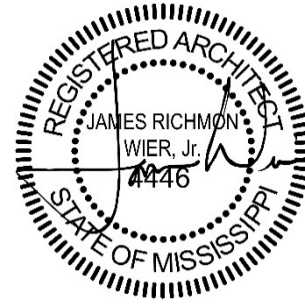




16 February 2022

Columbia High School – Boiler Replacement
Columbia School District



ADDENDUM NO. 01

NOTICE TO ALL DOCUMENT HOLDERS:

The following additions, deletions, changes and clarifications to the drawings and specifications are to be included as part of the Contract Documents.

SPECIFICATIONS








ITEM NO. 01 **PROJECT MANUAL TABLE OF CONTENTS**
ADD the following items to the table of contents:
E000 Electrical Demolition and Renovation Plans
E001 Electrical Specifications
E002 Electrical Specifications
E003 Electrical Specifications

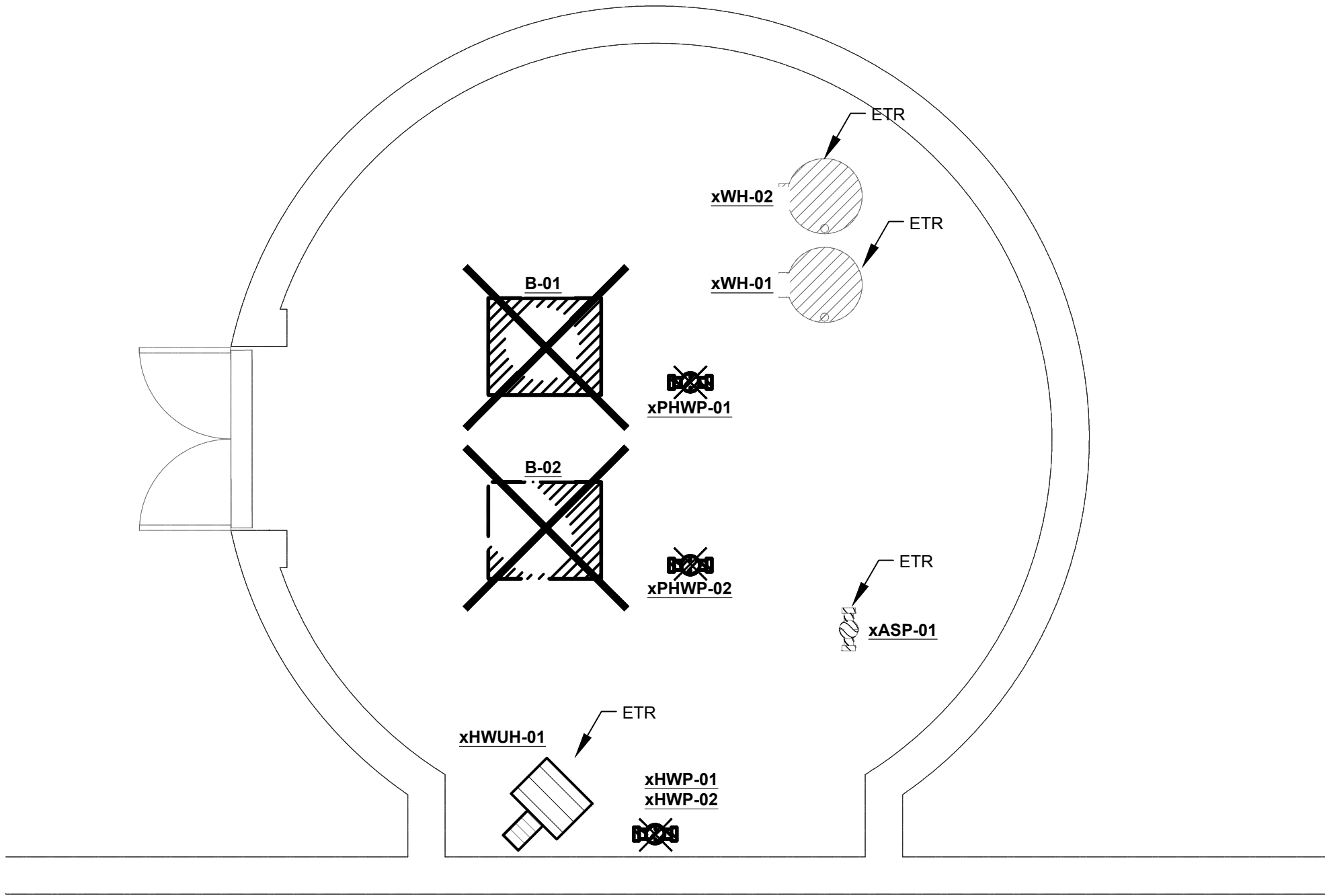
DRAWINGS

ITEM NO. 02 **ADD THE FOLLOWING SHEETS TO THE CONTRACT DOCUMENTS**
E000 Electrical Demolition and Renovation Plans
E001 Electrical Specifications
E002 Electrical Specifications
E003 Electrical Specifications

