric Company; GE Energy Management - Electrical Distribution.](#)
3. [SIEMENS Industry, Inc.; Energy Management Division.](#)
4. Square D Schneider Electric
5. NJ Sullivan

B. Panelboards: NEMA PB 1, distribution type.

C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.

1. For doors more than 36 inches high, provide two latches, keyed alike. D.

Mains: Circuit breaker Lugs only.

E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.

F. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. [Manufacturers:](#) Subject to compliance with requirements, provide products by one of the following:

1. [Eaton.](#)
2. [General Electric Company; GE Energy Management - Electrical Distribution.](#)
3. [SIEMENS Industry, Inc.; Energy Management Division.](#)
4. Square D Schneider Electric

B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

C. Mains: Circuit breaker or lugs only.

D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

E. Doors: Door-in-door construction with concealed hinges; secured with multipoint latch with tumbler lock; keyed alike. Outer door shall permit full access to the panel interior. Inner door shall permit access to breaker operating handles and labeling, but current carrying terminals and bus shall remain concealed.

2.5 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A.MCCB: Comply with UL 489, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers:
 - a. Inverse time-current element for low-level overloads.
 - b. Instantaneous magnetic trip element for short circuits.
 - c. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front mounted, field-adjustable trip setting.
3. Electronic Trip Circuit Breakers:
 - a. RMS sensing.
 - b. Field-replaceable rating plug or electronic trip.
 - c. Digital display of settings, trip targets, and indicated metering displays.
 - d. Multi-button keypad to access programmable functions and monitored data.
 - e. Ten-event, trip-history log. Each trip event shall be recorded with type, phase, and magnitude of fault that caused the trip.
 - f. Integral test jack for connection to portable test set or laptop computer.
 - g. Field-Adjustable Settings:
 - 1) Instantaneous trip.
 - 2) Long- and short-time pickup levels.
 - 3) Long and short time adjustments.
 - 4) Ground-fault pickup level, time delay, and $I^2 T$ response.
4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
5. GFCI Circuit Breakers: Single- and double-pole configurations with Class A ground-fault protection (6-mA trip).
6. GFEP Circuit Breakers: Class B ground-fault protection (30-mA trip).
7. Arc-Fault Circuit Interrupter Circuit Breakers: Comply with UL 1699; 120/240-V, single pole configuration.
8. Subfeed Circuit Breakers: Vertically mounted.
9. MCCB Features and Accessories:
 - a. Standard frame sizes, trip ratings, and number of poles.
 - b. Breaker handle indicates tripped status.
 - c. UL listed for reverse connection without restrictive line or load ratings.
 - d. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
 - e. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and HID lighting circuits.

- f. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
- g. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at 55 percent of rated voltage.
- h. Rating Plugs: Three-pole breakers with ampere ratings greater than 150 amperes shall have interchangeable rating plugs or electronic adjustable trip units.
- i. Auxiliary Contacts: Two, SPDT switches with "a" and "b" contacts; "a" contacts mimic circuit-breaker contacts and "b" contacts operate in reverse of circuit-breaker contacts.
- j. Alarm Switch: Single-pole, normally open contact that actuates only when circuit breaker trips.
- k. Key Interlock Kit: Externally mounted to prohibit circuit-breaker operation; key shall be removable only when circuit breaker is in off position.
- l. Zone-Selective Interlocking: Integral with electronic trip unit; for interlocking ground-fault protection function with other upstream or downstream devices.
- m. Multipole units enclosed in a.
- n. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or off position.
- o. Handle Clamp: Loose attachment, for holding circuit-breaker handle in on position.

2.6 IDENTIFICATION

- A. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles shall be located on the interior of the panelboard door.
- B. Breaker Labels: Faceplate shall list current rating, UL and IEC certification standards, and AIC rating.
- C. Circuit Directory: Directory card inside panelboard door, mounted in metal frame with transparent protective cover.
 - 1. Circuit directory shall identify specific purpose with detail sufficient to distinguish it from all other circuits.
- D. Circuit Directory: Computer-generated circuit directory mounted inside panelboard door with transparent plastic protective cover.
 - 1. Circuit directory shall identify specific purpose with detail sufficient to distinguish it from all other circuits.

