

**THE SCHOOL DISTRICT OF PHILADELPHIA
Office of Capital Programs
440 North Broad Street, 3rd Floor – Suite 371
Philadelphia, PA 19130**

TELEPHONE: (215) 400-4730

Addendum No. 01

Subject: Stephen Decatur Elementary School
Generator Replacement & Fire Alarm System Extension
SDP Contract No. B-049C 2020/21

Location: Stephen Decatur Elementary School
3500 Academy Road
Philadelphia, PA 19154

This Addendum, dated November 17, 2021 shall modify and become part of the Contract Documents for the work of this project. Any items not mentioned herein, or affected by, shall be performed strictly in accordance with the original documents.

Bid RFIs:

Revised Drawings:

CS1.0 Cover Sheet
ED1.0 Demolition Plans – Partial Main Building Ground Floor
ED2.0 Partial Electrical One Line Diagram – Demolition
E1.0 Electrical Symbols & Notes
E2.0 Installation Plans – Partial Main Building Ground & First Floor
E3.0 Partial Electrical One Line Diagram – Installation
E4.0 Electrical Details
FA1.0 Fire Alarm Symbols & Notes
FA2.0 Fire Alarm Installation Plans – First Floor SLC Devices
FA4.0 Fire Alarm Riser Diagrams

Revised Specifications:

024199 Selective Demolition
026002 Table of Contents
262416 Panelboards (Added specification section)
284621.11 Addressable Fire-Alarm Systems

Revised Summary of Work:

011000 Summary of Work

Question #1:

Drawing E2.0, Crawl Space – Is the crawl space considered wet and damp location which requires galvanized rigid conduit or is EMT permitted for generator circuits?

Response:

Crawl Space is to be considered a damp location; GRC raceways are required in this area.

Question #2:

Drawing ED2.0, Existing Generator Exhaust Pipe – Do we include in our bid to remove the existing exhaust piping and shield running up the front of the building to the roof?

Response:

Yes, all existing associated systems directly connected to the demolished generator, including the exhaust system from and on the exterior of the building, are to be reworked &/or removed in their entirety, with all building penetrations sealed accordingly.

Question #3:

Drawing FA2.0, Fire Alarm Keyed Notes #1 – Does bid require a “single mode fiber module” or was this from a previous design?

Response:

A Single Mode Fiber Module is not required to be installed on this project, and Key Note #1 has been edited accordingly to indicate a new SLC is to be provided.

Be advised that review of the ‘Phase 1’ FA install As-Builts (received since the Bid release) has prompted the addition of a new amplifier being included under this project and addendum (proposed install at the location of the existing FA equipment), which is to be provided as necessary to serve the audible NAC devices being installed in the Annex buildings.

Question #4:

Generators Spec’s call for an annunciator but location is not shown on floors plans. Do we supply an annunciator for generator and where do we install?

Response:

The Generator Annunciator Panel is required and it is now indicated on plans, with proposed location being in the existing Building Engineers Office on the First Floor; this location (as with all other items requiring coordination) shall be confirmed with the SDP Construction Project Manager and School Principal prior to construction.

Question #5:

Electrical Spec's do not have a "Panel Specification". Please provide.

Response:

Spec Section "262416 Panelboards" omission was an oversight, and it has been provided in this addendum.

Be advised that this panelboard shall have a Surge Suppression Device installed, which is indicated in this Section.

Question #6:

Drawing 3.0: Drawings do not have a "Feeder Schedule". Please confirm "100A-4W (N)" is four #2's and one #8G in 1 ½" GRC.

Response:

Feeder Schedule now appears on E3.0.

"100A-4W" feeder consists of (4) #2 CU & (1) #8 CU EGC in 2" GRC



THE SCHOOL DISTRICT OF PHILADELPHIA

OFFICE OF CAPITAL PROGRAMS

GENERATOR REPLACEMENT & FIRE ALARM SYSTEM EXTENSION

FOR

**STEPHEN DECATUR
ELEMENTARY SCHOOL**
3500 ACADEMY ROAD
PHILADELPHIA, PA 19154

SDP#: B-049 C 2020/21

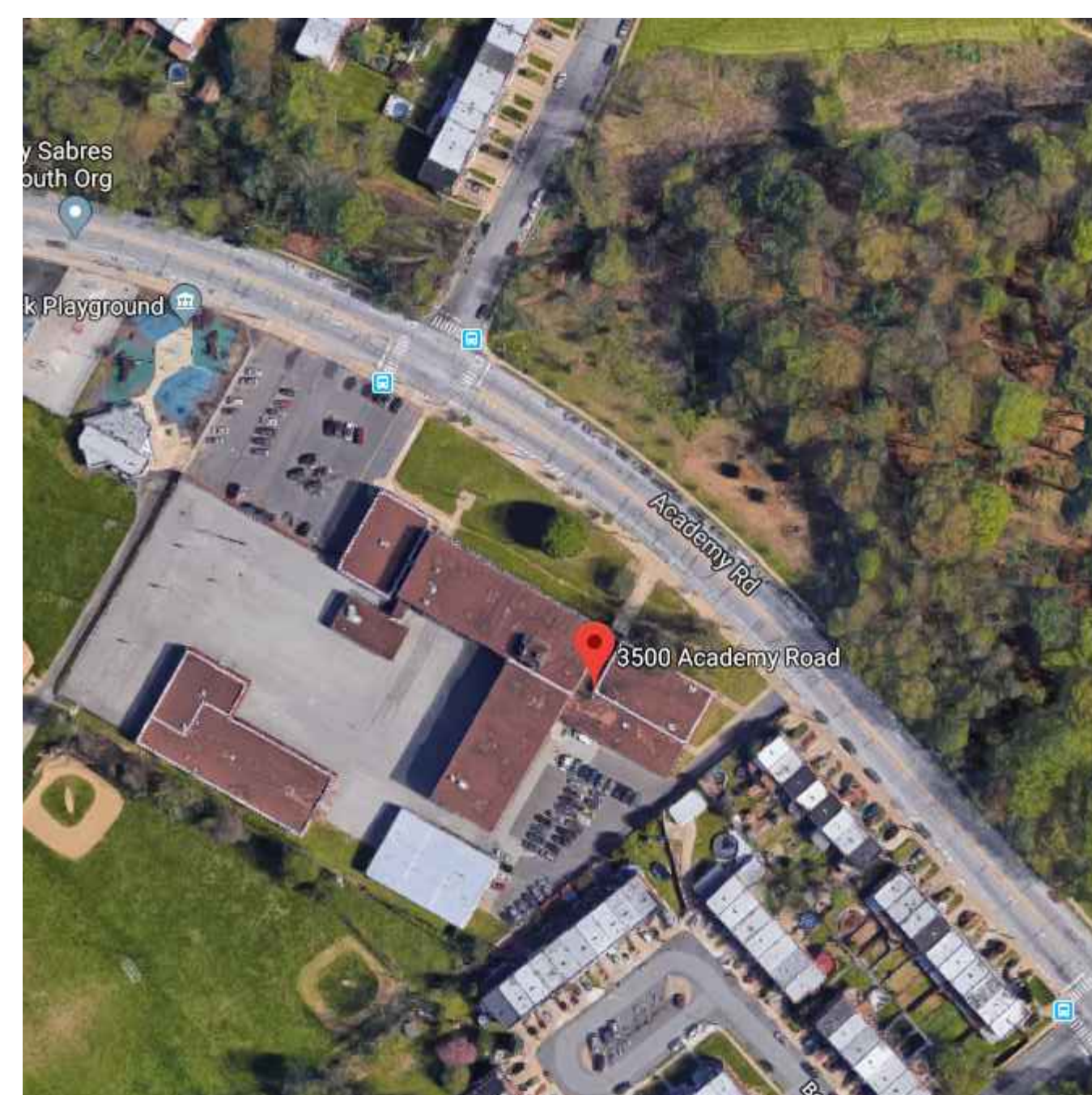
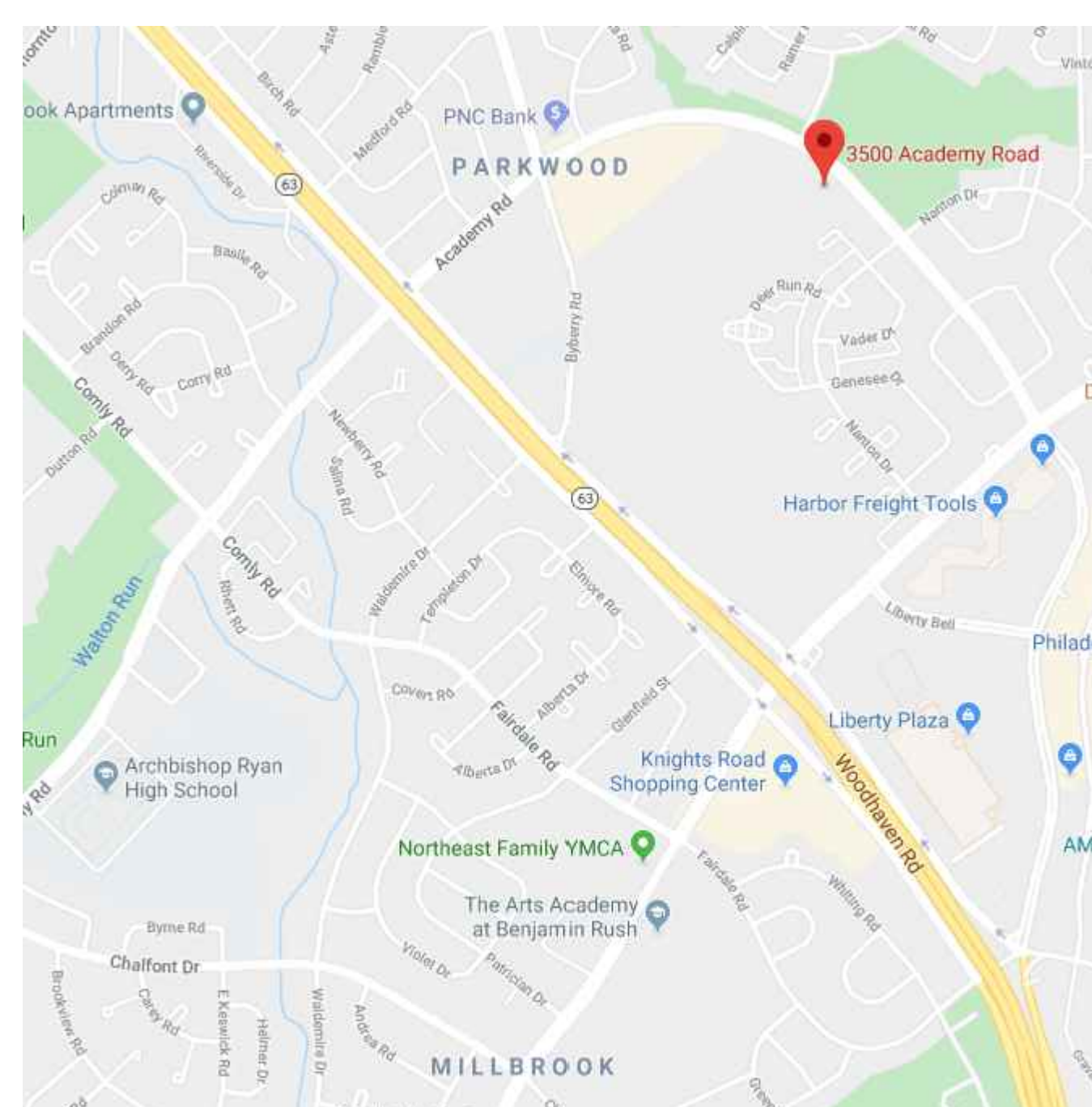
SEAL:



DRAWING LIST

CURRENT ISSUE: ADDENDUM #01		06.30.21 ISSUE FOR 90% REVIEW	07.23.21 ISSUE FOR 100% REVIEW	11.17.21 ADDENDUM #01
	A	B		1
COVER SHEET				
CS1.0	COVER SHEET	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
DEMOLITION				
ED1.0	DEMOLITION PLANS - PARTIAL MAIN BUILDING GROUND FLOOR	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ED1.1	DEMOLITION PLANS - ANNEX BUILDINGS	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ED2.0	PARTIAL ELECTRICAL ONE LINE DIAGRAM - DEMOLITION	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
ELECTRICAL				
E1.0	ELECTRICAL SYMBOLS & NOTES	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
E2.0	INSTALLATION PLANS - PARTIAL MAIN BUILDING GROUND & FIRST FLOOR	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
E3.0	PARTIAL ELECTRICAL ONE LINE DIAGRAM - INSTALLATION	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
E4.0	ELECTRICAL DETAILS	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
FIRE ALARM				
FA1.0	FIRE ALARM SYMBOLS & NOTES	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
FA1.1	FIRE ALARM DETAILS & GUIDELINES	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
FA2.0	FIRE ALARM INSTALLATION PLANS - FIRST FLOOR SLC DEVICES	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
FA3.0	FIRE ALARM INSTALLATION PLANS - FIRST FLOOR NAC DEVICES	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
FA4.0	FIRE ALARM RISER DIAGRAMS	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
FA5.0	FIRE ALARM SPECIFICATION SHEETS	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
FA5.1	FIRE ALARM SPECIFICATION SHEETS	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
FA5.2	FIRE ALARM SPECIFICATION SHEETS	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
FA5.3	FIRE ALARM SPECIFICATION SHEETS	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

LOCATION MAPS



ENGINEERING CONTACT

FXB ENGINEERING

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Chadds Ford, PA 19317
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CONTRACTS

8:04P C 2020/21

1	11.17.21	ADDENDUM #01
B	07.23.21	ISSUE FOR 100% REVIEW
A	06.30.21	ISSUE FOR 90% REVIEW
NO.	DATE	REVISION

SCHOOL & LOCATION
**STEPHEN DECATUR
K-8 SCHOOL**
3500 ACADEMY ROAD,
PHILADELPHIA, PA 19154

PROJECT TITLE
GENERATOR REPLACEMENT & FIRE ALARM SYSTEM EXTENSION

DRAWING TITLE
COVER SHEET

DRAWN BY AVW	CHECKED BY PJB
DRAWING NO. CS1.0	
SHEET 01 OF 17	

CIRCUIT WIRING

	HOME RUN TO PANEL "RP" INDICATES PANEL NO. & 1 INDICATES CIRCUIT NO.
	BRANCH CIRCUIT WIRING CONSISTING OF THIN COPPER CONDUCTORS RUN IN CONCEALED RACEWAY. IN AREAS WITH NO CEILING RUN OVERHEAD CONDUCTORS IN EXPOSED EMT. EQUIPMENT GROUNDING CONDUCTOR IS REQUIRED IN ALL CONDUIT/CABLE RUNS. CONTRACTOR IS RESPONSIBLE FOR DETERMINING QUANTITY OF CONDUCTORS IN RACEWAY. WIREMOLD SHALL NOT BE USED WITHOUT WRITTEN PERMISSION FROM THE SDP.
	BRANCH CIRCUIT WIRING CONSISTING OF THIN COPPER CONDUCTORS IN APPROPRIATE RACEWAY. RUN UNDERGROUND, IN FLOOR SLAB, OR UNDER FLOOR. WIREMOLD SHALL NOT BE USED WITHOUT WRITTEN PERMISSION FROM THE SDP.
	LOW VOLTAGE OR CONTROL WIRING CONSISTING OF THIN COPPER CONDUCTORS RUN IN EMT CONDUIT. WIREMOLD SHALL NOT BE USED WITHOUT WRITTEN PERMISSION FROM THE SDP.
	BRANCH CIRCUIT WIRING CONSISTING OF CONDUCTORS RUN IN FLEXIBLE METAL CONDUIT TO LIGHTING FIXTURE OR MOTORIZED EQUIPMENT. RUN IN "SEALTITE" FOR ALL PLUMB CONNECTIONS. 6"-0" MAX. UNSUPPORTED LENGTH FOR LIGHTING FIXTURES AND 30' FOR OTHER EQUIPMENT. THIS SYMBOL COULD ALSO REPRESENT A FLEXIBLE CORD FINAL CONNECTION TO LIGHT FIXTURES.

POWER DISTRIBUTION

	VARIABLE FREQUENCY DRIVE
	FUSED DISCONNECT SWITCH HEAVY DUTY TYPE. SEE DRAWINGS FOR SIZE, VOLTAGE AND FUSE SIZE. PROVIDE DUAL ELEMENT TIME DELAY TYPE RK5 FUSES
	NON FUSED DISCONNECT SWITCH HEAVY DUTY TYPE. SEE DRAWINGS FOR SIZE AND VOLTAGE
	COMBINATION STARTER AND C/B DISCONNECT HEAVY DUTY TYPE. SEE DRAWINGS FOR SIZES, HP AND VOLTAGE. FURNISHED AND INSTALLED BY E.C. UNLESS NOTED.
	PANEL BOARD SQUARE "D" # NO FOR 208/120 VOLT 3Ø FOR BRANCH CIRCUIT PANEL BOARDS # NF FOR 480/277 VOLT 3Ø FOR BRANCH CIRCUIT PANEL BOARDS
	JUNCTION BOX
	JUNCTION BOX FOR HARD WIRE CONNECTION TO EQUIPMENT
	GENERATOR ANNUNCIATOR PANEL
	TRANSFER SWITCH
	SURGE SUPPRESSION DEVICE

HVAC EQUIPMENT

	MOTOR OR MOTORIZED EQUIPMENT - SEE DRAWINGS FOR EQUIPMENT POWER REQUIREMENTS (SEE NOTE BELOW)
NOTE:	VERIFY MCA, FLA, MSCP, VOLTAGE & PHASE WITH VENDOR SHOP DRAWINGS PRIOR TO INSTALLATION OF ELECTRICAL FEEDER TO EQUIPMENT AND PRIOR TO MAKING FINAL CONNECTIONS. VERIFY EXACT EQUIPMENT LOCATIONS WITH M.C. PRIOR TO ROUGH-INS.