Encl: Drawings (4 Sheets - 24x36):
 E000 Electrical Demolition and Renovation Plans
 E001 Electrical Specifications
 E002 Electrical Specifications
 E003 Electrical Specifications

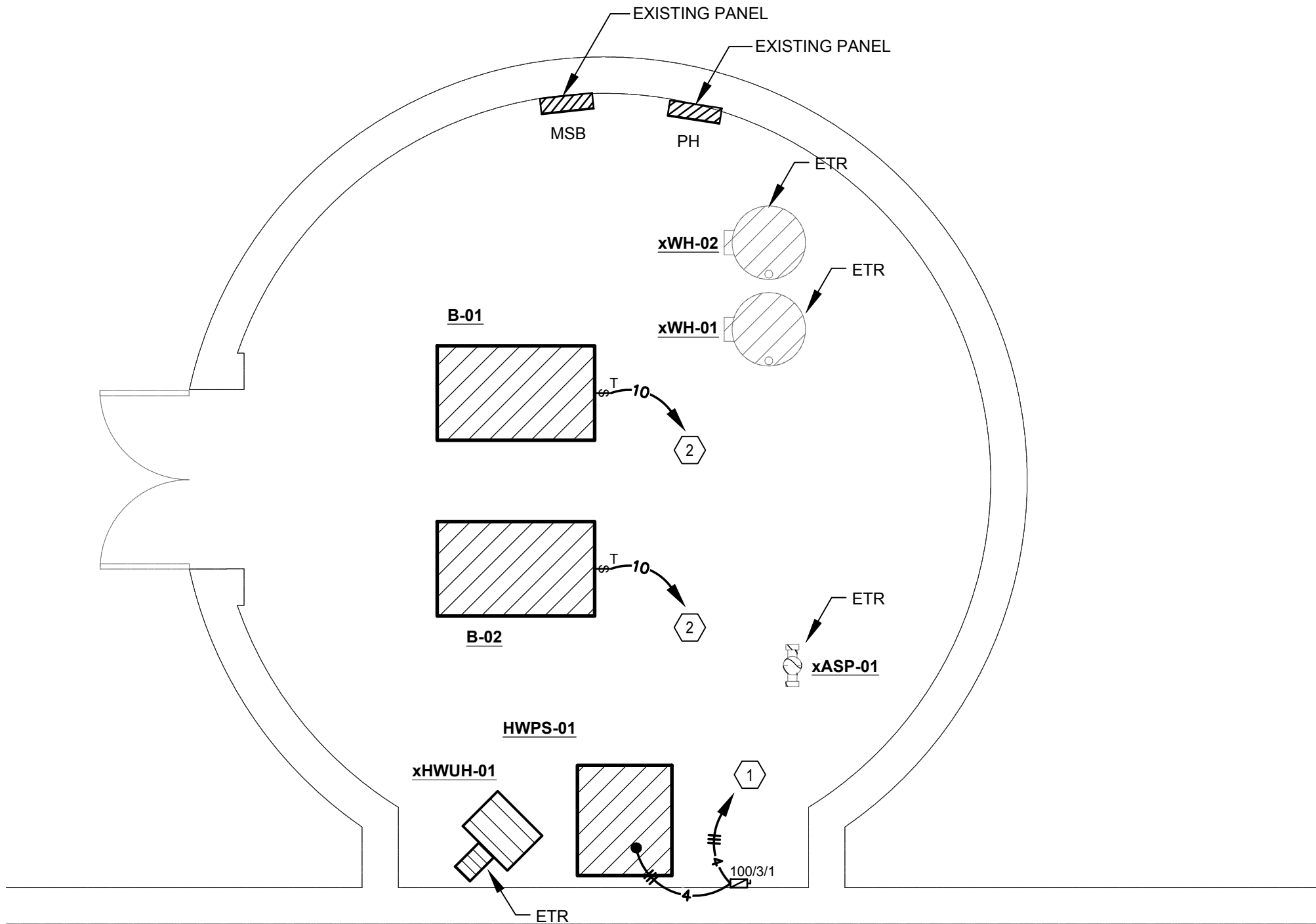
cc: All Document Holders
 File 21-007

ELECTRICAL LEGEND		
GENERAL NOTES		
1. ALL EQUIPMENT AND DEVICES ARE TO BE FLUSH MOUNTED UNLESS OTHERWISE NOTED.		
2. ALL EQUIPMENT NOTED "ETR" ARE EXISTING TO REMAIN.		
SWITCHES		
	HORSEPOWER RATED SWITCH WITH THERMAL OVERLOADS (MANUAL MOTOR STARTER).	
CONDUIT AND WIRING		
	CONDUCTORS IN CONDUIT CONCEALED WITHIN WALL OR CEILING. TIC MARKS INDICATE NUMBER OF CONDUCTORS. THE EQUIPMENT GROUNDING CONDUCTOR IS NOT SHOWN, BUT SHALL BE PROVIDED. SIZE THE EQUIPMENT GROUNDING CONDUCTOR AND THE CONDUIT PER THE NEC. THE ABSENCE OF TIC MARKS SIGNIFIES THAT TWO CONDUCTORS PLUS AN EQUIPMENT GROUNDING CONDUCTOR SHOULD BE PROVIDED. FOR EXAMPLE, THE MARKINGS TO THE LEFT SIGNIFY THAT THREE CONDUCTORS PLUS AN EQUIPMENT GROUNDING CONDUCTOR SHOULD BE PROVIDED.	
	THE TEXT INSIDE THE ARC INDICATES THE AWG SIZE OF THE CONDUCTORS THAT SHALL BE RUN IN THE CONDUIT. THE ABSENCE OF TEXT SIGNIFIES THAT THE CONDUCTORS SHOULD BE #12 AWG.	