2.7 ACCESSORY COMPONENTS AND FEATURES

- A. Accessory Set: Include tools and miscellaneous items required for overcurrent protective device test, inspection, maintenance, and operation.
- B. Portable Test Set: For testing functions of solid-state trip devices without removing from panelboard. Include relay and meter test plugs suitable for testing panelboard meters and switchboard class relays.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify actual conditions with field measurements prior to ordering panelboards to verify that equipment fits in allocated space in, and comply with, minimum required clearances specified in NFPA 70.
- B. Receive, inspect, handle, and store panelboards according to NECA 407 NEMA PB 1.1.
- C. Examine panelboards before installation. Reject panelboards that are damaged, rusted, or have been subjected to water saturation.
- D. Examine elements and surfaces to receive panelboards for compliance with installation tolerances and other conditions affecting performance of the Work.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Coordinate layout and installation of panelboards and components with other construction that penetrates walls or is supported by them, including electrical and other types of equipment, raceways, piping, encumbrances to workspace clearance requirements, and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Comply with NECA 1.
- C. Install panelboards and accessories according to NECA 407 NEMA PB 1.1.
- D. Equipment Mounting:
 - 1. Attach panelboard to the vertical finished or structural surface behind the panelboard.
- E. Temporary Lifting Provisions: Remove temporary lifting eyes, channels, and brackets and temporary blocking of moving parts from panelboards.

- F. Comply with mounting and anchoring requirements specified in Section 260548.16 "Seismic Controls for Electrical Systems."
- G. Mount top of trim 90 inches above finished floor unless otherwise indicated.
- H. Mount panelboard cabinet plumb and rigid without distortion of box.
- I. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
- J. Mount surface-mounted panelboards to steel slotted supports 1 1/4 inch in depth. Orient steel slotted supports vertically.
- K. Install overcurrent protective devices and controllers not already factory installed.
 - 1. Set field-adjustable, circuit-breaker trip ranges.
 - 2. Tighten bolted connections and circuit breaker connections using calibrated torque wrench or torque screwdriver per manufacturer's written instructions.
- L. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.
- M. Install filler plates in unused spaces.
- N. Stub four 1-inch empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future. Stub four 1-inch empty conduits into raised floor space or below slab not on grade.
- O. Arrange conductors in gutters into groups and bundle and wrap with wire ties after completing load balancing.
- P. Mount spare fuse cabinet in accessible location.

3.3 IDENTIFICATION

- A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems."
- B. Create a directory to indicate installed circuit loads after balancing panelboard loads; incorporate Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.
- C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

- D. Device Nameplates: Label each branch circuit device in power panelboards with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- E. Install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems" identifying source of remote circuit.

3.4 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
- B. Perform tests and inspections.

- 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

- C. Acceptance Testing Preparation:

- 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
- 2. Test continuity of each circuit.

Inspections:

- 1. Perform each visual and mechanical inspection and electrical test for low-voltage air circuit breakers and low-voltage surge arrestors stated in NETA ATS, Paragraph 7.6 Circuit Breakers and Paragraph 7.19.1 Surge Arrestors, Low-Voltage. Perform optional tests. 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.
- 3. Perform the following infrared scan tests and inspections and prepare reports:
 - a. Initial Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, perform an infrared scan of each panelboard. Remove front panels so joints and connections are accessible to portable scanner.
 - b. Follow-up Infrared Scanning: Perform an additional follow-up infrared scan of each panelboard 11 months after date of Substantial Completion.
 - c. Instruments and Equipment:
 - 1) Use an infrared scanning device designed to measure temperature or to detect significant deviations from normal values. Provide calibration record for device.

- E. Panelboards will be considered defective if they do not pass tests and inspections.
- F. Prepare test and inspection reports, including a certified report that identifies panelboards included and that describes scanning results, with comparisons of the two scans. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

3.5 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges.
- C. Load Balancing: After Substantial Completion, but not more than 60 days after Final Acceptance, measure load balancing and make circuit changes. Prior to making circuit changes to achieve load balancing, inform Solar Consultant of effect on phase color coding.
 - 1. Measure loads during period of normal facility operations.
 - 2. Perform circuit changes to achieve load balancing outside normal facility operation schedule or at times directed by the Solar Consultant. Avoid disrupting services such as fax machines and on-line data processing, computing, transmitting, and receiving equipment.
 - 3. After changing circuits to achieve load balancing, recheck loads during normal facility operations. Record load readings before and after changing circuits to achieve load balancing.
 - 4. Tolerance: Maximum difference between phase loads, within a panelboard, shall not exceed 20 percent.