ABBREVIATIONS

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
A, AMP	AMPERES	LAN	LOCAL AREA NETWORK
AA	AMBIENT AIR	LT	LONG TIME
AC	ALTERNATING CURRENT	LTG	LIGHTING
ACR	ABOVE COUNTER RECEPTACLES	LP	LIGHTING PANEL
AF	AMPERE FRAME (CIRCUIT BREAKER)	LS	LONG TIME, SHORT TIME, INSTANTANEOUS
AFB	ABOVE FINISH FLOOR	LSG	LONG TIME, SHORT TIME, INSTANTANEOUS, GROUND FAULT
AFG	ABOVE FINISH GRADE	M	METER
AJU	AMPERE FUSE	M.C.	MECHANICAL CONTRACTOR
AJH	AIR HANDLING UNIT	MCB	MAIN CIRCUIT BREAKER
AC	AMPERE INTERRUPTING CAPACITY	MCC	MOTOR CONTROL CENTER
AL	ALUMINUM	MCCB	MOLDED CASE CIRCUIT BREAKER
ARCH	ARCHITECT	MCP	MOTOR CIRCUIT PROTECTOR
AT	AMPERE TRIP (CIRCUIT BREAKER)	MEP	MECHANICAL, ELECTRICAL, PLUMBING
ATS	AUTOMATIC TRANSFER SWITCH	MECH	MECHANICAL
AUX	AUXILIARY	MFR	MANUFACTURER
A/V	AUDIO VISUAL	MH	MANHOLE
AWG	American Wire Gauge	MI	MISCELLANEOUS
BAS	BUILDING AUTOMATION SYSTEM	MISC	MISCELLANEOUS
BKR	BREAKER	MLO	MAIN LUGS ONLY
BLDG	BUILDING	MTD	MOUNTED
BYP, BP	BYPASS	MTG	MOUNTING
C	CONDUIT - RACEWAY	MTS	MANUAL TRANSFER SWITCH
CAV, TV	CABLE TELEVISION	MV	MEDIUM VOLTAGE
C/B, CB	CIRCUIT BREAKER	N	NEUTRAL/NORMAL
CCIV	CLOSED CIRCUIT TELEVISION	N.C.	NORMALLY CLOSED
CKT	CIRCUIT	N.O.	NORMALLY OPEN
CLG	CEILING	NEC	NATIONAL ELECTRICAL CODE
CLM	CABLE MANAGEMENT	N.I.C.	NOT IN CONTRACT
COM	COMMUNICATIONS	NFSS	NON-FUSED SAFETY SWITCH
CPU	CONTROL POWER TRANSFORMER	NL	NIGHT LIGHT
CPU	CENTRAL PROCESSING UNIT	NTS	NOT TO SCALE
CR	CARD READER	OS	OCCUPANCY SENSOR
CS	CONTROL SWITCH	OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
CU	COPPER	P	PUSH-BUTTON/PULLBOX
CUH	CABINET UNIT HEATER	PB	PUSH-BUTTON/PULLBOX
CT	CURRENT TRANSFORMER	PC	PHOTOCELL
D	DEDICATED	POU	POWER DISTRIBUTION UNIT
DC	DIRECT CURRENT	PF	POWER FACTOR
DDC	DIRECT DIGITAL CONTROL	PH, φ	PHASE
DDC	DIRECT DIGITAL CONTROL	PMS	POWER MONITORING SYSTEM
DEMO	DEMONSTRATION	PNL	PANEL OR PANELBOARD
DI	DIAMETER	PVC	POLYVINYL CHLORIDE
DIST	DISTRIBUTION	PWR	POWER
DWG	DRAWING	PR	PRIMARY
DN	DOWN	PS	POWER SUPPLY
EN	EXISTING TO REMAIN	PT	POTENTIAL TRANSFORMER
E.C.	ELECTRICAL CONTRACTOR	QTY	QUANTITY
EF	EXHAUST FAN	(R)	EXISTING TO BE REMOVED
ELEV	ELEVATOR	REC, RECD	RECEPTACLE
EM	EMERGENCY	REQ, REQD	REQUIRED
EMT	ELECTRICAL METALLIC TUBING	RGS	RIGID GALVANIZED STEEL
EOL	END OF LINE DEVICE	RM	ROOM
EPO	EMERGENCY POWER OFF	RTU	ROOF TOP UNIT
EQU	EQUIPMENT	RUPS	ROTARY UPS
ERMS	ENERGY REDUCTION MAINTENANCE SWITCH	SCA	SHORT CIRCUIT AMPERES
EMC	ELECTRIC WATER COOLER	SCCR	SHORT CIRCUIT CURRENT RATING
F	FUSE	SDP	SCHOOL DISTRICT OF PHILADELPHIA
FA	FIRE ALARM	SEC	SECONDARY
FA	FORCED AIR	SP	SPARE
FAAP	FIRE ALARM ANNUNCIATOR PANEL	SPD	SURGE PROTECTIVE DEVICE
FACP	FIRE ALARM CONTROL PANEL	SPEC	SPECIFICATION
FCC	FIRE COMMAND CENTER	SPKR	SPEAKER
FCU	FAN COIL UNIT	ST	SHUNT TRIP
FDR	FEEDER	STD	STANDARD
FLA	FULL LOAD AMPERES	STP	SHIELDED TWISTED PAIR
FRB	FAN POWERED BOX	STS	STATIC TRANSFER SWITCH
F/S	FUSED SWITCH	SW	SWITCH
FT	FEET	SWBD	SWITCHBOARD
FUL	FUSES	SWGR	SWITCHGEAR
FUT	FUTURE	SYM	SYMMETRICAL
FVR	FULL VOLTAGE REVERSIBLE	SYS	SYSTEM
FVNR	FULL VOLTAGE NON-REVERSIBLE	TB	TERMINAL BLOCK
G	GROUND OR GROUNDING	TEL	TELEPHONE
GND, GRD	GROUND OR GROUNDING	TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
GA	GALVE	TYP	TYPICAL
GEN	GENERATOR	UC	UNDER COUNTER
GF	GROUND FAULT	UG	UNDERGROUND
GFCI, GFI	GROUND FAULT CIRCUIT INTERRUPTER	UH, UH	UNIT HEATER
GPS	GENERATOR PARALLELING SWITCHGEAR	UL	UNDERWRITERS LABORATORY
HH	HAND HOLE	UDN, UNO	UNDERWRITERS LABORATORY
HD	HIGH INTENSITY DISCHARGE	UPS	UNINTERRUPTIBLE POWER SUPPLY
HGA	HAND-OFF-AUTOMATIC SWITCH	UTP	UNSHIELDED TWISTED PAIR
HP	HORSEPOWER	V	VOLT(S)
HZ	HERTZ	VAV	VARIABLE AIR VOLUME BOX
I/NST	INSTANTANEOUS	VFD	VARIABLE FREQUENCY DRIVE
IG	ISOLATED GROUND	VM	VOLTMETER
IMC	INTERMEDIATE METAL CONDUIT	VMS	VOLTMETER SWITCH
JB, JBOX	JUNCTION BOX	W	WIRE/WATT
K	KEY LOCK (KEY INTERLOCK SCHEME)	W/	WITH
KA	KILOAMPERES	WM	WATTMETER
KCAL	THOUSAND CIRCULAR MILS	WP	WEATHERPROOF
KVA	KILOVOLT AMPERES	WG	WITH WRE/GUARD
KW	KILOWATTS	WT	WATERIGHT
KWH	KILOWATT HOUR	XTFMR	TRANSFORMER
KV	KILOVOLTS	Δ	DELTA
KVAR	KVA REACTIVE	⋈	GROUNDING WYE
L	LOCKING TYPE/LOAD		
LA	LIGHTNING SURGE ARRESTOR		

ELECTRICAL GENERAL NOTES

- ALL FEEDER AND BRANCH CIRCUIT WIRING SHALL BE RUN IN CONDUIT AS INDICATED IN THE SECTION 26 SPECIFICATIONS. MC CABLE SHALL BE PERMITTED ONLY AS INDICATED IN SECTION 26 SPECIFICATIONS. TYPE "AC" OR "NM" CABLE SHALL NOT BE USED. AN INSULATED EQUIPMENT GROUNDING CONDUCTOR MUST BE RUN IN ALL BRANCH CIRCUITS. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
- ALL EQUIPMENT SHALL BE INSTALLED IN A NEAT AND WORKMANLIKE MANNER, PARALLEL & PERPENDICULAR TO BUILDING STRUCTURE.
- MINIMUM CONDUIT SIZE SHALL BE 3/4", UNLESS NOTED OTHERWISE. MINIMUM WIRE SIZE SHALL BE #12 AWG TYPE THHN/THWN FOR POWER AND #14 THHN/THWN FOR CONTROL. ALL WIRING TO BE COPPER.
- ALL RACEWAYS RUNNING THROUGH BUILDING EXPANSION JOINTS SHALL BE EQUIPPED WITH EXPANSION FITTINGS.
- ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH THE 2017 NATIONAL ELECTRICAL CODE, THE PHILADELPHIA FIRE CODE, IBC 2018, IECC 2018, IFC 2018, THE LATEST STATE CODES, AND ALL LOCAL CODES.
- ALL ELECTRICAL EQUIPMENT, INCLUDING, BUT NOT LIMITED TO CONDUIT, WIRE, BOXES, AND FITTINGS, SHALL BE NEW AND FREE OF DEFECTS, SHALL BEAR THE UL LABEL, AND SHALL MEET NEMA AND ANSI STANDARDS.
- ALL WORK AND MATERIALS SHALL BE GUARANTEED FREE FROM DEFECTS FOR A MINIMUM PERIOD OF ONE YEAR UNLESS NOTED OTHERWISE. THE WARRANTY PERIOD SHALL BEGIN AT THE DATE OF BENEFICIAL OCCUPANCY OF THE SPACE UNLESS NOTED OTHERWISE IN THE PROJECT SPECIFICATIONS.
- THE CONTRACTOR IS RESPONSIBLE FOR FILING AND PAYING ALL FEES AND OBTAINING NECESSARY PERMITS, CERTIFICATES OF INSPECTION AND SHALL DELIVER ALL CERTIFICATES OF INSPECTION TO OWNER/CONSTRUCTION MANAGER OR GENERAL CONTRACTOR INCLUDING COPIES WITH MAINTENANCE MANUALS.
- ALL NEW BRANCH CIRCUITS SHALL CONTAIN DEDICATED NEUTRAL CONDUCTORS. DO NOT SHARE NEUTRAL CONDUCTORS.
- CONTRACTOR IS RESPONSIBLE FOR CREATING AND TURNING OVER COMPLETE RED LINED AS BUILT DRAWINGS TO INDICATE ANY DEVIATIONS IN DESIGN DOCUMENTS. CONTRACTOR SHALL SUBMIT BOTH HARD COPIES AND DIGITAL COPIES OF "AS-BUILT" DRAWINGS UPON ACCEPTANCE OF COMPLETION OF CONSTRUCTION.
- CONTRACTOR IS RESPONSIBLE FOR CONFIRMING ALL EXISTING SITE CONDITIONS BEFORE COMMENCEMENT OF WORK OR ORDERING OF MATERIALS. COORDINATE SITE CONDITIONS WHICH DEVIATE FROM DRAWINGS WITH THIS ENGINEER BEFORE PROCEEDING.
- ALL NEW BRANCH CIRCUITS, FEEDERS, RECEPTACLES, AND LIGHT SWITCHES SHALL BE SURFACE MOUNTED, UNLESS NOTED OTHERWISE. PROVIDE FACEPLATES, BACKBOXES, MOUNTING HARDWARE, SURFACE MOUNTED CONDUIT, AND SIMILAR APPURTENANCES FOR A FULL INSTALLATION OF ALL INDICATED WORK.
- IF REQUIRED FOR THE SCOPE OF WORK SHOWN HEREIN, ALL NEW RECEPTACLES SHALL BE TAMPER PROOF PER NEC 2017.
- IF NECESSARY FOR THE SCOPE OF WORK SHOWN HEREIN, THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR THE MEANS AND METHODS NECESSARY FOR PROVIDING TEMPORARY ELECTRICAL SERVICE, POWER & LIGHTING IN THE FACILITY DURING THE ENTIRE PERIOD OF CONSTRUCTION UNTIL THE PROPOSED ELECTRICAL SERVICE IS INSTALLED AND FULLY OPERATIONAL. ALL FEES, OVERTIME PAY, UTILITY COORDINATION, AND SIMILAR EXPENSES ASSOCIATED WITH PROVIDING TEMPORARY SERVICE AND POWER SHALL BE INCLUDED IN THE BID. POWER OUTAGES SHALL NOT OCCUR UNTIL COORDINATED WITH AND APPROVED BY THE SDP CONSTRUCTION MANAGER.
- ELECTRICAL CONTRACTOR MUST SUBMIT A METHOD OF PROCEDURE "MOP" FOR ALL POWER TRANSITIONS AND SHUTDOWNS. MOPS WILL BE REVIEWED AND APPROVED BY ENGINEER AND OWNER. REFER TO MOP REQUIREMENTS ON THIS DRAWING.
- PATCH, REPAIR, AND PAINT ALL HOLES AND COSMETIC BLEMISHES DUE TO REMOVAL OF DEVICES AND EQUIPMENT. INSTALL BLANK STAINLESS STEEL FACEPLATES ON UNCOVERED OUTLET AND SWITCH BOXES.
- CABLING FOR MONITORING AND/OR CONTROLS SHALL BE PLENUM RATED, ABOVE DROP CEILING. CABLING MAY BE SUSPENDED FROM J-HOOKS. IN WALLS OR EXPOSED, CABLING SHALL BE IN CONDUIT.

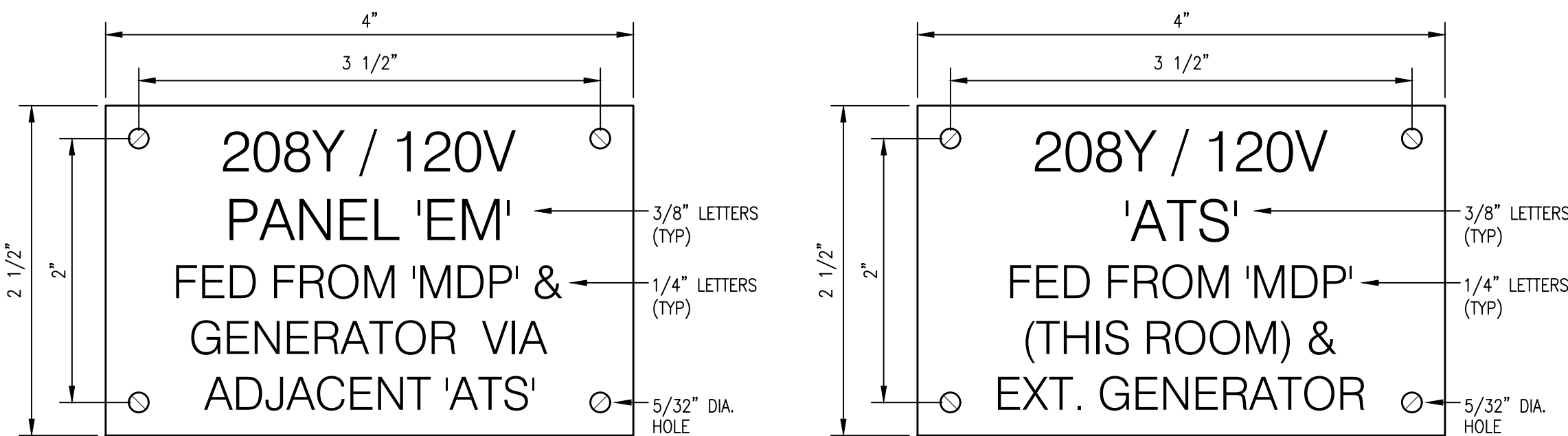
BIDDING INSTRUCTIONS - BASE BID

- PROVIDE ALL MATERIAL, LABOR, EQUIPMENT, AND RELATED APPURTENANCES AS INDICATED AND IMPLIED BY THESE DRAWINGS, BOOK SPECIFICATIONS, AND EXISTING BUILDING CONDITIONS. THIS SHALL INCLUDE ALL COSTS REQUIRED FOR A FULLY OPERATIONAL, CODE COMPLIANT, "TURN KEY" SYSTEM FOR TYPE OF WORK INDICATED.
- VISIT THE SITE AND IDENTIFY EXISTING BUILDING AND BUILDING SYSTEMS ISSUES THAT WILL AFFECT THE BID PRICE. ANY QUESTIONS AND CLARIFICATIONS SHALL BE SUBMITTED TO THIS ENGINEER AS A 'REQUEST FOR INFORMATION' (RFI) PRIOR TO SUBMITTAL OF BID.
- IDENTIFY DUCTWORK, PIPING, STRUCTURAL COMPONENTS, AND SIMILAR EQUIPMENT AND DEVICES THAT WILL NEED TO BE REMOVED, RELOCATED, AND/OR REINSTALLED TO COMPLETE THE INDICATED WORK. INCLUDE ROUTING FEEDERS AND CIRCUITS AROUND THESE SYSTEMS AS REQUIRED.
- DUE TO UNAVAILABILITY OF ACCURATE "AS BUILT" DRAWINGS, LIMITED PANELBOARD DIRECTORIES, AND OTHER DESIGN LIMITATIONS, NOT ALL HVAC, PLUMBING, UTILIZATION EQUIPMENT, AND OTHER EXISTING DEVICES TO REMAIN POWERED ARE INDICATED ON THESE DESIGN DRAWINGS. BID PRICE SHALL INCLUDE COSTS TO IDENTIFY AND RE-FEED THESE DEVICES DURING CONSTRUCTION.
- FAILURE TO IDENTIFY AND ACCOUNT FOR BUILDING CONDITION CHALLENGES THAT AFFECT THE WORK DESCRIBED IN THESE BIDDING INSTRUCTIONS, DRAWINGS, AND BOOK SPECIFICATIONS SHALL NOT RESULT IN ADDITIONAL COST TO THE SCHOOL DISTRICT OF PHILADELPHIA TO COMPLETE ALL WORK DESCRIBED, INDICATED, AND IMPLIED.
- CONFLICTS BETWEEN THE DRAWINGS, BOOK SPECIFICATIONS, AND THE REQUIREMENTS OF THE EXISTING BUILDING CONDITIONS SHALL BE BID USING THE MOST STRINGENT REQUIREMENTS, INCLUDING THE GREATER QUANTITY OF WORK AND THE MORE EXPENSIVE MATERIAL COST.
- TEMPORARILY RELOCATE FURNITURE, FURNISHINGS, AND EQUIPMENT AS REQUIRED TO COMPLETE ALL INDICATED WORK.
- COVER AND PROTECT ALL SCHOOL PROPERTY FROM DUST AND DEBRIS DURING ALL PHASES OF CONSTRUCTION, INCLUDING COMPUTERS, FURNITURE, FIRE ALARM DEVICES, AND SECURITY DEVICES.
- IF REQUIRED, CAREFULLY REMOVE, STORE, AND REINSTALL CEILING TILES AS REQUIRED TO PERFORM INDICATED WORK. CONTRACTOR IS RESPONSIBLE TO REPLACE ANY TILES DAMAGED DURING CONSTRUCTION.