	HOMERUN TO PANELBOARD. ARC DENOTES CONCEALED CIRCUITRY. TEXT DENOTES PANELBOARD NAME WITH CIRCUIT NUMBER. DEVICES HAVING CIRCUIT NUMBERS LOCATED BESIDE THEM MAY NOT SHOW THE CIRCUIT NUMBERS AT THE HOMERUN ARROWS.	
GEAR		
	NON-FUSED DISCONNECT SWITCH. TEXT INDICATES AMPACITY/NUMBER OF POLES/ENCLOSURE TYPE.	
	PANELBOARD.	
VOLTAGE DROP CHART FOR 20A, 1Ø CIRCUITS		
Voltage	Circuit Length	Conductor Size (AWG)
120	< 50'	#12
120	> 50'	#10
120	> 90'	#8
120	> 140'	#6
277	< 130'	#12
277	> 130'	#10
277	> 200'	#8
277	> 330'	#6
VOLTAGE DROP CHART NOTES: 1) CIRCUIT SIZES INDICATED ON THE DRAWINGS ARE MINIMUM REQUIREMENTS. REFER TO THIS CHART FOR UPSIZING CONDUCTORS AS NEEDED. 2) DO NOT CONNECT CONDUCTORS LARGER THAN #10 DIRECTLY TO A RECEPTACLE OR A SWITCH. PROVIDE A JUNCTION BOX TO DOWNSIZE THE CONDUCTOR TO #12 AT THE DEVICE. 3) FOR CIRCUITS LONGER THAN THOSE LISTED ABOVE, CONSULT WITH THE ENGINEER FOR CONDUCTOR SIZES.		
DEMOLITION		
	DEMOLISH EXITING EQUIPMENT.	

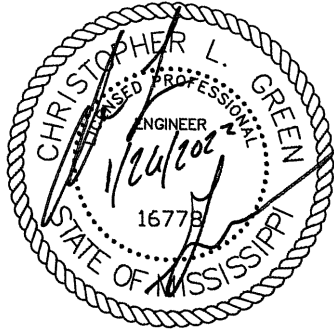
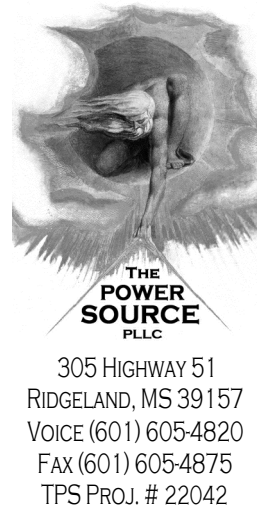


2
E000
MECHANICAL DEMOLITION
Scale: 1/4" = 1'-0"

KEYED NOTES	
Mark	Description
①	PROVIDE A NEW 70/3 BREAKER IN PANEL "PH".
②	PROVIDE A NEW 30/1 BREAKER IN PANEL "PH".