3.6 PROTECTION

- A. Temporary Heating: Prior to energizing panelboards, apply temporary heat to maintain temperature according to manufacturer's written instructions.

END OF SECTION 262416

SECTION 262813 - FUSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Cartridge fuses rated 600 V ac and less for use in the following:
 - a. Enclosed controllers.
 - b. Enclosed switches.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- 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. Bussmann; Eaton, Electrical Sector.
 - 2. Littelfuse, Inc.
- B. Source Limitations: Obtain fuses, for use within a specific product or circuit, from single source from single manufacturer.

2.2 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, current-limiting, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.
 - 1. Type RK-1: 600-V, zero- to 600-A rating, 200 kAIC.

- 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.
- C. Comply with NEMA FU 1 for cartridge fuses.
- D. Comply with NFPA 70.
- E. Coordinate fuse ratings with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine fuses before installation. Reject fuses that are moisture damaged or physically damaged.
- B. Examine holders to receive fuses for compliance with installation tolerances and other conditions affecting performance, such as rejection features.
- C. Examine utilization equipment nameplates and installation instructions. Install fuses of sizes and with characteristics appropriate for each piece of equipment.
- D. Evaluate ambient temperatures to determine if fuse rating adjustment factors must be applied to fuse ratings.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 FUSE APPLICATIONS

- A. Cartridge Fuses:
 - 1. Feeders: Class RK1, fast acting
 - 2. Motor Branch Circuits: Class RK1.
 - 3. Other Branch Circuits: Class RK1.
 - 4. Control Transformer Circuits: Class CC, time delay, control transformer duty.
 - 5. Provide open-fuse indicator fuses or fuse covers with open fuse indication.

3.3 INSTALLATION

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

3.4 IDENTIFICATION

- A. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems" and indicating fuse replacement information inside of door of each fused switch and adjacent to each fuse block, socket, and holder.

END OF SECTION 262813

SECTION 262816 - ENCLOSED SWITCHES AND CIRCUIT BREAKERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Fusible switches.
 - 2. Nonfusible switches.
 - 3. Enclosures.

1.3 DEFINITIONS

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

1.4 ACTION SUBMITTALS

- A. Product Data: For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections,

weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.

1. Enclosure types and details for types other than NEMA 250, Type 1.
2. Current and voltage ratings.
3. Short-circuit current ratings (interrupting and withstand, as appropriate).
4. Include evidence of a nationally recognized testing laboratory (NRTL) listing for series rating of installed devices.
5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.
6. Include time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Provide in PDF electronic format.

B. Shop Drawings: For enclosed switches and circuit breakers.

1. Include plans, elevations, sections, details, and attachments to other work.
2. Include wiring diagrams for power, signal, and control wiring.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For enclosed switches and circuit breakers to include in emergency, operation, and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
 - a. Manufacturer's written instructions for testing and adjusting enclosed switches and circuit breakers.
 - b. Time-current coordination curves (average melt) for each type and rating of overcurrent protective device; include selectable ranges for each type of overcurrent protective device. Provide in PDF electronic format.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Fuses: Equal to 10 percent of quantity installed for each size and type, but no fewer than three of each size and type.
2. Fuse Pullers: One for each size and type..

1.7 QUALITY ASSURANCE

A. Testing Agency Qualifications: Accredited by NETA.

1. Testing Agency's Field Supervisor: Currently certified by NETA to supervise on-site testing.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Rate equipment for continuous operation under the following conditions unless otherwise indicated:

1. Ambient Temperature: Not less than minus 22 deg F and not exceeding 104 deg F.
2. Altitude: Not exceeding 6600 feet.

1.9 WARRANTY

A. Manufacturer's Warranty: Manufacturer and Contractor agree to repair or replace components that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two (2) years from date of final electrical inspection approval.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Source Limitations: Obtain enclosed switches and circuit breakers, overcurrent protective devices, components, and accessories, within same product category, from single manufacturer.
- B. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
- D. Comply with NFPA 70.