METHOD OF PROCEDURE ("M.O.P.")

WHERE CALLED FOR THROUGHOUT THE CONSTRUCTION DOCUMENTS, OR AS REQUESTED THROUGH THE CONSTRUCTION PROCESS, THE CONTRACTOR SHALL SUBMIT AN M.O.P. FOR ANY ACTIVITY DEEMED BY THE OWNER/ENGINEER TO POTENTIALLY IMPACT FACILITY OPERATIONS. CONTRACTOR TO RELEASE M.O.P. TO THE ENGINEER FOR REVIEW AND COMMENT A MINIMUM OF TWO WEEKS PRIOR TO THE SCHEDULED ACTIVITY. THE M.O.P. SHALL INCLUDE ITEMS SUCH AS, BUT NOT LIMITED TO:

- SHORT DESCRIPTION OF ACTIVITY
- PROPOSED SCHEDULE/ CALENDAR DAY(S) OF ACTIVITY
- ESTIMATED START AND END TIME
- IDENTIFICATION AND REQUIRED ACTION FOR CRITICAL PATH MILESTONES, INCLUDING OWNER DEPENDENCIES
- LENGTH OF ANY PLANNED DOWNTIME OF LIVE POWER SYSTEMS
- STEP BY STEP PROCEDURE WITH ITEMIZED TIME ESTIMATE FOR EACH MAJOR STEP
- EMERGENCY BACK OUT PROCEDURE
- SAFETY EQUIPMENT AND/OR ANY OTHER SPECIAL SAFETY MEASURES TO BE TAKEN
- IDENTIFY LEAD PERSONNEL INVOLVED, INCLUDING 24 HR. CONTACT INFORMATION
- IDENTIFY REQUIRED TRADES TO PARTICIPATE AND TASKS TO BE PERFORMED



TYPICAL EQUIPMENT NAMEPLATE DETAILS

SCALE: NONE
NOTES:

- REFER TO SPECIFICATIONS FOR ADDITIONAL NAMEPLATE REQUIREMENTS; NAMEPLATES SHALL COMPLY WITH NEC 408.4(B).
- NAMEPLATE TO BE 1/16" THICK WHITE PLASTIC WITH BLACK CENTER LAMINATION. FACE SHALL BE BLACK, ENGRAVED LETTERS SHALL BE WHITE.
- SECURE NAMEPLATE TO SURFACES WITH (4) FLAT HEAD BRASS SCREWS. ADHESIVE CEMENT SHALL NOT BE ALLOWED.
- THIS NAMEPLATE DETAIL IS FOR FACILITIES THAT DO NOT ALREADY HAVE EXISTING PANEL NAMEPLATE NOMENCLATURE & CONTENT REQUIREMENTS; VERIFY NOMENCLATURE REQUIREMENTS WITH AUTHORIZED SDP REPRESENTATIVE PRIOR TO PURCHASE & CONSTRUCTION.

SEAL:

NAME (LICENSED PROFESSIONAL): PETER J. BONNES DATE: 09/30/2023
STATE AND LICENSE NO.: PA 046114E



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Engineering Excellence Since 1968

CONTRACTS

8:04P C 2020/21

NO.	DATE	REVISION
1	11.17.21	ADDENDUM #01
B	07.23.21	ISSUE FOR 100% REVIEW
A	06.30.21	ISSUE FOR 90% REVIEW

SCHOOL & LOCATION
**STEPHEN DECATUR
K-8 SCHOOL**
3500 ACADEMY ROAD,
PHILADELPHIA, PA 19154

PROJECT TITLE
**GENERATOR REPLACEMENT &
FIRE ALARM SYSTEM EXTENSION**

DRAWING TITLE

ELECTRICAL
SYMBOLS & NOTES

DRAWN BY
AVW

CHECKED BY
PJB

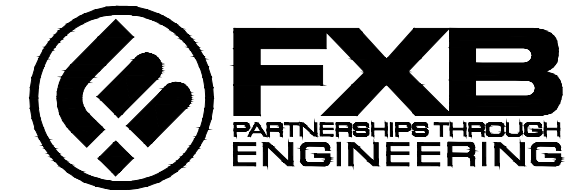
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E1.0

SHEET 05 OF 17

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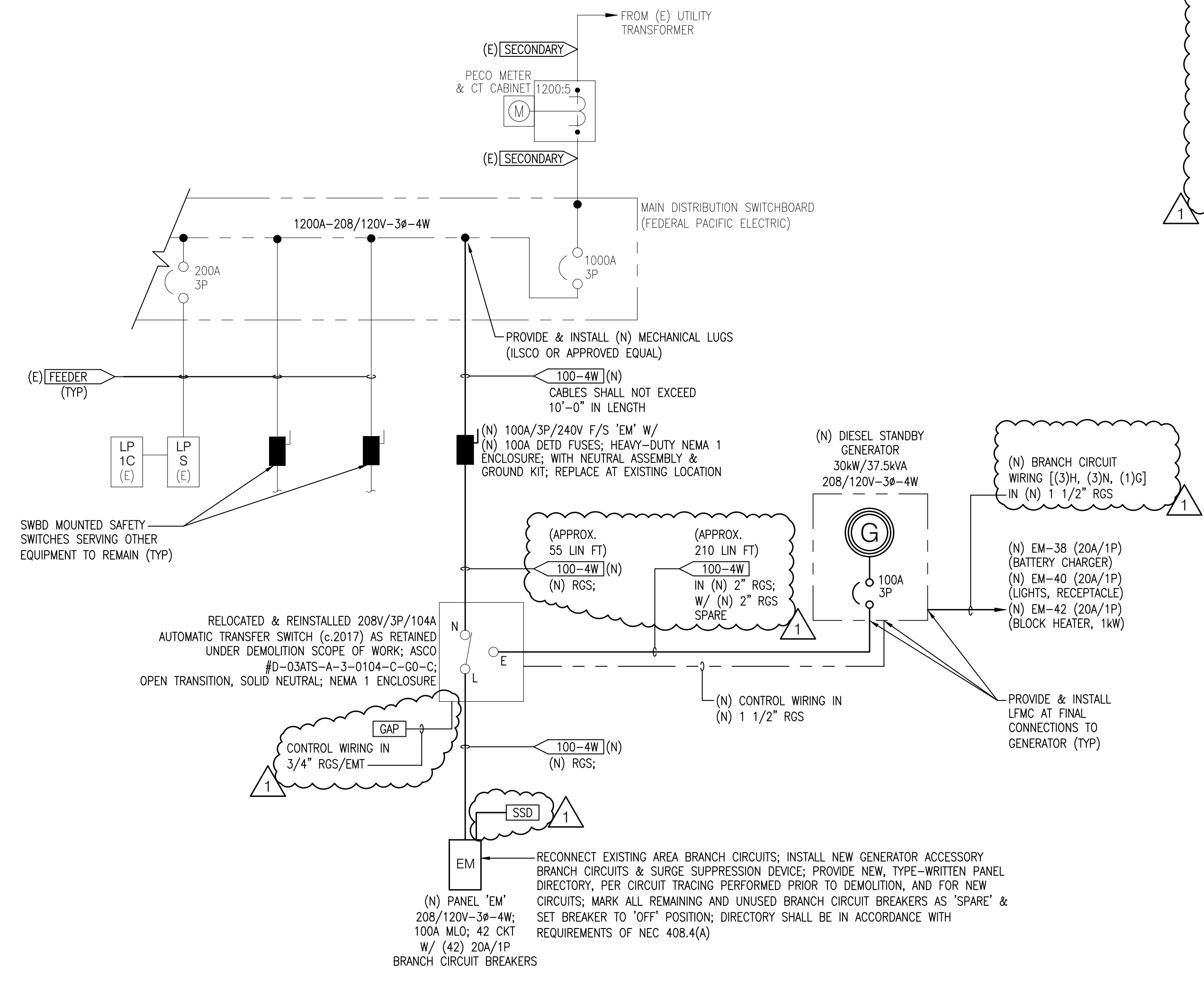
NAME (LICENSED PROFESSIONAL): PETER J. BONNES DATE 09/30/2023
STATE AND LICENSE NO.: PA 046114E



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FEEDER SCHEDULE			
FEEDER TAG	NUMBER OF CONDUITS	SIZE OF CONDUITS	QUANTITY AND SIZE OF CU CONDUCTORS PER CONDUIT
100-3W	1	2"	3 #2 AWG & 1 #8 GND
100-4W	1	2"	4 #2 AWG & 1 #8 GND



PARTIAL ELECTRICAL ONE LINE DIAGRAM - INSTALLATION

1
E3.0

SCALE: NONE

NOTES:

1. ALL EQUIPMENT & WIRING IS NEW AND BY E.C. UNLESS SPECIFICALLY NOTED OTHERWISE.
2. PROVIDE SUBMITTALS FOR ALL NEW EQUIPMENT INDICATED ON THIS ONE LINE DIAGRAM.
3. INCREASE CONDUCTOR SIZE SHOWN BY ONE SIZE IF ACTUAL CIRCUIT DISTANCE FROM SOURCE TO LOAD EXCEEDS THE FOLLOWING (THIS APPLIES TO ALL FEEDERS AND BRANCH CIRCUITS EVEN IF DRAWINGS INDICATE A STANDARD SIZE CONDUCTOR).

VOLTS	PHASE	ONE WAY CONDUCTOR DISTANCE (IN FEET) FROM BREAKER TO LOAD
120	1	70
208	1	100
208	3	130

CONTRACTS
8-04F C 2020/21

NO.	DATE	REVISION
1	11.17.21	ADDENDUM #01
B	07.23.21	ISSUE FOR 100% REVIEW
A	06.30.21	ISSUE FOR 90% REVIEW

SCHOOL & LOCATION
STEPHEN DECATUR K-8 SCHOOL
3500 ACADEMY ROAD,
PHILADELPHIA, PA 19154

PROJECT TITLE
GENERATOR REPLACEMENT & FIRE ALARM SYSTEM EXTENSION

DRAWING TITLE
PARTIAL ELECTRICAL ONE LINE DIAGRAM - INSTALLATION

DRAWN BY AVW CHECKED BY PJB

DRAWING NO.
E3.0

SHEET 07 OF 17

SEAL:

NAME (LICENSED PROFESSIONAL): PETER J. BONNES DATE 09/30/2023
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B	07.23.21	ISSUE FOR 100% REVIEW
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SCHOOL & LOCATION
**STEPHEN DECATUR
K-8 SCHOOL**
3500 ACADEMY ROAD,
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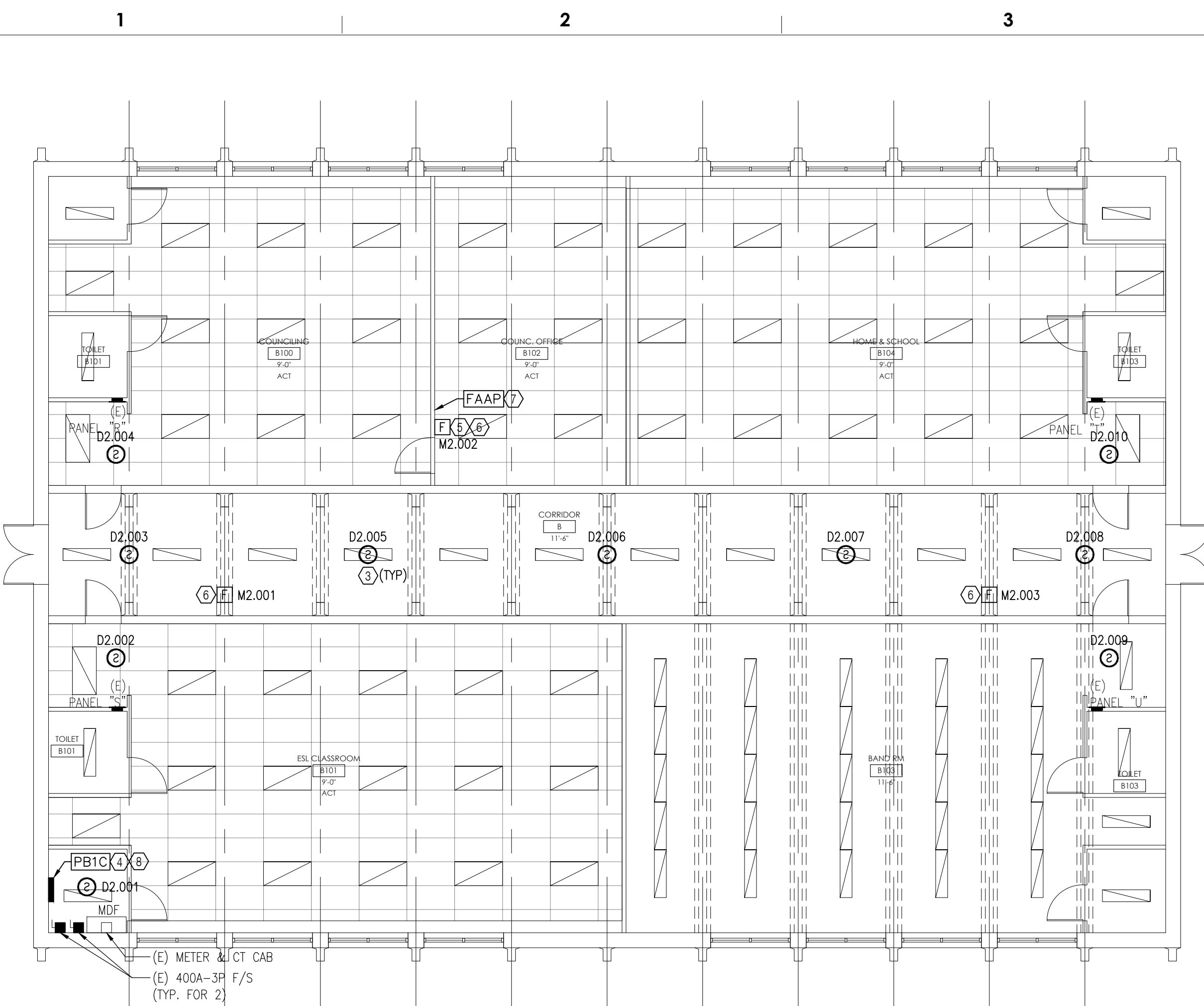
PROJECT TITLE
**GENERATOR REPLACEMENT &
FIRE ALARM SYSTEM EXTENSION**