2.2 FUSIBLE SWITCHES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ABB Inc.
2. Eaton.
3. General Electric Company.
4. SIEMENS Industry, Inc.: Energy Management Division.
5. Square D Schneider Electric B. Type HD, Heavy Duty:

1. Single throw.
2. Three pole.
3. 600-V ac.
4. 1200 A and smaller.
5. UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses.
6. Lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

- C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Isolated Ground Kit: Internally mounted; insulated, labeled for copper and aluminum neutral conductors.
4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
5. Auxiliary Contact Kit: Two NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open. Contact rating - 120-V ac.
6. Hookstick Handle: Allows use of a hookstick to operate the handle.
7. Lugs: Mechanical type, suitable for number, size, and conductor material.
8. Service-Rated Switches: Labeled for use as service equipment.

2.3 NONFUSIBLE SWITCHES

- A. Type HD, Heavy Duty, Three Pole, 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.
- B. 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. Isolated Ground Kit: Internally mounted; insulated, labeled for copper and aluminum neutral conductors.
4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.
5. Auxiliary Contact Kit: Two NO/NC (Form "C") auxiliary contact(s), arranged to activate before switch blades open. Contact rating - 120-V ac.
6. Hookstick Handle: Allows use of a hookstick to operate the handle.
7. Lugs: Mechanical type, suitable for number, size, and conductor material.
8. Service-Rated Switches: Labeled for use as service equipment.

2.4 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, NEMA 250, and UL 50, to comply with environmental conditions at installed location.
- B. Enclosure Finish: The enclosure shall be finished with gray baked enamel paint, electrodeposited on cleaned, phosphatized steel (NEMA 250 Type 1) gray baked enamel paint, electrodeposited on cleaned, phosphatized galvanized steel (NEMA 250 Types 3R, 12) a brush finish on Type 304 stainless steel (NEMA 250 Type 4-4X stainless steel) copper-free cast aluminum alloy (NEMA 250 Types 7, 9).
- C. Conduit Entry: NEMA 250 Types 4, 4X, and 12 enclosures shall contain no knockouts. NEMA 250 Types 7 and 9 enclosures shall be provided with threaded conduit openings in both endwalls.
- D. Operating Mechanism: The circuit-breaker operating handle shall be directly operable through the dead front trim of the enclosure (NEMA 250 Type 3R) externally operable with the operating mechanism being an integral part of the cover (NEMA 250 Types 7, 9). The cover interlock mechanism shall have an externally operated override. The override shall not permanently disable the interlock mechanism, which shall return to the locked position once the override is released. The tool used to override the cover interlock mechanism shall not be required to enter the enclosure in order to override the interlock.
- E. Enclosures designated as NEMA 250 Type 4, 4X stainless steel, 12, or 12K shall have a dual cover interlock mechanism to prevent unintentional opening of the enclosure cover when the circuit breaker is ON and to prevent turning the circuit breaker ON when the enclosure cover is open.

- F. NEMA 250 Type 7/9 enclosures shall be furnished with a breather and drain kit to allow their use in outdoor and wet location applications.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine elements and surfaces to receive enclosed switches and circuit breakers for compliance with installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 - 1. Commencement of work shall indicate Installer's acceptance of the areas and conditions as satisfactory.

3.2 PREPARATION

- A. Interruption of Existing Electric Service: Do not interrupt electric service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electric service according to requirements indicated:
 - 1. Notify Owner no fewer than ten days in advance of proposed interruption of electric service.
 - 2. Indicate method of providing temporary electric service.
 - 3. Do not proceed with interruption of electric service without Owner's written permission.
 - 4. Comply with NFPA 70E.

3.3 ENCLOSURE ENVIRONMENTAL RATING APPLICATIONS

- A. Enclosed Switches and Circuit Breakers: Provide enclosures at installed locations with the following environmental ratings.
 - 1. Indoor, Dry and Clean Locations: NEMA 250, Type 1.
 - 2. Outdoor Locations: NEMA 250, Type 3R Type 4X.
 - 3. Other Wet or Damp, Indoor Locations: NEMA 250, Type 4.
 - 4. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids:
NEMA 250, Type 12.
 - 5. Hazardous Areas Indicated on Drawings: NEMA 250, Type 7 Type 9.

3.4 INSTALLATION

- A. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
- B. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
- C. Comply with mounting and anchoring requirements specified in Section 260548.16 "Seismic Controls for Electrical Systems."
- D. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components. E. Install fuses in fusible devices.
- F. Comply with NFPA 70 and NECA 1.

3.5 IDENTIFICATION

- A. Comply with requirements in Section 260553 "Identification for Electrical Systems."
 - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
 - 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- C. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections. D. Perform tests and inspections.
- E. Tests and Inspections for Switches:
 - 1. Visual and Mechanical Inspection:
 - a. Inspect physical and mechanical condition.

- b. Inspect anchorage, alignment, grounding, and clearances.
- c. Verify that the unit is clean.
- d. Verify blade alignment, blade penetration, travel stops, and mechanical operation.
- e. Verify that fuse sizes and types match the Specifications and Drawings.
- f. Verify that each fuse has adequate mechanical support and contact integrity.
- g. Inspect bolted electrical connections for high resistance using one of the two following methods:

1) Use a low-resistance ohmmeter.

- a) Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from those of similar bolted connections by more than 50 percent of the lowest value.

2) Verify tightness of accessible bolted electrical connections by calibrated torque-wrench method in accordance with manufacturer's published data or NETA ATS Table 100.12.

- a) Bolt-torque levels shall be in accordance with manufacturer's published data. In the absence of manufacturer's published data, use NETA ATS Table 100.12.

- h. Verify that operation and sequencing of interlocking systems is as described in the Specifications and shown on the Drawings.
- i. Verify correct phase barrier installation.
- j. Verify lubrication of moving current-carrying parts and moving and sliding surfaces.

2. Electrical Tests:

- a. Perform resistance measurements through bolted connections with a low-resistance ohmmeter. Compare bolted connection resistance values to values of similar connections. Investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
- b. Measure contact resistance across each switchblade fuse holder. Drop values shall not exceed the high level of the manufacturer's published data. If manufacturer's published data are not available, investigate values that deviate from adjacent poles or similar switches by more than 50 percent of the lowest value.
- c. Perform insulation-resistance tests for one minute on each pole, phase-to-phase and phase-to-ground with switch closed, and across each open pole.

Apply voltage in accordance with manufacturer's published data. In the absence of manufacturer's published data, use Table 100.1 from the NETA ATS. Investigate values of insulation resistance less than those published in Table 100.1 or as recommended in manufacturer's published data.

- d. Measure fuse resistance. Investigate fuse-resistance values that deviate from each other by more than 15 percent.
 - e. Perform ground fault test according to NETA ATS 7.14 "Ground Fault Protection Systems, Low-Voltage."
- F. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
- G. Prepare test and inspection reports.
- 1. Test procedures used.
 - 2. Include identification of each enclosed switch and circuit breaker tested and describe test results.
 - 3. List deficiencies detected, remedial action taken, and observations after remedial action.

3.7 ADJUSTING

- A. Adjust moving parts and operable components to function smoothly, and lubricate as recommended by manufacturer.

END OF SECTION 262816

SECTION 481500 - SOLAR ENERGY ELECTRICAL POWER GENERATION SYSTEM

PART 1 GENERAL

1.1 SUMMARY

- A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following scope of work.
1. All Design-Build responsibility for the complete installation, testing, commissioning and start-up of a grid-tied, interactive net-metered, solar photovoltaic system on the roof of the Chatham Park Elementary School.
 2. Basis of Design is a solar array designed to completely cover all of the available roof area resulting in a PV system capacity of 400,710 watts DC. The design assumes 703 Q-CELL 570w PV Modules mounted on the IronRidge BX System 5 Degree racking with a 10" interrow spacing
 3. Scope includes furnishing final design, utility submission plans, municipal permitting plans and documents and the complete installation, and commissioning of a solar photovoltaic system with a capacity ranging from 400 kW DC to 300 kW DC
 4. Work includes plans and specifications for the utility interconnection application and administration, project permitting, and maintaining the roof warranty requirements.
 5. Selection, installation, and commissioning of solar modules, racking, solar inverters, inverter combiner panels and interconnection wiring. Provide a web portal and mobile application monitoring system, including a monitoring platform at no cost for the life of the system.
 6. Miscellaneous modification of the existing electrical distribution system, including conduit, wire, and circuit protection equipment.
 7. Coordination with the Utility to establish a net-metering connection.
 8. Providing to the Owner all required documentation associated with the Inflation Reduction Act rebate for the installation of the solar system.
 9. Executing the installation and design to conform to the PA Solar for Schools grant. Providing to the Owner all required documentation associated with the grant processing and payment.