DRAWING TITLE
FIRE ALARM
INSTALLATION PLANS
- FIRST FLOOR SLC DEVICES

DRAWN BY
AVW

CHECKED BY
PJB

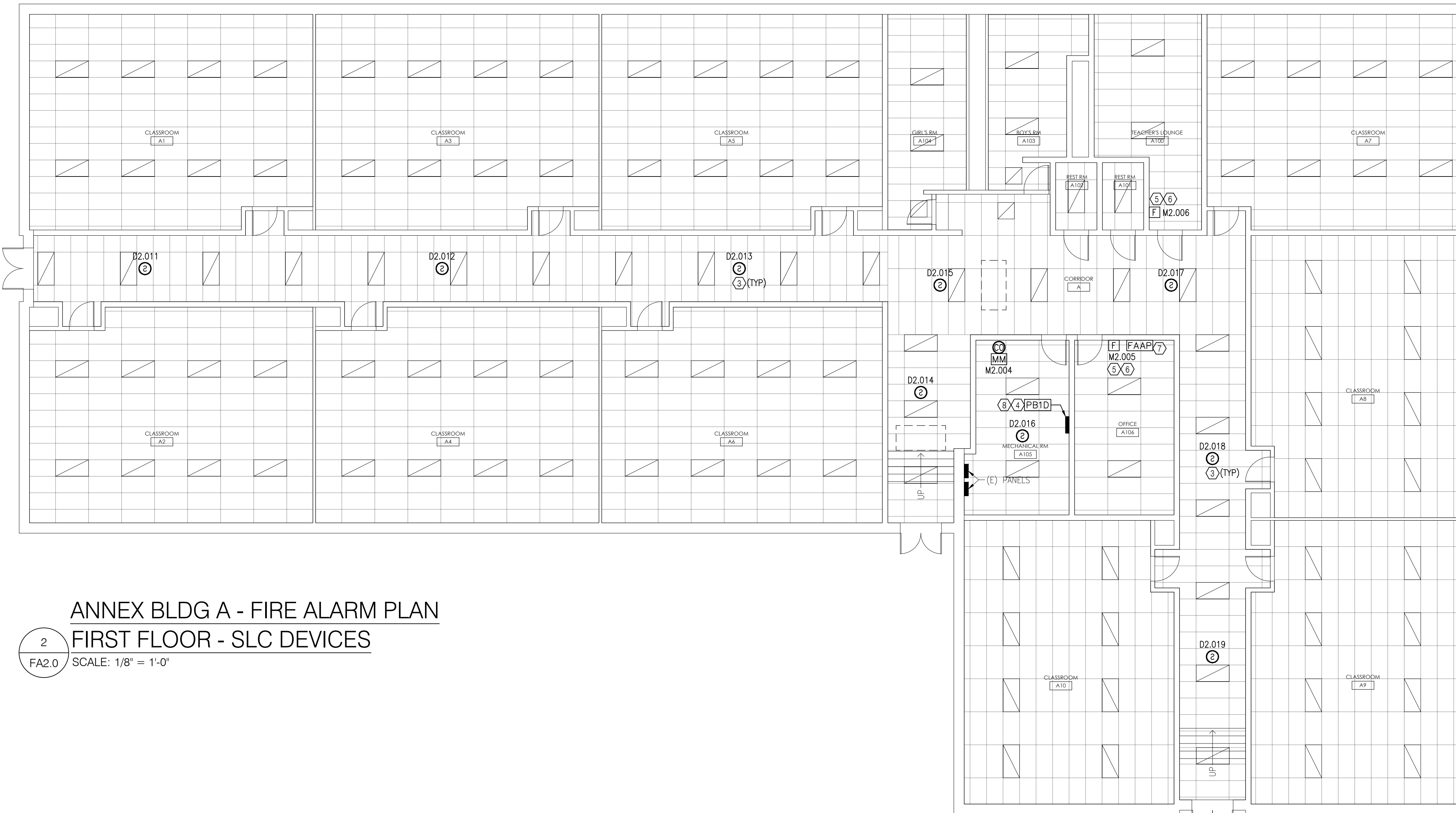
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FA2.0
SHEET 11 OF 17



ANNEX BLDG B - FIRE ALARM PLAN

1 FIRST FLOOR - SLC DEVICES

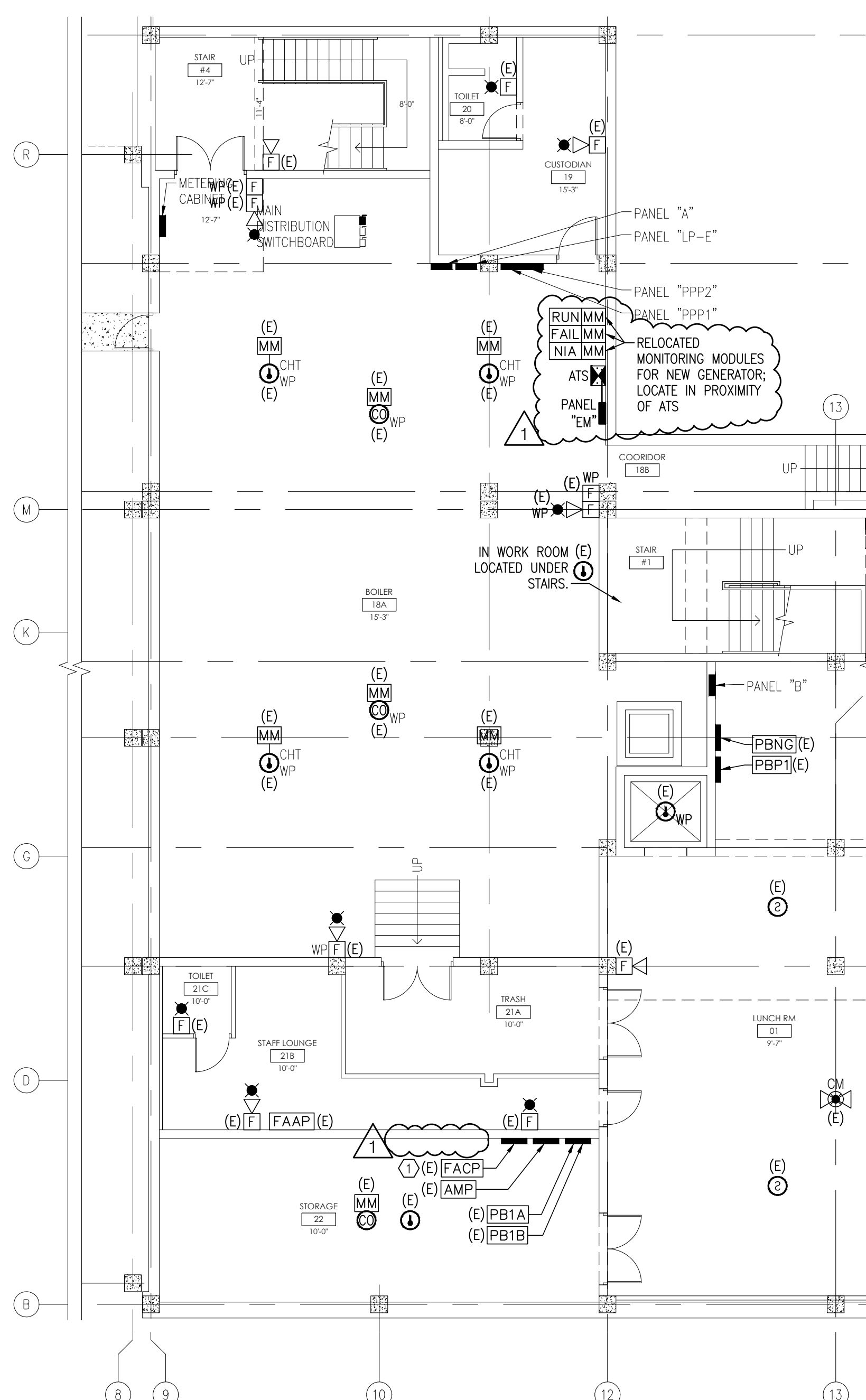
FA2.0 SCALE: 1/8" = 1'-0"



ANNEX BLDG A - FIRE ALARM PLAN

2 FIRST FLOOR - SLC DEVICES

FA2.0 SCALE: 1/8" = 1'-0"



MAIN BLDG - FIRE ALARM PLAN

3 GROUND FLOOR STORAGE ROOM

FA2.0 SCALE: 1/8" = 1'-0"

FIRE ALARM GENERAL NOTES

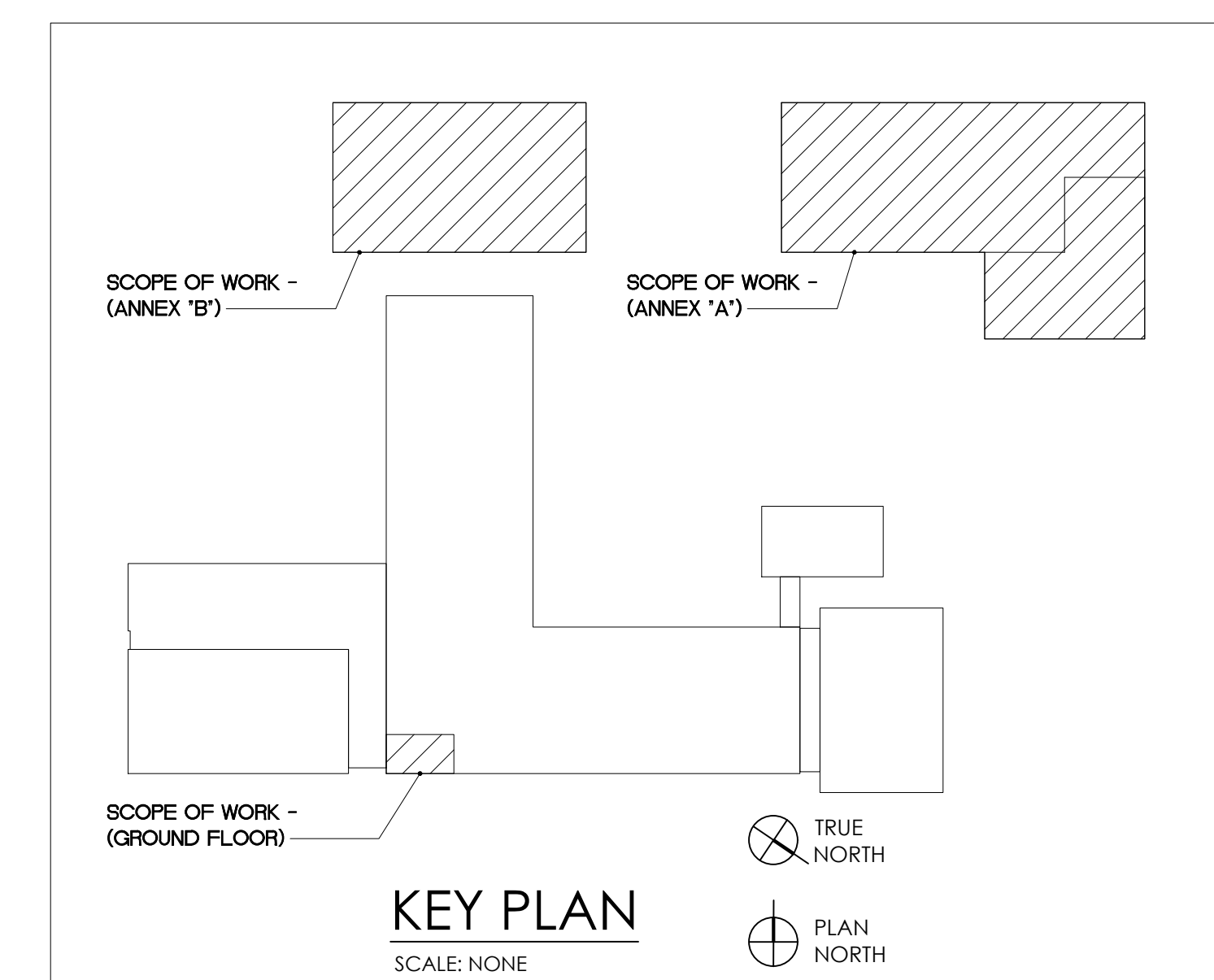
- ALL KEYED NOTES INDICATED MAY NOT APPLY TO DRAWING. ONLY THOSE KEYED NOTES CALLED OUT ON FLOOR PLAN SHALL APPLY.
- PRIOR TO START OF THE FIRE ALARM SYSTEM SCOPE OF WORK, CONTRACTOR MUST REVIEW AND COMPLY WITH THE ASBESTOS INSPECTION REPORT ("AIR") FOR ALL ASBESTOS CONTAINING AREAS AND BUILDING MATERIALS TO REMAIN AS IS. ALL FINAL DEVICE & EQUIPMENT LOCATIONS AND CONDUIT ROUTES SHALL BE COORDINATED WITH THE AIR AND SDP TO AVOID ALL ASBESTOS MATERIALS IN/ON WALLS, CEILINGS, AND FLOORS (ETC.). THERE SHALL BE NO COST TO THE SCHOOL DISTRICT OF PHILADELPHIA FOR DEVICES, EQUIPMENT AND CONDUIT WHICH MUST BE RELOCATED TO AVOID ALL ASBESTOS (ETC.) MATERIAL.
- ALL NEW FIRE ALARM DETECTION AND SUPPRESSION DEVICES SHALL BE INSTALLED, TESTED AND ACCEPTED PRIOR TO OCCUPANCY. THE LOCAL AUTHORITY HAVING JURISDICTION SHALL PERFORM ALL FINAL ACCEPTANCES.
- ALL DEVICES CONTAINING END OF LINE RESISTORS SHALL BE LABELED 'EOL'.
- PROVIDE SIGNAGE AT EACH MANUAL PULL STATION. SIGN MUST BE MOUNTED IMMEDIATELY ADJACENT TO THE MANUAL PULL STATION. THE SIGN SHALL READ "IN CASE OF FIRE, SOUND ALARM AND CALL THE FIRE DEPARTMENT".
- CONTRACTOR SHALL USE CONDUIT SEALING FITTING WITH APPROVED SEALING COMPOUND ON ALL CONDUITS PASSING FROM INTERIOR TO EXTERIOR OF A BUILDING AND BETWEEN AREAS OF DIFFERENT TEMPERATURES. SEAL ALL CONDUIT PENETRATIONS THROUGH RATED WALLS AND FLOORS TO MAINTAIN FIRE RATING INTEGRITY.
- ALL FIRE ALARM WIRING TO BE RUN IN EMT CONDUIT AND COMPLY WITH NEC ARTICLE 760. PROVIDE GALVANIZED RIGID STEEL CONDUIT WITH THREADED FITTINGS FOR ALL RISER CONDUITS AND ALL CONDUITS IN MECHANICAL, ELECTRICAL AND BOILER ROOMS. PAINT ALL JUNCTION BOXES WITH RED COLOR PAINT AND LABEL AS "FIRE ALARM" CONDUIT TO BE CONCEALED ABOVE DROP CEILING WHERE POSSIBLE AND SURFACE MOUNTED ELSEWHERE. DO NOT INSTALL CONDUIT IN WALLS. MINIMUM CONDUIT SIZE TO BE 3/4". ALL WIRING TO BE COPPER. TYPE "MC" CABLE IS NOT ACCEPTABLE.
- THE QUANTITY OF FIRE ALARM NAC EXTENDER POWER SUPPLY PANELS SHOWN ON THESE DRAWINGS AND THE RISER DIAGRAM ARE FOR SCHEMATIC PURPOSES ONLY. THE CONTRACTOR AND FIRE ALARM VENDOR SHALL DETERMINE THE EXACT QUANTITY OF NAC PANELS REQUIRED BASED ON THE MANUFACTURER'S NAC PANEL FUNCTION AND SPECIFICATIONS. THE CONTRACTOR SHALL PROVIDE THE QUANTITY OF NAC PANELS REQUIRED TO SUPPORT THE ENTIRE FIRE ALARM SYSTEM BASED ON THE QUANTITY OF DEVICES SHOWN ON PLAN, TOTAL POWER NEEDED TO SUPPORT THE DEVICES, VOLTAGE DROP CALCULATIONS FOR EACH CIRCUIT, BATTERY CALCULATIONS, SIZE OF BUILDING, ETC. THE CONTRACTOR SHALL PROVIDE 120V, 20AMP CIRCUITS FOR ALL NAC PANELS THAT ARE INSTALLED BASED ON THE FIRE ALARM VENDOR'S CALCULATIONS AT NO ADDITIONAL COST TO SDP.
- CONTRACTOR SHALL VERIFY EXACT PRESENT SITE CONDITIONS IN FIELD SO AS TO FULLY UNDERSTAND THE COORDINATION NECESSARY FOR ALL PROPOSED DEVICE LOCATION(S) WITH ALL EXISTING BUILDING AND CEILING MOUNTED ELEMENTS, EQUIPMENT, DEVICES (ETC.) PRIOR TO BID.

ROOM NAME LEGEND

- ROOM NAME ——— INDICATES ROOM TYPE
 * "1 - 01" ——— 1"(FLOOR LEVEL) - 01"(ROOM NUMBER)
 ** CLG: X-XX" ——— INDICATES CEILING HEIGHT (FT.)
- * ROOM NUMBERS ARE DIAGNOSTIC AND ARE SHOWN FOR REFERENCE ONLY AND DESIGN INTENT. EXISTING ROOM #'S ARE TO BE VERIFIED IN FIELD.
 ** CONTRACTOR IS RESPONSIBLE FOR CONFIRMING ALL EXISTING CEILING HEIGHTS AND EXISTING CONDITIONS WHICH MAY AFFECT FIRE ALARM INSTALLATION IN FIELD. ANY LIGHT FIXTURE HEIGHTS ARE SHOWN FOR DESIGN INTENT AND MUST BE CONFIRMED WITH EXISTING CONDITIONS PRIOR TO INSTALLATION.