1.2 DEFINITIONS

- A. PV: Photovoltaic.
- B. STC: Standard Test Conditions are defined by solar module manufacturers and testing bodies to standardize the measurement of a module's performance. These conditions are defined as an irradiance of 1000 W/m², a cell temperature of 25°C, and an air mass of 1.5
- C. CEC: California Energy Commission.
- D. Unless otherwise specified or indicated, electrical and electronics terms used in these specifications, and on the drawings, are as defined in the IEEE Studs Dictionary.
- E. Unless otherwise specified or indicated, solar energy conversion and solar photovoltaic energy system terminology used in these specifications, and on the drawings, shall be as defined in ASTM E772.
- F. Unless otherwise specified or indicated, all other terms related to solar PV modules are defined or referenced in the following standards:
 - 1. UL 1703
 - 2. IEEE 1547
 - 3. NEC (Articles 690, 705)
 - 4. NFPA 70

1.3 ACTION SUBMITTALS

- A. Product Data:
 - 1. Include detailed information for components of the solar energy electrical generation system.
 - 2. For each type of product used, including but not limited to:
 - a. Wiring.
 - b. Inverters.
 - c. Photovoltaic modules.
 - d. Rack and support assemblies.
 - e. Instrumentation.
 - f. DC and AC disconnects.
- B. Delegated Design Submittals:
 - 1. All Solar PV System Permit Drawings
 - a. Signed and sealed by the qualified professional engineer responsible for their preparation.
 - 2. Racking

- a Supports and racking for solar photovoltaic system installations shall be prepared by the racking manufacturer's licensed Structural Engineer in Pennsylvania. The manufacturer engineer shall submit to the Contractor the design documents include engineering calculations, drawings, the environmental loading analyses (including wind, snow, hail, and where applicable, seismic), and the rack and substrate's ability to withstand these environmental forces. Signed and sealed by the qualified professional engineer responsible for their preparation.

C. Shop Drawings:

- 1. Submit sufficient information to demonstrate compliance with drawings and specifications.
- 2. Include in the shop drawings wire diagrams, utility interconnection diagrams, layout and arrangement of PV modules, support and mounting mechanism, inverters, combiner boxes-if any, AC and DC disconnects, equipment enclosures, conduits, monitors, meters, transformer, utility isolation switch, and all other accessories associated with the installation of the PV system.
 - a . Provide equipment dimensions, weights and structural mounting details.
 - b . Include dimensions, mounting details, materials, required clearances and setbacks.
 - c . Include electrical ratings, dimensions, mounting details, materials, required clearances, terminations, weight, wiring and connection diagrams, accessories, and nameplate data.
 - d . Provide PV module and inverter spec sheets, as well as rapid shutdown device spec sheet.
- 3. Provide Design Structural Calculations. Include all assumptions such as applicable wind speed, snow and seismic loads.
- 4. Provide Design Electrical Calculations of the PV System.

D. System Description and Performance Requirements

- 1. Strings of PV modules wired in series up to nominal 1000 volts DC
- 2. Strings and arrays of PV modules wired for optimum performance

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Manuals:

- 1. Submit, simultaneously with the shop drawings, complete maintenance and operating manuals including technical data sheets, wiring diagrams, and information for ordering replacement parts. Include the following:
 - a. Safety precautions.
 - b. Operator restart.

- c. Startup, shutdown, and post-shutdown procedures.
- d. Normal operations.
- e. Emergency operations.
- f. Environmental conditions.
- g. Preventive maintenance plan and schedule.
- h. Troubleshooting guides and diagnostic techniques.
- i. Wiring and control diagrams.
- j. Maintenance and repair procedures.
- k. Removal and replacement instructions.
- l. Spare parts and supply list.
- m. Parts identification.
- n. Testing equipment and special tool information.
- o. Warranty information.
- p. Testing and performance data.
- q. Contractor information.

B. Certifications: Two weeks prior to final inspection, submit the following.

- 1. Certification by the Contractor of all major items of the solar energy electric generation system that the system conforms to the requirements of the drawings and specifications, and that they have jointly coordinated and properly integrated this equipment and controls to provide a complete and functional installation.
- 2. Certification by the Contractor that the solar energy electric generation system has been properly installed, adjusted, tested, commissioned, and warrantied. Contractor shall make all necessary field measurements and investigations to ensure that the equipment and assemblies meet contract requirements.

C. Warranty Documentation:

- 1. Manufacturers' special warranties.
- 2. Installer's special warranties.

1.5 WARRANTY

A. Warrant the overall system for both parts and labor for a minimum period of two (2) years. Provide the following component specific warranties:

- 1. PV Modules – Minimum 25-year performance warranty, and minimum 10-year product warranty.

2. Inverters – Minimum 10-year warranty, extendable to 15 or 20 years if offered by manufacturer.
3. Racking System – Minimum 10-year warranty against structural failure or corrosion.
4. Power output - 25 year manufacturer s power output warranty, with the first 10 years at 90% minimum rated power output and the balance of the 25 years at 80% minimum rated power output.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Provide materials to fabricate functioning photovoltaic system in accordance with ASTM, IEEE, NEMA, NFPA, and UL, as specified in this section, and as shown on the drawings.
- B. Factory-prefabricated solar equipment packages which include photovoltaic modules, inverters, and controls and which meet the requirements of this section are acceptable.

2.2 SOLAR PV SYSTEM DESCRIPTION

- A. Interactive solar PV system connected on the line side of the facility's electric service equipment, through a step-down transformer, 480 VAC to 208 VAC, wired in parallel to the electrical utility; and capable of providing power for the facility and supplying power to a distributed network.
- B. The solar PV system shall have a rated capacity ranging from 300 kW_{DC} to 400 kW_{DC}.
- C. Solar PV arrays shall be mounted on ballasted racking on the facility's flat roof
- D. Inverters shall be mounted on the roof on HVAC screens

2.3 Racking and Mounting Systems

- A. Flat-Roof Mounting:
 1. Minimal roof penetrations.
 2. Self-ballasting.
 3. Service Life: 25 years.
 4. Freestanding system.
 5. Approved equal compatible with PV modules

2.4 INVERTER

- A. Shall be listed to UL 1741 and comply with IEEE 1547.
- B. Inverter manufacturer and model shall be listed in California Energy Commission - Solar Equipment Lists Program.
<https://www.energy.ca.gov/programs-and-topics/programs/solar-equipment-lists>
- C. Shall have stand-alone, utility-interactive, or combined capabilities.
- D. Shall be a string inverter with maximum power point tracking (MPPT) features, and have a CEC efficiency no less than 98%.
- E. Shall include anti-islanding protection if paralleling arrangement is required.

2.5 SOLAR PHOTOVOLTAIC (PV) MODULES

- A. Shall be listed to UL 1703.
- B. Solar PV modules shall be connected to rapid shutdown devices which also optimizes the performance of each or a pair of solar PV modules
- C. Solar PV modules shall be Tier 1 class and have module efficiency of no less than 20% at STC.
- D. PV module manufacturer and model shall be listed in California Energy Commission - Solar Equipment Lists Program:
<https://www.energy.ca.gov/programs-and-topics/programs/solar-equipment-lists>

2.6 MANUFACTURERS

- A. Mounting System and Racking System:
 - 1. Basis of Design: IronRidge
 - 2. UniRAC
 - 3. Or Equivalent
- B. Inverter:

1. Basis of Design (Three phase, 480 VAC): SolarEdge
2. Alternate Manufacturers (Three phase, 480 VAC):
 - a. SMA America Sunny Tripower Core1
 - b. CSP
 - c. Or Equivalent

C. Photovoltaic Module:

1. Basis of Design: Q-Cells
2. Alternate Manufacturers: Trina
3. Or Equivalent Tier 1 Module

2.7 RAPID SHUTDOWN

- A. The solar energy electrical generation system shall incorporate rapid shutdown functionality compliant with NEC 690.12 and other related NEC Articles.

2.8 WIRING SPECIALTIES

A. Direct Current Conductors:

1. If Exposed: Shall be PV Wire.
2. If in Conduit: Shall be RHW-2, THWN-2, or XHHW-2.

B. Conduits and Raceways:

1. Shall use steel conduit listed per UL 6, UL 1242, UL 797 (as appropriate).
Weathertight EMT installations shall be allowed for DC wiring in weather-protected areas.
2. Shall use expansion joints on long conduit runs.
3. Shall not be installed on photovoltaic modules.

C. Enclosures subject to weather shall be rated NEMA 3R or better.

D. Cable Assemblies and Junction Boxes:

1. Shall be UL-listed.

2.9 SWITCH/DISCONNECTING MEANS

- A. Shall be UL-listed, in accordance with the NEC, as shown on the drawings, and as specified.