FIRE ALARM KEYED NOTES

- PROVIDE AND INSTALL (N) SLC IN EXISTING FACP.
- (NOT USED ON THIS PROJECT)
- FIELD COORDINATE EXACT LOCATIONS OF CEILING MOUNTED DETECTORS; DEVICES TO BE MOUNTED BELOW ALL DUCTWORK, PIPING, AND CONDUIT. DEVICES SHALL BE CLEAR OF ANY OBSTRUCTIONS. WHERE NECESSARY, DEVICES SHALL BE MOUNTED TO UNISTRUT FRAMING AT AN ACCESSIBLE LOCATION SECURELY FASTENED TO CEILING.
- NEW FIRE ALARM REMOTE BOOSTER POWER SUPPLY (NAC). PROVIDE 120V, 20AMP POWER CIRCUIT FROM LOCAL PANELBOARD FOR THE FIRE ALARM REMOTE BOOSTER/NAC POWER SUPPLY. PROVIDE (N) BRANCH CIRCUIT CONSISTING OF (2) #12 + (1) #12 GND. IN 3/4" CONDUIT. PROVIDE & INSTALL (N) 20A/1P OCPD WITH RED LOCK PROVISIONS AS REQUIRED.
- COORDINATE EXACT LOCATION OF PULL STATIONS WITH SDP PRIOR TO INSTALLATION.
- PROVIDE PROTECTIVE PULL STATION COVER WITH PIEZO HORN ALARM MODEL #ST1-1100 W/ST1-3104 'ST1 STOPPER II' AND 9V DC ALKALINE BATTERY. DO NOT CONNECT COVER TO FIRE ALARM SYSTEM.
- LOCATION AS APPROVED BY FIRE MARSHAL.
- COORDINATE EXACT LOCATION WITH AUTHORIZED SDP REPRESENTATIVE PRIOR TO BID AND CONSTRUCTION.



KEY PLAN

SCALE: NONE

SEAL:

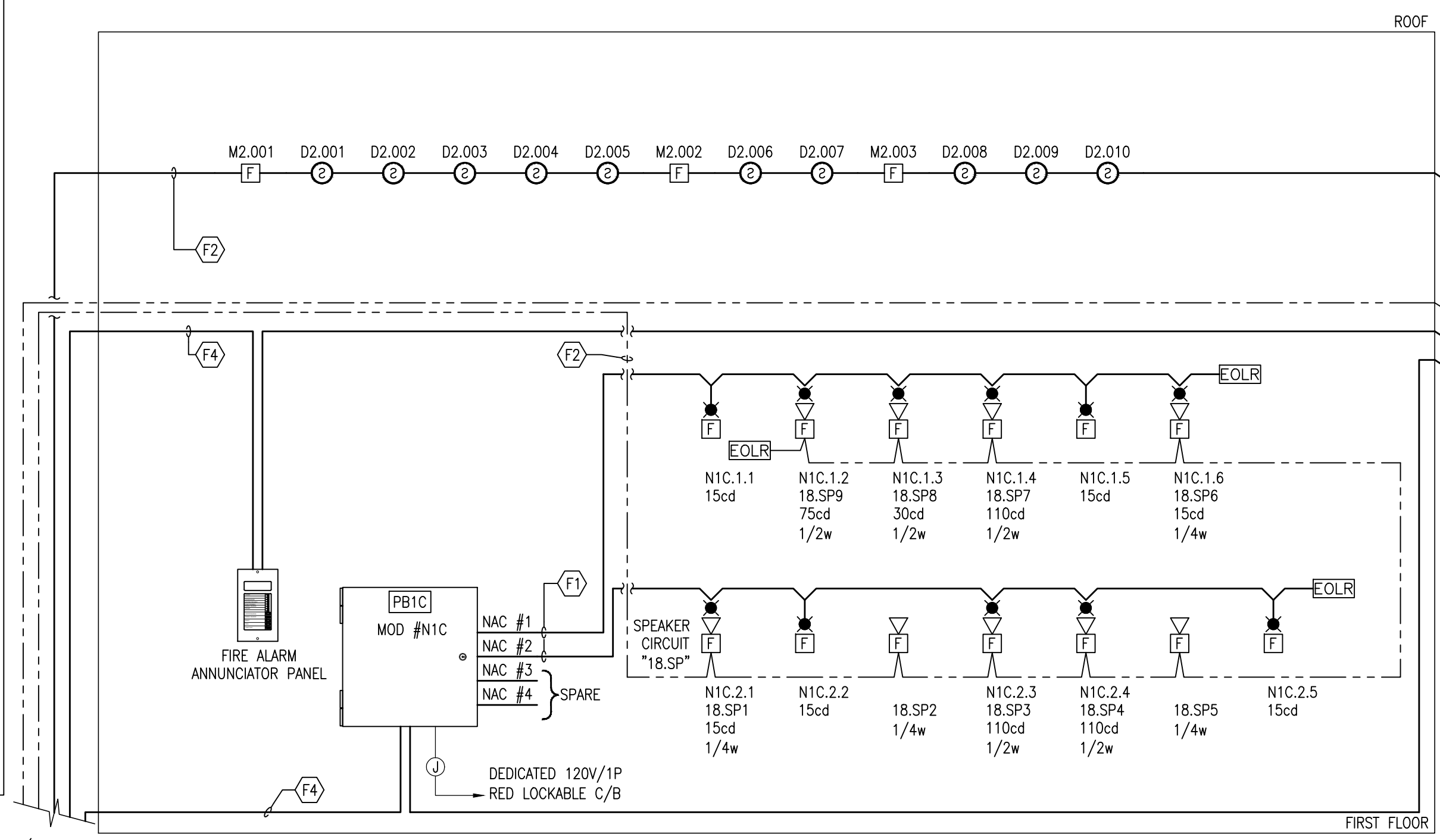
NAME (LICENSED PROFESSIONAL): PETER J. BONNES DATE 09/30/2023
STATE AND LICENSE NO.: PA 046114E



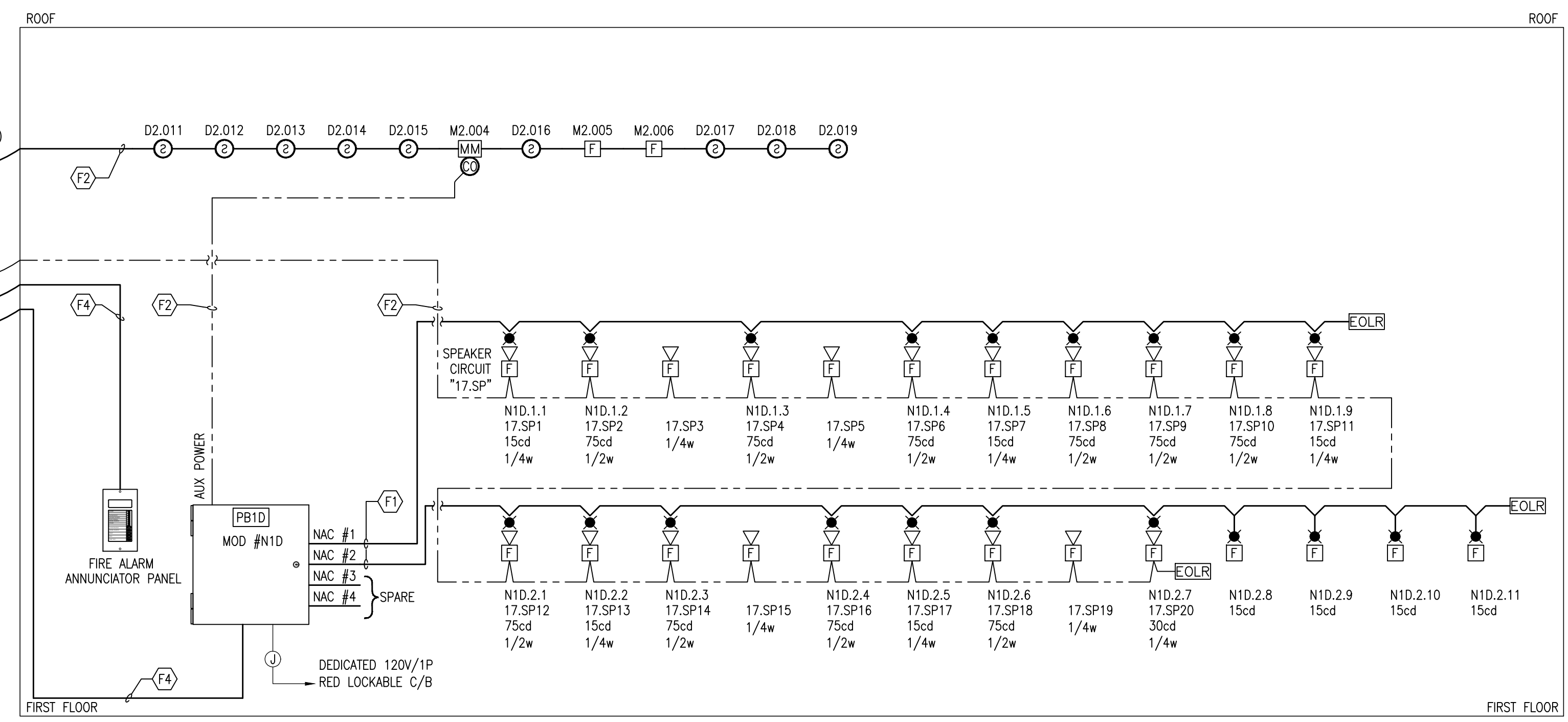
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FIRE ALARM RISER DIAGRAM NOTES

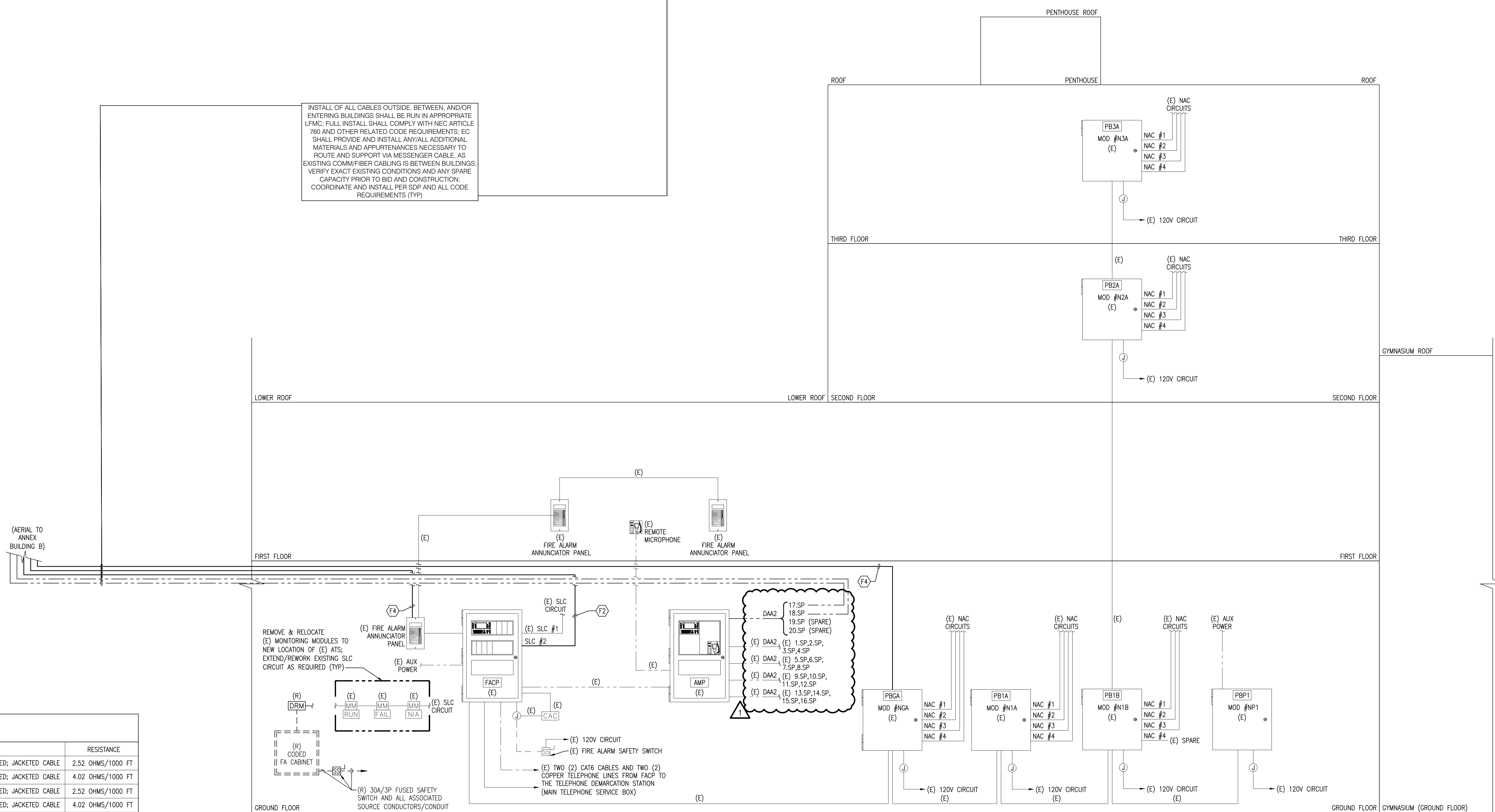
- THIS SCHEMATIC FIRE ALARM RISER IS INTENDED TO INDICATE THE MAJOR FIRE ALARM COMPONENTS AND GENERAL SEPARATION OF INDICATING, INITIATING, COMMUNICATIONS, AND ANNUNCIATION CIRCUITS AS REQUIRED BY THE PROJECT. WIRING IS TO BE PROVIDED AS REQUIRED BY THE FIRE ALARM EQUIPMENT MANUFACTURER. THE RISER DIAGRAM IS A GENERAL INDICATION OF EQUIPMENT TO BE PROVIDED AND DOES NOT NECESSARILY INDICATE ALL ITEMS OR APPURTENANCES WHICH MAY BE REQUIRED TO PROVIDE A FULLY OPERATIONAL SYSTEM. ALL SUCH ITEMS ARE TO BE PROVIDED AS INDICATED IN THE SPECIFICATIONS AND AS REQUIRED BY FIRE ALARM MANUFACTURER FOR OPERATION OF THE SYSTEM.
- ACTIVATION OF ANY COMMON AREA SMOKE DETECTOR, OR PULL STATION SHALL INITIATE A GENERAL ALARM FOR THE ENTIRE BUILDING.
- PROVIDE FULLY ADDRESSABLE SYSTEM CAPABLE OF ADDRESSING EACH DEVICE.
- FACP SHALL BE SUPPLIED WITH BATTERY BACKUP TO COMPLY WITH NFPA 72. ALSO PROVIDE THE APPROPRIATE DIALER TO NOTIFY A CENTRAL MONITORING LOCATION OR CENTRAL STATION.
- THE INSTALLING CONTRACTOR SHOULD BE ADVISED TO PREPARE THE FOLLOWING DOCUMENTATION AT THE PROJECT CLOSE-OUT:
 - SET OF "AS-BUILT" DRAWINGS AS PER INSPECTED INSTALLATION AND AS APPROVED BY THE FIRE MARSHAL.
 - RECORD OF COMPLETION (A DOCUMENT THAT ACKNOWLEDGES THE FEATURES OF INSTALLATION, OPERATION (PERFORMANCE), SERVICE AND EQUIPMENT).
 - MANUAL CONTAINING A "SEQUENCE OF ALARM" AND A MANUFACTURER'S SHEET FOR EACH DEVICE INSTALLED IN THE FIRE ALARM SYSTEM INCLUDING THE MAIN CONSOLE.
- CONTRACTOR IS RESPONSIBLE TO SCHEDULE/ARRANGE, AND PAY FOR ALL PERMITS AND INSPECTIONS.
- THE NEW FIRE ALARM SYSTEM IS TO BE ACCEPTABLE BY FIRE MARSHAL BEFORE THE REMOVAL OF THE EXISTING FIRE ALARM SYSTEM.
- THE QUANTITY OF FIRE ALARM NAC EXTENDER POWER SUPPLY PANELS SHOWN ON THESE DRAWINGS AND THE RISER DIAGRAM ARE FOR SCHEMATIC PURPOSES ONLY. THE CONTRACTOR AND FIRE ALARM VENDOR SHALL DETERMINE THE EXACT QUANTITY OF NAC PANELS REQUIRED BASED ON THE MANUFACTURER'S NAC PANEL FUNCTION AND SPECIFICATIONS. THE CONTRACTOR SHALL PROVIDE THE QUANTITY OF NAC PANELS REQUIRED TO SUPPORT THE ENTIRE FIRE ALARM SYSTEM BASED ON THE QUANTITY OF DEVICES SHOWN ON PLAN. TOTAL POWER NEEDED TO SUPPORT THE DEVICES, VOLTAGE DROP CALCULATIONS FOR EACH CIRCUIT, BATTERY CALCULATIONS, SIZE OF BUILDING, ETC. THE CONTRACTOR SHALL PROVIDE 120V, 20AMP CIRCUITS FOR ALL NAC PANELS THAT ARE INSTALLED BASED ON THE FIRE ALARM VENDOR'S CALCULATIONS AT NO ADDITIONAL COST TO SDP.



1 ANNEX BUILDING - B
FIRE ALARM RISER DIAGRAM
FA4.0 SCALE: NONE



2 ANNEX BUILDING - A
FIRE ALARM RISER DIAGRAM
FA4.0 SCALE: NONE



3 MAIN BUILDING PARTIAL
FIRE ALARM RISER DIAGRAM
FA4.0 SCALE: NONE

CABLE TYPE SCHEDULE

TAG	DESCRIPTION	RESISTANCE
(F1)	2/C, #14 CU SOLID; POWER-LIMITED FIRE ALARM CABLE; UNSHELD; JACKETED CABLE	2.52 OHMS/1000 FT
(F2)	2/C, #16 CU SOLID; POWER-LIMITED FIRE ALARM CABLE; UNSHELD; JACKETED CABLE	4.02 OHMS/1000 FT
(F3)	4/C, #14 CU SOLID; POWER-LIMITED FIRE ALARM CABLE; UNSHELD; JACKETED CABLE	2.52 OHMS/1000 FT
(F4)	4/C, #16 CU SOLID; POWER-LIMITED FIRE ALARM CABLE; UNSHELD; JACKETED CABLE	4.02 OHMS/1000 FT
TYPE	APPLICATIONS (SEE NEC ARTICLE 760.154)	
FPL-CI (CIRCUIT INTEGRITY)	INSTALLED WHERE 2 HR FIRE RATING OF CABLE IS REQUIRED	
FPLP (PLENUM RATED)	INSTALLED IN DUCTS, PLENUMS, AND OTHER SPACES USED FOR ENVIRONMENTAL AIR.	
FPLR (RISER RATED)	INSTALLED IN VERTICAL RUNS AND PENETRATING MORE THAN ONE FLOOR OR INSTALLED IN VERTICAL RUNS IN A SHAFT.	
FPL (GENERAL PURPOSE)	INSTALLED IN BUILDING LOCATIONS OTHER THAN THOSE LISTED ABOVE.	

CONTRACTS
8-049 C 2020/21

NO.	DATE	REVISION
1	11.17.21	ADDENDUM #01
B	07.23.21	ISSUE FOR 100% REVIEW
A	06.30.21	ISSUE FOR 90% REVIEW

SCHOOL & LOCATION
**STEPHEN DECATUR
K-8 SCHOOL**
3500 ACADEMY ROAD,
PHILADELPHIA, PA 19154

PROJECT TITLE
**GENERATOR REPLACEMENT &
FIRE ALARM SYSTEM EXTENSION**

DRAWING TITLE
FIRE ALARM
RISER DIAGRAMS

DRAWN BY
AVW

CHECKED BY
PJB

DRAWING NO.
FA4.0

SHEET 13 OF 17

SECTION 024119 - SELECTIVE DEMOLITION

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. Demolition and removal of selected site elements.

B. Related Requirements:

- 1. Section 011000 "Summary" for restrictions on the use of the premises, Owner-occupancy requirements, and phasing requirements.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.

- 1.4 Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.5 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor. Before disposing of any demolition waste, Contractor must confirm disposal of items with the School District of Philadelphia Construction Manager. Any demolition waste of value to the Philadelphia School District shall be disposed of as directed. In particular, Contractor shall confirm disposal of all fuses being removed.

1.6 PREINSTALLATION MEETINGS

- A. Pre-demolition Conference: Conduct conference at Project site.
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.
 - 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review requirements of work performed that rely on substrates exposed by selective demolition operations.
 - 5. Review areas where existing construction is to remain and requires protection.

1.7 INFORMATIONAL SUBMITTALS

- A. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- B. Schedule of Selective Demolition Activities: Indicate the following:
 - 1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's on-site operations are uninterrupted.
 - 2. Use of elevator and stairs.
 - 3. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
- C. Inventory: Submit a list of items to be removed and salvaged and deliver to Owner prior to start of demolition.
- D. Predemolition Photographs or Video: Show existing conditions, including adjoining construction, and including finish surfaces, that might be misconstrued as damage caused by demolition operations. Submit before Work begins.
- E. Warranties: Documentation indicated that existing warranties are still in effect after completion of selective demolition.

1.8 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.
- B. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.

1.9 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Engineer of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: Hazardous materials are present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.
 - 1. Hazardous material remediation is specified elsewhere in the Contract Documents.
 - 2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
 - 3. Owner will provide material safety data sheets for suspected hazardous materials that are known to be present in buildings and structures to be selectively demolished because of building operations or processes performed there.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 - 1. Maintain fire-protection facilities in service during selective demolition operations.

1.10 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties. Notify warrantor before proceeding.
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

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

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.
- C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.
- D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Engineer.
- E. Survey of Existing Conditions: Record existing conditions by use of measured drawings, preconstruction photographs, preconstruction videotapes and templates.
 - 1. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.
 - 2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

3.2 UTILITY SERVICES AND ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
 - 1. Comply with requirements for existing services/systems interruptions specified in Section 011000 "Summary."
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and electrical systems serving areas to be selectively demolished.
 - 1. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 - 3. Disconnect, demolish, and remove electrical systems, equipment, and components indicated to be removed.

3.3 PREPARATION

- A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 3. Cover and protect furniture, furnishings, and equipment that have not been removed.

3.4 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.
 - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
 - 5. Maintain adequate ventilation when using cutting torches.
 - 6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 - 7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 - 8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
- B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Engineer6, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.
 - 1. Do not allow demolished materials to accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 - 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
- B. Burning: Do not burn demolished materials.
- C. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.6 CLEANING

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

3.7 SELECTIVE DEMOLITION SCHEDULE

- A. Existing Items to Be Removed: As indicated on plans, including all related appurtenances, &/or as directed by SDP.

END OF SECTION 024119

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SECTION 262416 - PANELBOARDS

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. 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. HID: High-intensity discharge.
- E. MCCB: Molded-case circuit breaker.
- F. SPD: Surge protective device.
- G. 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. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
7. 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 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.
 3. Fuses for Fused Switches: Three of quantity installed for each size and type.
 4. Fuses for Fused Power-Circuit Devices: Three of quantity installed for each size and type.

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.

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 Engineer and the Philadelphia School District Construction Management Department no fewer than ten days in advance of proposed interruption of electric service.
2. Do not proceed with interruption of electric service without the Philadelphia School District 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: 24 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.
- 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: 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. Kitchen and Wash-Down] Areas: NEMA 250, Type 4X.
 - d. Other Wet or Damp Indoor Locations: NEMA 250, Type 4
 - e. Indoor Locations Subject to Dust, Falling Dirt, and Dripping Noncorrosive Liquids: NEMA 250, Type 5.
 - 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. (Where applicable).
 - 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.
 - c. Fungus Proofing: Permanent fungicidal treatment for overcurrent protective devices and other components.

- G. Incoming Mains:
1. Location: Contractor shall choose top or bottom as required for a functional installation.
 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. 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.
 5. Split Bus: Vertical buses divided into individual vertical sections. (Where applicable)
- 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.
 8. Gutter-Tap Lugs: Mechanical type suitable for use with conductor material and with matching insulating covers. 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: Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed by an NRTL for 100 percent interrupting capacity.
 - 1. Panelboards and overcurrent protective devices rated less than 240 V shall have short-circuit ratings as shown on Drawings, but not less than 14,000 A rms symmetrical.

2.2 PERFORMANCE REQUIREMENTS

- A. Surge Suppression: Factory installed as an integral part of indicated panelboards, complying with UL 1449 SPD Type 2. (Where applicable)

2.3 POWER PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Square D
 - 2. Eaton
 - 3. General Electrical Company
 - 4. Siemens Industry, Inc.
 - 5. Approved equal.
- 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 or 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: Bolt-on circuit breakers.

2.4 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Square D
 - 2. Eaton
 - 3. General Electrical Company
 - 4. Siemens Industry, Inc.
 - 5. Approved equal.
- 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. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Square D
 - 2. Eaton
 - 3. General Electrical Company
 - 4. Siemens Industry, Inc.
 - 5. Approved equal.
- B. 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 squared 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. Arc-Fault Circuit Interrupter Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.
- 7. Subfeed Circuit Breakers: Vertically mounted.
- 8. 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. Multipole units enclosed in a single housing with a single handle.
 - h. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in off 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: 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.
- 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.
- 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. Mount top of trim 90 inches above finished floor unless otherwise indicated.
- G. Mount panelboard cabinet plumb and rigid without distortion of box.
- H. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

- I. Mount surface-mounted panelboards to steel slotted supports 1 1/4 inch in depth. Orient steel slotted supports vertically.
- J. 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.
- K. 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.
- L. Install filler plates in unused spaces.
- M. Arrange conductors in gutters into groups and bundle and wrap with wire ties after completing load balancing.

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 load 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. Acceptance Testing Preparation:
 - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
 - 2. Test continuity of each circuit.
- B. Tests and Inspections:
 - 1. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

- C. Panelboards will be considered defective if they do not pass tests and inspections.

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 Architect 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 Engineer. 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.

END OF SECTION 262416

SECTION 284621.11 - ADDRESSABLE FIRE-ALARM SYSTEMS

PART 1 - GENERAL

1.1 NOTE

- A. Per SDP standards, no self-mapping technology is allowed.

1.2 RELATED DOCUMENTS

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

1.3 SUMMARY

A. Section Includes:

1. Existing fire-alarm system to be modified.
2. Manual fire-alarm boxes.
3. System smoke detectors.
4. Notification appliances.
5. Device guards.
6. Remote annunciator.
7. Addressable interface device.
8. Network communications.

B. Related Requirements:

1. Section 260519 "Low-Voltage Electrical Power Conductors and Cables" or Section 260523 "Control Voltage Electrical Power Cables" for cables and conductors for fire-alarm systems.
2. Section 078413 "Penetration Firestopping" for firestopping at conduit and box entrances.

1.4 DEFINITIONS

- A. EMT: Electrical Metallic Tubing.
- B. FACP: Fire Alarm Control Panel.
- C. HLI: High Level Interface.
- D. NICET: National Institute for Certification in Engineering Technologies.
- E. PC: Personal computer.
- F. Voltage Class: For specified circuits and equipment, voltage classes are defined as follows:

1. Control Voltage: Listed and labeled for use in remote-control, signaling, and power-limited circuits supplied by a Class 2 or Class 3 power supply having rated output not greater than 150 V and 5 A, allowing use of alternate wiring methods complying with NFPA 70, Article 725.
2. Low Voltage: Listed and labeled for use in circuits supplied by a Class 1 or other power supply having rated output not greater than 1000 V, requiring use of wiring methods complying with NFPA 70, Article 300, Part I.

G. SDP: School District of Philadelphia / Philadelphia School District

1.5 SEQUENCING AND SCHEDULING

- A. Existing Fire-Alarm Equipment: Maintain existing equipment fully operational until new equipment has been tested and accepted. When new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service, and label existing fire-alarm equipment "NOT IN SERVICE" until removed from building.
- B. Equipment Removal: After acceptance of new fire-alarm system, remove existing disconnected fire-alarm equipment and wiring.

1.6 ACTION SUBMITTALS

- A. Product Data: For each type of product, including furnished options and accessories.
 1. Include construction details, material descriptions, dimensions, profiles, and finishes.
 2. Include rated capacities, operating characteristics, and electrical characteristics.
- B. Shop Drawings: For fire-alarm system.
 1. Comply with recommendations and requirements in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
 2. Include plans, elevations, sections, details, and attachments to other work.
 3. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations. Indicate conductor sizes, indicate termination locations and requirements, and distinguish between factory and field wiring.
 4. Detail assembly and support requirements.
 5. Include voltage drop calculations for notification-appliance circuits.
 6. Include battery-size calculations.
 7. Include input/output matrix.
 8. Include statement from manufacturer that all equipment and components have been tested as a system and meet all requirements in this Specification and in NFPA 72.
 9. Include performance parameters and installation details for each detector.
 10. Verify that each duct detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
 11. Provide program report showing that air-sampling detector pipe layout balances pneumatically within the airflow range of the air-sampling detector.

12. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale; coordinate location of duct smoke detectors and access to them.
 - a. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators.
 - b. Show field wiring required for HVAC unit shutdown on alarm.
 - c. Locate detectors according to manufacturer's written recommendations.
 - d. Show air-sampling detector pipe routing.
13. Include voice/alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
14. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits and point-to-point wiring diagrams.

C. General Submittal Requirements:

1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Engineer.
2. Shop Drawings shall be prepared by persons with the following qualifications:
 - a. Trained and certified by manufacturer in fire-alarm system design, and
 - b. NICET-certified, fire-alarm technician; Level IV minimum, or
 - c. Licensed or certified by authorities having jurisdiction.

D. Delegated-Design Submittal: For notification appliances and smoke and heat detectors, in addition to submittals listed above, indicate compliance with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Drawings showing the location of each notification appliance and smoke and heat detector, ratings of each, and installation details as needed to comply with listing conditions of the device.
2. Design Calculations: Calculate requirements for selecting the spacing and sensitivity of detection, complying with NFPA 72. Calculate spacing and intensities for strobe signals and sound-pressure levels for audible appliances.
3. Indicate audible appliances required to produce square wave signal per NFPA 72.

1.7 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Seismic Qualification Data: Certificates, for fire-alarm control unit, accessories, and components, from manufacturer.

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

- C. Field quality-control reports.
- 1.8 Sample Warranty: For special warranty.
- 1.9 CLOSEOUT SUBMITTALS
- A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.
 - 1. Include the following and deliver copies to authorities having jurisdiction:
 - a. Comply with the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
 - b. Provide "Fire Alarm and Emergency Communications System Record of Completion Documents" according to the "Completion Documents" Article in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
 - c. Complete wiring diagrams showing connections between all devices and equipment. Each conductor shall be numbered at every junction point with indication of origination and termination points.
 - d. Riser diagram.
 - e. Device addresses.
 - f. Air-sampling system sample port locations and modeling program report showing layout meets performance criteria.
 - g. Record copy of site-specific software.
 - h. Provide "Inspection and Testing Form" according to the "Inspection, Testing and Maintenance" chapter in NFPA 72, and include the following:
 - 1) Equipment tested.
 - 2) Frequency of testing of installed components.
 - 3) Frequency of inspection of installed components.
 - 4) Requirements and recommendations related to results of maintenance.
 - 5) Manufacturer's user training manuals.
 - i. Manufacturer's required maintenance related to system warranty requirements.
 - j. Abbreviated operating instructions for mounting at fire-alarm control unit and each annunciator unit.
 - B. Software and Firmware Operational Documentation:
 - 1. Software operating and upgrade manuals.
 - 2. Program Software Backup: On magnetic media or compact disk, complete with data files.
 - 3. Device address list.
 - 4. Printout of software application and graphic screens.

1.10 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. Contractor shall include cost to install all extra materials.
1. Lamps for Remote Indicating Lamp Units: Three units of each type installed in the system.
 2. Lamps for Strobe Units: Three units of each type installed in the system.
 3. Smoke Detectors: Two units of each type installed in the system.
 4. Duct Smoke Detectors: One unit of each type installed in the system.
 5. Carbon Monoxide Detectors: One unit of each type installed in the system.
 6. Detector Bases: Three units of each type installed in the system.
 7. Addressable Monitoring Module: One unit of each type installed in the system.
 8. Manual Pull Stations: Two units of each type installed in the system.
 9. Speaker/Strobe (Wall Mounted): Three units of each type installed in the system.
 10. Strobe (Wall Mounted): Two units of each type installed in the system.
 11. Horn (Wall Mounted): One unit of each type installed in the system.
 12. Keys and Tools: Two extra sets for access to locked or tamper proofed components.
 13. Fuses: Five of each type installed in the system. Provide in a box or cabinet with compartments marked with fuse types and sizes.

1.11 QUALITY ASSURANCE

- A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.
- B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level IV technician.
- C. NFPA Certification: Obtain certification according to NFPA 72 by an NRTL (nationally recognized testing laboratory).

1.12 PROJECT CONDITIONS

- A. Perform a full test of the existing system prior to starting work. Document any equipment or components not functioning as designed.
- B. Interruption of Existing Fire-Alarm Service: Do not interrupt fire-alarm service to facilities occupied by Owner.
- C. Use of Devices during Construction: Protect devices during construction unless devices are placed in service to protect the facility during construction.

1.13 SEQUENCING AND SCHEDULING

- A. Existing Fire-Alarm Equipment: Maintain existing equipment fully operational until new equipment has been tested and accepted. As new equipment is installed, label it "NOT IN SERVICE" until it is accepted. Remove labels from new equipment when put into service, and label existing fire-alarm equipment "NOT IN SERVICE" until removed from the building.
- B. Equipment Removal: After acceptance of new fire-alarm system, remove existing disconnected fire-alarm equipment and wiring.

1.14 WARRANTY AND MAINTENANCE

- A. Contractor shall warrant the complete fire alarm system installation against defective materials or faulty workmanship for a period of THREE (3) YEARS from the date of acceptance.
- B. Maintenance and Re-certification Services: Contractor shall also provide THREE (3) YEARS of factory-authorized maintenance and re-certification service from the date of acceptance, including any required maintenance or repairs, hardware and software updates, annual testing and re-certifications.
- C. Required response:
 - 1. Emergency Calls: Contractor shall provide factory-authorized service within FOUR (4) HOURS after notification by the District's Maintenance Department of system trouble or failure.
 - 2. Non-Emergency Calls: Contractor shall provide factory-authorized service within EIGHT (8) HOURS after notification by the District's Maintenance Department of system trouble or failure.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

- A. Source Limitations for Fire-Alarm System and Components: Components must be compatible with, and operate as extension of, existing system installed in main building. Provide system manufacturer's certification that components provided have been tested as, and will operate as, a system.
- B. Noncoded, UL-certified addressable system, with multiplexed signal transmission and voice/strobe evacuation.
- C. Automatic sensitivity control of certain smoke detectors.
- D. All components provided shall be listed for use with the existing system.
- E. 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.