- B. Utility External Disconnect Switch (UEDS) or Utility Isolation Switch: Coordinate requirements with serving electric utility

2.10 Equipment Identification and Labels

- A. All electrical equipment and devices shall be labeled per current NEC 690

2.11 GROUNDING

- A. All applicable components of the solar energy electrical power generating system must be grounded per latest NEC requirements.
- B. DC Ground-Fault Protector:
 - 1. Shall be listed per UL 1703.
 - 2. Shall comply with requirements of the NEC.

2.12 INSTRUMENTATION

- A. Meters: If applicable and system is grid-connected, use net smart meter provided by the serving electric utility.
- B. Sensors:
 - 1. May install additional data acquisition sensors to measure irradiance, wind speed, and ambient and PV module temperatures. Any additional sensors shall require a conduit separate from the current conductor conduit.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. Ballast racking system shall be assembled and installed, as well as the solar PV modules onto the racking system per racking manufacturer's design layout and manual instructions.
- B. Install the solar photovoltaic system in accordance with the NEC, this section, and the instructions of the manufacturer, including the inverters and all other devices.
- C. Prior to system start-up, ensure no copper wire remains exposed with the exception of ground wire as allowed in certain circumstances per manufacturer's instructions.

- D. Wiring Installation: Workers shall be made aware that photovoltaic modules are energized electrically when there is any ambient light source; therefore, workers shall take appropriate safety precautions to prevent accidents. Ensure wires are free of snags and sharp edges that have the potential to compromise the wire insulation.
- E. Instrumentation: Install instruments as recommended by the manufacturer.
- F. Provide safety signage and NEC labeling on all devices and conduit, accordingly.
- G. Remove, replace, patch, and repair existing roofing materials and surfaces cut or damaged during installation of the solar energy electrical power generation system, by methods and with materials so as not to void existing roofing system warranty. Notify roof warrantor before proceeding with the work.

3.2 FIELD QUALITY CONTROL

- A. Field Inspection: Perform in accordance with manufacturer's recommendations. Prior to initial operation, inspect the solar energy electrical power generation system for conformance to drawings, specifications, and NEC. In addition, include the following:
 - 1. Visual Inspection and Tests:
 - a. Compare equipment nameplate data with specifications and approved shop drawings.
 - b. Inspect physical, electrical, and mechanical condition.
 - c. Verify required area clearances.
 - d. Verifying tightness of accessible bolted electrical connections by calibrated torque wrench method, or performing thermographic survey after energization.
 - e. Verify the correct operation of all sensing devices, alarms, and indicating devices.
 - f. Verify that all cable entries from top of junction boxes are sealed per junction box rating.
 - g. Verify all connections and integrity of printed circuit boards in all applicable junction boxes.
- B. Tests: Provide equipment and apparatus required for performing tests. Correct defects disclosed by the tests and repeat tests. Conduct tests in the presence of the Solar Consultant.
 - 1. Module String Voltage Test: Prior to connecting wiring to the inverter, use a digital multi-meter to ensure each series string s polarity is correct and the open circuit voltage (Voc) is within reason of expectation (accounting for ambient temperature).
 - 2. Operational Tests: Perform tests in accordance with the manufacturer s written recommendations.

3.3 PROTECTION AND GROUNDING

- A. Solar PV array and racking system shall be properly bonded and grounded per NEC and racking manufacturer's instructions.

3.4 COMMISSIONING

- A. Each PV string polarity and open circuit voltage shall be measured and verified per expected voltage readings, based on environmental conditions, PV data sheet specs and string design per inverter type.
- B. Insulation resistance testing shall be conducted on home run DC wiring to assure minimum leakage and no arc or ground faults.
- C. Only qualified personnel shall connect the solar photovoltaic electrical power generation system to the serving electric utility grid.
- D. Follow inverter manufacturer's manual instructions for commissioning and start-up procedures.
- E. Officially connect the solar photovoltaic electrical power generation system to the serving electric utility grid only after receiving prior approval and permission to operate (PTO) from the electric utility company.

3.5 INSTRUCTION

- A. A complete set of operating instructions for the solar photovoltaic electrical power generation system shall be provided to the Owner and Facility Manager.
- B. Furnish the services of a factory-trained technician for instructing personnel in the maintenance and operation of the solar photovoltaic electrical power generation system, on the date requested by the Owner.

END OF SECTION 481500