2.2 SYSTEMS OPERATIONAL DESCRIPTION

- A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:
1. Manual stations.
 2. Smoke detectors.
 3. Duct smoke detectors.
 4. Carbon monoxide detectors.
- B. Fire-alarm signal shall initiate the following actions:
1. Continuously operate alarm notification appliances, including voice evacuation notices.
 2. Identify alarm and specific initiating device at fire-alarm control unit, connected network control panels, off-premises network control panels, and remote annunciators.
 3. Transmit an alarm signal to the remote alarm receiving station.
 4. Unlock electric door locks in designated egress paths.
 5. Release fire and smoke doors held open by magnetic door holders.
 6. Activate voice/alarm communication system.
 7. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
 8. Activate emergency shutoffs for gas and fuel supplies, except for shutoffs serving legally required life-safety systems such as emergency generators (as applicable).
 9. Record events in the system memory.
 10. Record events by the system printer.
 11. Indicate device in alarm on the graphic annunciator.
- C. Supervisory signal initiation shall be by one or more of the following devices and actions:
1. User disabling of zones or individual devices.
 2. Loss of communication with any panel on the network.
- D. System trouble signal initiation shall be by one or more of the following devices and actions:
1. Open circuits, shorts, and grounds in designated circuits.
 2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
 3. Loss of communication with any addressable sensor, input module, relay, control module, remote annunciator, printer interface, or Ethernet module.
 4. Loss of primary power at fire-alarm control unit.
 5. Ground or a single break in internal circuits of fire-alarm control unit.
 6. Abnormal ac voltage at fire-alarm control unit.
 7. Break in standby battery circuitry.
 8. Failure of battery charging.
 9. Abnormal position of any switch at fire-alarm control unit or annunciator.
 10. Voice signal amplifier failure.
- E. System Supervisory Signal Actions:
1. Initiate notification appliances.

2. Identify specific device initiating the event at fire-alarm control unit, connected network control panels, off-premises network control panels, and remote annunciators.
 3. Record the event on system printer.
 4. After a time delay of 200 seconds, transmit a trouble or supervisory signal to the remote alarm receiving station.
 5. Transmit system status to building management system.
 6. Display system status on graphic annunciator.
- F. Network Communications (as applicable):
1. Provide network communications for fire-alarm system in accordance with fire-alarm manufacturer's written instructions & SDP requirements.
 2. Provide network communications pathway per manufacturer's written instructions and requirements in NFPA 72 and NFPA 70.
 3. Provide integration gateway using SDP-approved protocol for connection to building automation system.
 4. Device Guards:
 - 1) Description: Welded wire mesh of size and shape for manual station, smoke detector, gong, or other device requiring protection.
 - a) Factory fabricated and furnished by device manufacturer.
 - b) Finish: Paint of color to match protected device.
 5. Document Storage Box (existing):
 - a. Description: Enclosure to accommodate standard 8-1/2-by-11 inch manuals and loose document records. Legend sheet will be permanently attached to door for system required documentation, key contacts, and system information. Provide two key ring holders with location to mount standard business cards for key contact personnel.
 - b. Material and Finish: 18-gauge cold-rolled steel; four mounting holes.
 - c. Color: Red powder-coat epoxy finish.
 - d. Labeling: Permanently screened with 1 inch high lettering "SYSTEM RECORD DOCUMENTS" with white indelible ink.
 - e. Security: Locked with 3/4 inch barrel lock. Provide solid 12 inch stainless steel piano hinge.
 - f. Update/Include additional documentation for new work/devices.

2.3 PERFORMANCE REQUIREMENTS

- A. Seismic Performance: Fire-alarm control unit and raceways 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 and the unit will be fully operational after the seismic event."

2.4 FIRE-ALARM CONTROL UNIT

- A. Manufacturers: Subject to compliance with requirements, provide products **compatible with** the following:

1. Notifier, NFS2-640 FACP with DVC-EM Digital Voice Command (existing main building system).
 2. No substitutions
- B. General Requirements for Fire-Alarm Control Unit:
1. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864.
 - a. System software and programs shall be held in nonvolatile flash, electrically erasable, programmable, read-only memory, retaining the information through failure of primary and secondary power supplies.
 - b. Include a real-time clock for time annotation of events on the event recorder and printer.
 - c. Provide communication between the FACP and remote circuit interface panels, annunciators, and displays.
 - d. The FACP shall be listed for connection to a central-station signaling system service.
 - e. Provide nonvolatile memory for system database, logic, and operating system and event history. The system shall require no manual input to initialize in the event of a complete power down condition. The FACP shall provide a minimum 500-event history log.
 2. Addressable Initiation Device Circuits: The FACP shall indicate which communication zones have been silenced and shall provide selective silencing of alarm notification appliance by building communication zone.
 3. Addressable Control Circuits for Operation of Notification Appliances and Mechanical Equipment: The FACP shall be listed for releasing service.
- C. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.
1. Annunciator and Display: Liquid-crystal type, three] lines of 80 characters, minimum.
 2. Keypad: Arranged to permit entry and execution of programming, display, and control commands and to indicate control commands to be entered into the system for control of smoke-detector sensitivity and other parameters.
- D. Initiating-Device, Notification-Appliance, and Signaling-Line Circuits:
1. Pathway Class Designations: NFPA 72, Class B.
 2. NFPA 72 requires that fire-alarm system design include the designation of system pathway survivability unless no provisions for pathway survivability are included. Capacities on a single circuit should be determined based on the amount of detection that is lost during a fault condition and the resulting impact on life safety or property protection. See Editing Instruction No. 3 in the Evaluations for discussion about determining circuit survivability.
 3. Pathway Survivability: Level 0.

4. Install no more than 80% of manufacturer's maximum permitted quantity of addressable devices by type on each signaling line circuit.
5. Serial Interfaces:
 - a. One dedicated RS 485 port for each central-station and remote station operation using point ID DACT.
 - b. One RS 485 port for remote annunciators, Ethernet module, or multi-interface module (printer port).
 - c. One USB or RS 232 port for PC configuration.
 - d. One RS 232 port for VESDA HLI connection.
 - e. One RS 232 port for voice evacuation interface.
- E. Smoke-Alarm Verification:
 1. Initiate audible and visible indication of an "alarm-verification" signal at fire-alarm control unit.
 2. Activate an approved "alarm-verification" sequence at fire-alarm control unit and detector.
 3. Record events by the system printer.
 4. Sound general alarm if the alarm is verified.
 5. Cancel fire-alarm control unit indication and system reset if the alarm is not verified.
- F. Notification-Appliance Circuit:
 1. Audible appliances shall sound in a three-pulse temporal pattern, as defined in NFPA 72.
 2. Where notification appliances provide signals to sleeping areas, the alarm signal shall be a 520-Hz square wave with an intensity 15 dB above the average ambient sound level or 5 dB above the maximum sound level, or at least 75 dBA, whichever is greater, measured at the pillow.
 3. Visual alarm appliances shall flash in synchronization where multiple appliances are in the same field of view, as defined in NFPA 72.
- G. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke-barrier walls shall be connected to fire-alarm system.
- H. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory, and print out the final adjusted values on system printer.
- I. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.
- J. Voice/Alarm Signaling Service: Central emergency communication system with redundant microphones, preamplifiers, amplifiers, and tone generators provided in a separate cabinet or as part of the fire alarm control unit.

1. Indicate number of alarm channels for automatic, simultaneous transmission of different announcements to different zones or for manual transmission of announcements by use of the central-control microphone. Amplifiers shall comply with UL 1711.
 - a. Allow the application of, and evacuation signal to, indicated number of zones and, at the same time, allow voice paging to the other zones selectively or in any combination.
 - b. Programmable tone and message sequence selection.
 - c. Standard digitally recorded messages for "Evacuation" and "All Clear."
 - d. Generate tones to be sequenced with audio messages of type recommended by NFPA 72 and that are compatible with tone patterns of notification-appliance circuits of fire-alarm control unit.

2. Status Annunciator: Indicate the status of various voice/alarm speaker zones and the status of firefighters' two-way telephone communication zones.
3. Preamplifiers, amplifiers, and tone generators shall automatically transfer to backup units, on primary equipment failure.

- K. Printout of Events: On receipt of signal, print alarm, supervisory, and trouble events. Identify zone, device, and function. Include type of signal (alarm, supervisory, or trouble) and date and time of occurrence. Differentiate alarm signals from all other printed indications. Also, print system reset event, including same information for device, location, date, and time. Commands initiate the printing of a list of existing alarm, supervisory, and trouble conditions in the system and a historical log of events.

- L. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, supervisory signals, supervisory and digital alarm communicator transmitters and digital alarm radio transmitters shall be powered by 24-V dc source.
 1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.

- M. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.
 1. Batteries: Sealed lead calcium.

- N. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

- 2.5 MANUAL FIRE-ALARM BOXES
 - A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. Notifier.

2. Siemens Industry, Inc.; Fire Safety Division.
 3. Edwards
 4. Approved equal.
- B. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
1. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
 2. Station Reset: Key- or wrench-operated switch.
 3. Indoor Protective Shield: Factory-fabricated, clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation.
 4. Weatherproof Protective Shield: Factory-fabricated, clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm.

2.6 SYSTEM SMOKE DETECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Notifier.
 2. Siemens Industry, Inc.; Fire Safety Division.
 3. Edwards
 4. Approved equal
- B. General Requirements for System Smoke Detectors:
1. Comply with UL 268; operating at 24-V dc, nominal.
 2. Detectors shall be four wire type. Confirm final requirements with manufacturer.
 3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
 4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
 5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
 6. Integral Visual-Indicating Light: LED type, indicating detector has operated and power-on status.
 7. Remote Control: Unless otherwise indicated, detectors shall be digital-addressable type, individually monitored at fire-alarm control unit for calibration, sensitivity, and alarm condition and individually adjustable for sensitivity by fire-alarm control unit.
 - a. Fixed-temperature sensing characteristic of combination smoke- and heat-detection units shall be independent of rate-of-rise sensing and shall be settable at fire-alarm control unit to operate at 135 or 155 deg F.
 - b. Multiple levels of detection sensitivity for each sensor.

C. Photoelectric Smoke Detectors:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.
 - d. Present sensitivity selected.
 - e. Sensor range (normal, dirty, etc.).

D. Ionization Smoke Detector:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.
 - d. Present sensitivity selected.
 - e. Sensor range (normal, dirty, etc.).

E. Duct Smoke Detectors: Photoelectric type complying with UL 268A.

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
 - a. Primary status.
 - b. Device type.
 - c. Present average value.
 - d. Present sensitivity selected.
 - e. Sensor range (normal, dirty, etc.).
3. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector for smoke detection in HVAC system ducts.
4. Each sensor shall have multiple levels of detection sensitivity.
5. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
6. Relay Fan Shutdown: Fully programmable relay rated to interrupt fan motor-control circuit.

2.7 CARBON MONOXIDE DETECTORS

- A. General: Carbon monoxide detector listed for connection to fire-alarm system.
 - 1. Mounting: Adapter plate for outlet box mounting.
 - 2. Testable by introducing test carbon monoxide into the sensing cell.
 - 3. Detector shall provide alarm contacts and trouble contacts.
 - 4. Detector shall send trouble alarm when nearing end-of-life, power supply problems, or internal faults.
 - 5. Comply with UL 2075.
 - 6. Locate, mount, and wire according to manufacturer's written instructions.
 - 7. Provide means for addressable connection to fire-alarm system.
 - 8. Test button simulates an alarm condition.

2.8 HEAT DETECTORS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Notifier.
 - 2. Siemens Industry, Inc.; Fire Safety Division.
 - 3. Edwards
 - 4. Approved equal
- B. General Requirements for Heat Detectors: Comply with UL 521.
 - 1. Temperature sensors shall test for and communicate the sensitivity range of the device.
- C. Heat Detector, Combination Type: Actuated by a fixed temperature of 135 deg F.
 - 1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
 - 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
- D. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of 190 deg F.
 - 1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
 - 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

2.9 NOTIFICATION APPLIANCES

- A. Manufacturers: Subject to compliance with requirements, provide products by the following:
 - 1. Notifier.
 - 2. Siemens Industry, Inc.; Fire Safety Division.

3. Edwards
 4. Approved equal
- B. General Requirements for Notification Appliances: Individually addressed, connected to a signaling-line circuit, equipped for mounting as indicated, and with screw terminals for system connections.
- C. General Requirements for Notification Appliances: Connected to notification-appliance signal circuits, zoned as indicated, equipped for mounting as indicated, and with screw terminals for system connections.
1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated, and with screw terminals for system connections.
- D. Visible Notification Appliances: Xenon strobe lights complying with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch-high letters on the lens.
1. Rated Light Output:
 - a. 15/30/75/110 cd, selectable in the field.
 2. Mounting: Wall and ceiling mounted unless otherwise indicated.
 3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.
 4. Flashing shall be in a temporal pattern, synchronized with other units.
 5. Strobe Leads: Factory connected to screw terminals.
 6. Mounting Faceplate: Factory finished, red.
- E. Voice/Tone Notification Appliances:
1. Comply with UL 1480.
 2. Speakers for Voice Notification: Locate speakers for voice notification to provide the intelligibility requirements of the "Notification Appliances" and "Emergency Communications Systems" chapters in NFPA 72.
 3. High-Range Units: Rated 2 to 15 W.
 4. Low-Range Units: Rated 1 to 2 W.
 5. Mounting: surface mounted and bidirectional or recessed.
 6. Matching Transformers: Tap range matched to acoustical environment of speaker location.

2.10 MAGNETIC DOOR HOLDERS

- A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching doorplate.
1. Electromagnets: Require no more than 3 W to develop 25-lbf holding force.
 2. Wall-Mounted Units: Flush mounted unless otherwise indicated.
 3. Rating: 24-V ac or dc.
 4. Rating: 120-V ac.

- B. Material and Finish: Match door hardware.

2.11 REMOTE ANNUNCIATOR

- A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.
 - 1. Mounting: Surface cabinet, NEMA 250, Type 1.
- B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

2.12 ADDRESSABLE INTERFACE DEVICE

- A. General:
 - 1. Include address-setting means on the module.
 - 2. Store an internal identifying code for control panel use to identify the module type.
 - 3. Listed for controlling HVAC fan motor controllers.
- B. Monitor Module: Microelectronic module providing a system address for alarm-initiating devices for wired applications with normally open contacts.
- C. Integral Relay: Capable of providing a direct signal to elevator controller to initiate elevator recall or to circuit-breaker shunt trip for power shutdown.
 - 1. Allow the control panel to switch the relay contacts on command.
 - 2. Have a minimum of two normally open and two normally closed contacts available for field wiring.
- D. Control Module:
 - 1. Operate notification devices.
 - 2. Operate solenoids for use in sprinkler service.

~~2.13 DIGITAL ALARM COMMUNICATOR TRANSMITTER~~

- ~~A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632.~~
- ~~B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically capture two telephone line(s) and dial a preset number for a remote central station. When contact is made with central station(s), signals shall be transmitted. If service on either line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal and transmit the signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. Transmitter shall automatically report~~

~~telephone service restoration to the central station. If service is lost on both telephone lines, transmitter shall initiate the local trouble signal.~~

- C. ~~Local functions and display at the digital alarm communicator transmitter shall include the following:~~
- ~~1. Verification that both telephone lines are available.~~
 - ~~2. Programming device.~~
 - ~~3. LED display.~~
 - ~~4. Manual test report function and manual transmission clear indication.~~
 - ~~5. Communications failure with the central station or fire alarm control unit.~~
- D. ~~Digital data transmission shall include the following:~~
- ~~1. Address of the alarm initiating device.~~
 - ~~2. Address of the supervisory signal.~~
 - ~~3. Address of the trouble initiating device.~~
 - ~~4. Loss of ac supply.~~
 - ~~5. Loss of power.~~
 - ~~6. Low battery.~~
 - ~~7. Abnormal test signal.~~
 - ~~8. Communication bus failure.~~
- E. ~~Secondary Power: Integral rechargeable battery and automatic charger.~~
- F. ~~Self-Test: Conducted automatically every 24 hours with report transmitted to central station.~~

2.14 RADIO ALARM TRANSMITTER

- A. ~~Transmitter shall comply with NFPA 1221 and 47 CFR 90.~~
- B. ~~Description: Manufacturer's standard commercial product; factory assembled, wired, and tested; ready for installation and operation.~~
- ~~1. Packaging: A single, modular, NEMA 250, Type 1 metal enclosure with a tamper-resistant flush tumbler lock.~~
 - ~~2. Signal Transmission Mode and Frequency: VHF or UHF 2-W power output, coordinated with operating characteristics of the established remote alarm receiving station designated by Owner.~~
 - ~~3. Normal Power Input: 120-V ac.~~
 - ~~4. Secondary Power: Integral-sealed, rechargeable, 12-V battery and charger. Comply with NFPA 72 requirements for battery capacity; submit calculations.~~
 - ~~5. Antenna: Omnidirectional, coaxial half wave, dipole type with driving point impedance matched to transmitter and antenna cable output impedance. Wind load strength of antenna and mounting hardware and supports shall withstand 100 mph with a gust factor of 1.3 without failure.~~
 - ~~6. Antenna Cable: Coaxial cable with impedance matched to the transmitter output impedance.~~
 - ~~7. Antenna-Cable Connectors: Weatherproof.~~

~~8. Alarm Interface Devices: Circuit boards, modules, and other auxiliary devices, integral to the transmitter, matching fire alarm and other system outputs to message-generating inputs of the transmitter that produce required message transmissions.~~

~~C. Functional Performance: Unit shall receive alarm, supervisory, or trouble signal from fire alarm control unit or from its own internal sensors or controls and shall automatically transmit signal along with a unique code that identifies the transmitting station to the remote alarm receiving station. Transmitted messages shall correspond to standard designations for fire reporting system to which the signal is being transmitted and shall include separately designated messages in response to the following events or conditions:~~

- ~~1. Transmitter Low Battery Condition: Sent when battery voltage is below 85 percent of rated value.~~
- ~~2. System Test Message: Initiated manually by a test switch within the transmitter cabinet, or automatically at an optionally preselected time, once every 24 hours, with transmission time controlled by a programmed timing device integral to transmitter controls.~~
- ~~3. Transmitter Trouble Message: Actuated by failure, in excess of one minute duration, of the transmitter normal power source, derangement of the wiring of the transmitter, or any alarm input interface circuit or device connected to it.~~
- ~~4. Local Fire Alarm System Trouble Message: Initiated by events or conditions that cause a trouble signal to be indicated on the building system.~~
- ~~5. Local Fire Alarm System Alarm Message: Actuated when the building system goes into an alarm state. Identifies device that initiated the alarm.~~
- ~~6. Local Fire Alarm System, Supervisory Alarm Message: Actuated when the building alarm system indicates a supervisory alarm.~~

2.15 NETWORK COMMUNICATIONS

- A. Provide network communications for fire-alarm system according to fire-alarm manufacturer's written requirements.
- B. Provide network communications pathway per manufacturer's written requirements and requirements in NFPA 72 and NFPA 70.

~~2.16 SYSTEM PRINTER~~

- ~~A. Printer shall be listed and labeled as an integral part of fire-alarm system.~~

2.17 DEVICE GUARDS

- A. Description: Welded wire mesh of size and shape for the manual station, smoke detector, gong, or other device requiring protection.
 1. Factory fabricated and furnished by device manufacturer.
 2. Finish: Paint of color to match the protected device.

2.18 DOCUMENT STORAGE BOX:

- A. Description: Enclosure to accommodate standard 8-1/2-by-11 inch manuals and loose document records. Legend sheet will be permanently attached to door for system required documentation, key contacts, and system information. Provide two key ring holders with location to mount standard business cards for key contact personnel.
- B. Material and Finish: 18-gauge cold-rolled steel; four mounting holes.
- C. Color: Red powder-coat epoxy finish.
- D. Labeling: Permanently screened with 1 inch high lettering "SYSTEM RECORD DOCUMENTS" with white indelible ink.
- E. Security: Locked with 3/4 inch barrel lock. Provide solid 12 inch stainless steel piano hinge.
- F. Install Location: as directed by SDP.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance of the Work.
 - 1. Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment and wiring are installed, before installation begins.
- B. Examine roughing-in for electrical connections to verify actual locations of connections before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 EQUIPMENT INSTALLATION

- A. Comply with NFPA 72, NFPA 101, and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install all electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760, "Fire Alarm Systems."
 - 1. Devices placed in service before all other trades have completed cleanup shall be replaced.
 - 2. Devices installed but not yet placed in service shall be protected from construction dust, debris, dirt, moisture, and damage according to manufacturer's written storage instructions.

- B. Install wall-mounted equipment, with tops of cabinets not more than 78 inches above the finished floor. Manual Fire-Alarm Boxes:
1. Install manual fire-alarm box in the normal path of egress within 60 inches of the exit doorway where indicated on drawings.
 2. Mount manual fire-alarm box on a background of a contrasting color.
 3. The operable part of manual fire-alarm box shall be between 42 inches and 48 inches above floor level. All devices shall be mounted at the same height unless otherwise indicated.
- C. Smoke- or Heat-Detector Spacing:
1. Comply with the "Smoke-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for smoke-detector spacing.
 2. Comply with the "Heat-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for heat-detector spacing.
 3. Smooth ceiling spacing shall not exceed 30 feet.
 4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Annex A or Annex B in NFPA 72.
 5. HVAC: Locate detectors not closer than 36 inches from air-supply diffuser or return-air opening.
 6. Lighting Fixtures: Locate detectors not closer than 12 inches from any part of a lighting fixture and not directly above pendant mounted or indirect lighting.
- D. Install a cover on each smoke detector that is not placed in service during construction. Cover shall remain in place except during system testing. Remove cover prior to system turnover.
- E. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct. Tubes more than 36 inches long shall be supported at both ends.
1. Do not install smoke detector in duct smoke-detector housing during construction. Install detector only during system testing and prior to system turnover.
- F. Remote Status and Alarm Indicators: Install in a visible location near each smoke detector, sprinkler water-flow switch, and valve-tamper switch that is not readily visible from normal viewing position.
- G. Audible Alarm-Indicating Devices: Install not less than 6 inches below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Install all devices at the same height unless otherwise indicated.
- H. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches below the ceiling. Install all devices at the same height unless otherwise indicated.
- I. Device Location-Indicating Lights: Locate in public space near the device they monitor.

3.3 PATHWAYS

- A. Pathways above recessed ceilings and in non-accessible locations may be routed exposed.

1. Exposed pathways located less than 96 inches above the floor shall be installed in EMT.
- B. Pathways shall be installed in EMT and RGS. Pathways in Mechanical Rooms, Boiler Rooms, Electrical Rooms and Gymnasium shall be installed in RGS with threaded fittings.
- C. Exposed EMT shall be painted red enamel.

3.4 CONNECTIONS

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, connect hardware and devices to fire-alarm system.
 1. Verify that hardware and devices are listed for use with installed fire-alarm system before making connections.
- B. Make addressable connections with a supervised interface device to the following devices and systems as applicable. Install the interface device less than 36 inches from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
 1. Smoke dampers in air ducts of designated HVAC duct systems.
 2. Magnetically held-open doors.
 3. Electronically locked doors and access gates.
 4. Alarm-initiating connection to activate emergency lighting control.
 5. Alarm-initiating connection to activate emergency shutoffs for gas and fuel supplies.
 6. Data communication circuits for connection to mass notification system.

3.5 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 270553 "Identification for Communications Systems."
- B. Install framed instructions in a location visible from fire-alarm control unit.

3.6 GROUNDING

- A. Ground fire-alarm panels and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.
- B. Ground shielded cables at the control panel location only. Insulate shield at device location.

3.7 FIELD QUALITY CONTROL

- A. Field tests shall be witnessed by The Philadelphia School District Engineer, Authorized school representative and authorities having jurisdiction.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

- C. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
1. Visual Inspection: Conduct visual inspection prior to testing.
 - a. Inspection shall be based on completed record Drawings and system documentation that is required by the "Completion Documents, Preparation" table in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
 - b. Comply with the "Visual Inspection Frequencies" table in the "Inspection" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
 2. System Testing: Comply with the "Test Methods" table in the "Testing" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
 3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
 4. Test audible appliances for the private operating mode according to manufacturer's written instructions.
 5. Test visible appliances for the public operating mode according to manufacturer's written instructions.
 6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" section of the "Fundamentals" chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
- D. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.
- E. Fire-alarm system will be considered defective if it does not pass tests and inspections.
- F. Prepare test and inspection reports.
- G. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.
- H. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

3.8 SOFTWARE SERVICE AGREEMENT

- A. THE PHILADELPHIA SCHOOL DISTRICT SHALL RETAIN COMPLETE RIGHTS AND OWNERSHIP TO ALL SOFTWARE RUNNING IN THE SYSTEM. The fire alarm equipment vendor shall provide useable hard and soft copies of the software database to the Philadelphia School District at the end of the warranty period. The database provided shall be useable by any authorized and certified distributor of the product line and shall include all applicable passwords necessary for total and unrestricted use and modification of the database.

3.9 DEMONSTRATION AND TRAINING

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system. Training shall be provided at project site for a period of 4 hours minimum.
- B. The School District of Philadelphia requires that all prospective fire alarm manufacturers provide training, on their fire alarm product, to the Philadelphia School District, in order to be deemed acceptable for use. The School District employs a team of Life Safety technicians responsible for the upkeep of all Life Safety Systems within the Philadelphia School District and full system access to all Fire Alarm panels by this team is mandatory on all projects. Training is to include, but not be limited to:
 - 1. Training shall include all basic system operations of panel equipment as well as training of all peripheral equipment associated with the panel equipment. Complete system training from a technical, hands-on perspective for proper install, system operation & troubleshooting techniques will be the only acceptable training.
 - 2. All operating system software, used for programming of the system shall be provided to the school district as two (2) copies on CD-ROM prior to the closing of the project, as well as any programming keys, hasps, hand held programmers etc. used in the programming of the system. Any and all updates, patches, revisions to the operating software, etc. will be provided to the School District within 30 days of release at no additional cost to the School District.

END OF SECTION 284621.11

SECTION 011000 – SUMMARY

PART 1 GENERAL

1.1 PROJECT

- A. Project Name: Stephen Decatur K-8 School, Life Safety Generator Replacement and Fire Alarm System Extension Project.
- B. Project Location: 3500 Academy Road, Philadelphia, PA 19154.
- C. Owner's Name: The School District of Philadelphia.
- D. Engineer of Record's Name: FXB Engineering
- E. The Project consists of the upgrade of replacing an existing 15kW natural gas generator located on the ground floor, and the 100A fused emergency panel for the systems which they support. Includes the replacement of the existing coded fire alarm system in the Annex 'A' and Annex 'B' buildings as a coordinated expansion of/from the new addressable fire alarm voice evacuation system (presently under construction in the main building under separate contract).

1.2 CONTRACT DESCRIPTION

- A. Contract Type: Single prime contract based on a Stipulated price.
- B. The work of the prime contract is identified in this section and on Drawings.
- C. Electrical Contractor is Single Prime.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

- A. Without intending to limit or restrict extent of work required under Contract, Work to be performed includes but is not limited to the following:
 - 1. Design Goals and Objectives at the School District of Philadelphia's Stephen Decatur School Life Safety Generator Replacement and Fire Alarm System Extension Project:
 - a. Upgrades and renovations of the antiquated emergency generator system equipment and associated systems necessary to support it.
 - b. Include the two (2) Annex buildings as an expansion of the present Fire Alarm Replacement Project, intended upon completion to upgrade all buildings on the property from their present antiquated coded fire alarm system to a modern, digital, addressable, fire alarm system with voice evacuation function.
- B. Electrical Contract Scope Summary of Additions and Alterations: In order to meet the design goals and electrical improvements to the facility include - but are not limited to - the following:
 - 1. Selective demolition as required to perform this contractors work as indicated on the contract drawings. Refer to the Electrical Contract drawings, and the Division 02 technical specifications.
 - 2. Masonry work as required to perform this contractors work as indicated on the contract drawings. Refer to the Electrical Contract drawings, and the Division 03 and Division 04 technical specifications.

3. Thermal and moisture protection work as required to perform this contractors work as indicated on the contract drawings. Refer to the Electrical Contract drawings, and the Division 07 technical specifications.
4. Finishes work as required to perform this contractors work as indicated on the contract drawings. Refer to the Electrical Contract drawings, and the Division 09 technical specifications.
5. Electrical work as required to perform this contractors work as indicated on the contract drawings. Refer to the Electrical Contract drawings, and the Division 26 and 27 technical specifications.
6. Electrical safety and security (fire alarm) work as required to perform this contractors work as indicated on the contract drawings. Refer to the Electrical Contract drawings, the General Conditions drawings, and the Division 28 technical specifications.
7. Trace all existing circuits for purpose of identifying all areas, loads, and existing branch circuits served by the existing generator via the existing generator-supported dual-bus emergency panel "EM" (generator and emergency panel "EM" are to be removed and replaced). Tag all conductors for proper identification in new panel.
8. Remove all combustion exhaust, gas, and electrical connections to existing 15kW, 208/120V-3Ø-4W indoor natural gas generator; remove generator. Indoor generator removal by the electrical contractor; existing automatic transfer switch to be removed by the electrical contractor and retained for relocation & reinstall/reuse.
 - a. Remove all electrical connections between existing 208V/3P/104A associated open transition automatic transfer switch (existing automatic transfer switch to be removed and retained for relocation & reinstall/reuse) at Load-side of Normal source of 240V/3P/100A fused switch mounted to side of Main Distribution Switchboard. Fused switch and all Line-side wiring between it and the connection to the Main Distribution Switchboard are to be removed and replaced.
 - b. Remove all electrical connections and devices between existing 200A/3P associated open transition automatic transfer switch (existing automatic transfer switch to be removed and retained for relocation & reinstall/reuse) and emergency source of natural gas generator (gas generator is to be removed).
 - c. Remove all electrical connections between Load side of existing 200A/3P associated open transition automatic transfer switch (existing automatic transfer switch to be removed and retained for relocation & reinstall/reuse) at existing generator-supported dual-bus, emergency panel "EM" {a.k.a. 'EL'}; (Panel "EM" to be removed and replaced).
 - d. Remove all 'Emergency Only' electrical connections and devices (including tap lugs) in and between existing 200A/3P associated open transition automatic transfer switch (existing automatic transfer switch to be removed and retained for relocation & reinstall/reuse) and existing generator-supported dual-bus, emergency panel "EM" (Panel "EM" to be removed and replaced).

- f. Disconnect, pull back, and retain all previously tagged branch circuit electrical connections for reconnection to new branch circuit overcurrent protection devices in new replacement generator-supported emergency panel "EM". Label circuit directory of new Panel "EM" with existing branch circuit designations of areas and load types served per required existing branch circuit tracing and tags; label for new generator accessory loads, and mark all unused branch circuits as 'Spare'.
 - g. Provide & install new 240V/3P/100A heavy duty fused safety switch "EM", mounted to side of Main Distribution Switchboard; provide & install new Line-side electrical connections and wiring between new fused switch "EM" and the Main Distribution Switchboard; provide & install new Line-side feeder to relocated ATS from Load-side of new fused switch "EM".
 - h. Provide & install new 42-circuit, 208/120V-3Ø-4W-100A MLO panelboard "Panel EM"; rework branch circuits to new panel; provide & install new Load-side feeder from relocated ATS to new Panel EM". **Provide & install new 240kA Surge Suppression Device.**
 - i. Provide & install new 30kW, 208/120V-3Ø-4W outdoor diesel emergency generator in a weatherproof, Level-3 sound attenuated enclosure, with critical grade silencer. Provide & install new power and controls cabling/conductors to relocated ATS, and new branch circuit conductors/conduit for generator accessory equipment/devices. Includes new 24-hr dual-walled skid base tank. Includes installation of concrete equipment pads, protection bollards, and a lockable dual-gate chain link fence for the new outdoor generator. Includes power and controls cabling & conduits to associated devices & equipment (block heater, battery charger, to/from existing ATS, etc.) and any/all necessary upgrades to combustion ventilation and exhaust system component system upgrades, etc..
9. Remove and replace existing bell and gong fire alarm system following expansion of new voice evacuation fire alarm system from/in Main Building to both the Annex 'A' and Annex 'B' buildings, and all other work indicated (i.e., relocate generator status points of monitoring).
 10. Remove existing and provide new electrical & communications wiring, conduit, supports, cabling, and accessories to support the expansion of new voice evacuation fire alarm system from/in main building to both the Annex 'A' and Annex 'B' buildings.
 11. Miscellaneous patching, masonry infill, painting, and/or fire stopping to facilitate the electrical scope of work.
- C. Refer to the design documents and technical specifications for further detail. Any questions regarding the summary of work shall be sent as an RFI during the bidding process.

1.4 WORK BY OWNER

- A. No items of equipment have been pre-purchased by the owner.
- B. No items of equipment are to be installed by the owner.
- C. All equipment, conduit, wiring, devices, instruments, accessories, appurtenances, and controls required to complete the work of these contracts is to be furnished and installed by the respective contractor.

1.5 OWNER OCCUPANCY

- A. Owner intends to occupy portions of the existing building during the entire construction period.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

1.6 DRAWINGS

- A. The drawings listed on Sheet CS1.0 are included as part of all Contracts. The Work relative to each Contract is indicated on each sheet; however, full scope of work cannot be fully and correctly interpreted without reference to all drawings listed on Sheet CS1.0.

1.7 WORK SEQUENCE

- A. Coordinate construction schedule and operations with Owner. The Fire alarm system expansion/modifications shall be coordinated with ~~ongoing~~ main building fire alarm system upgrades, ~~expected to conclude in/around~~ completed October 2021. As the existing generator & emergency panel are fully functional and in operation, it is proposed that (aside from the required existing circuit tracing) all installation work related to the new generator be performed to the fullest possible and practical prior to any disturbing or demolition of any components related to the existing emergency generator and associated existing Panel 'EM'.

1.8 MODIFICATIONS

- A. Owner and Engineer of Record reserve the right to make changes in order and execution of Work of Contracts as, in the judgment of the Owner and Engineer of Record, may be necessary or expedient to carry out intent of design and Contract. No increase in prices over Contract rates will be paid to Contractor on account of such changes.

1.9 PHYSICAL DATA

- A. Become fully informed concerning location of facilities, structures, and utilities which may interfere with the Project. Contractor must prepare bid and enter into Contract with full understanding of conditions to be encountered and responsibilities in connection with that.
- B. From investigations and field surveys, location of utilities and equipment have been brought to attention of Engineer as indicated on Drawings; however, locations of existing conditions are not guaranteed. Indication on Drawings of such items will not be relieve the Contractors of any responsibilities with respect to it nor will Owner or Engineer of Record be held responsible for omissions or failure to give notice to Contractor of any other utilities or equipment.

1.10 DAMAGE

- A. Restore any damage done by the Contractor to School District property or adjacent property and right-of-way immediately to the School District's satisfaction at the Contractor's expense.

END OF SECTION