2
E000
MECHANICAL RENOVATION
Scale: 1/4" = 1'-0"



Columbia
High School
Boiler
Replacement

Columbia School
District
613 Wildcat Way
Columbia, MS 39429

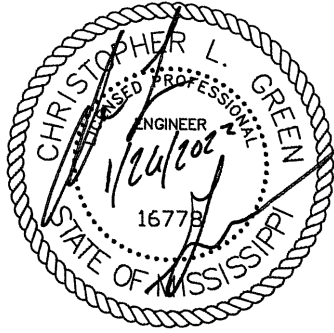
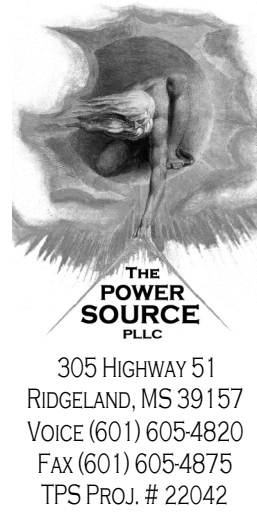
January 26, 2022

Contract
Documents
WBA # 21-007

REVISIONS		
NO.	DESCRIPTION	DATE

E000

SPECIFICATIONS																																																											
SECTION 26-05-11 ELECTRICAL GENERAL AND WORK IN EXISTING FACILITIES	SECTION 26-05-11 ELECTRICAL GENERAL AND WORK IN EXISTING FACILITIES (CONT.)	SECTION 26-05-19 LOW-VOLTAGE POWER CONDUCTORS AND CABLES (CONT.)																																																									
<p>PART 1 - GENERAL</p> <p>1.1 GENERAL</p> <p>A. All work shall conform to the latest editions of the National Electrical Code (NEC) [National Fire Protection Association (NFPA) 70], the Standard for Electrical Safety in the Workplace (NFPA 70E), the Life-Safety Code (NFPA 101), the International Building Code, the Americans with Disabilities Act, and all other applicable federal, state, and local codes and regulations.</p> <p>B. All work shall be performed in strict compliance with NFPA 70E. Submission of bid shall stand as an agreement by the Contractor to indemnify and hold harmless the Engineer and Owner from all liability related to damage and/or injury to personnel and equipment during the installation of the project.</p> <p>C. The contract documents are schematic in nature and are intended to convey the intent of the electrical work to be performed on this project. Provide all material, labor, equipment, etc., necessary to provide complete and operable electrical systems.</p> <p>D. The General Conditions, Supplementary Conditions, General Requirements, Information to Bidders, and all other parts of this set of Contract Documents are hereby adopted and are applicable to the Division 26, 27, and 28 Contractor.</p> <p>1.2 SCOPE OF WORK</p> <p>A. Visit site prior to bid. Devise a plan for installation of complete and operable electrical systems meeting the requirements and intent of the Contract Documents. Submission of Bid stands as evidence that the Contractor accepts the Contract Documents as sufficient and complete for the work to be performed. Notify the Engineer at least two weeks prior to bid of any discrepancies between the Contract Documents and actual field conditions. No change orders will be granted due to existing conditions that could have been observed during a site visit.</p> <p>B. Provide temporary power and lighting during construction. Coordinate with the General Contractor for the exact requirements.</p> <p>C. Electrical switchgear and panelboard layouts are based on sizes of Square D equipment. Equipment manufactured by General Electric, Siemens, and Cutler Hammer are equally acceptable. However, the Electrical Contractor is responsible for selecting and furnishing gear that will fit in the spaces provided and shall be responsible for arranging the gear to meet the required code clearances. Regardless of the manufacturer, the Electrical Contractor shall provide a drawn-to-scale electrical layout with the equipment brochures for all rooms in which panelboards, motor control centers, switchboards, or switchgear are placed. The drawings shall include the work of all other trades including mechanical system piping, ductwork, sprinkler piping, etc. No conduits shall be installed until layouts have been approved.</p> <p>D. Locate junction boxes, pull boxes, disconnects, and other equipment requiring access in such a manner that they are accessible at the end of construction. Notify the Architect where it is impossible to plan conduit routing or equipment placement in such a manner, and provide the necessary access panels in the ceiling or wall as required. The access panel type and style shall be subject to the Architect's approval. Employ a painter to provide the appropriate coatings as directed by the Architect.</p> <p>E. Relocate, or recruit, all electrical equipment, conduit, and circuitry conflicting with or obstructing work on this project. Where the electrical systems are owned by other entities, pay them to relocate, or recruit, their facilities.</p> <p>F. Arrange for connection of service to all electrical systems by the appropriate utility company. Coordinate completely with all utility company requirements even if they are different than the contract documents. If utility company requirements are different from the contract documents, notify the engineer at least ten days prior to bid. Pay all utility company charges necessary for installation and connection of service. No change orders will be granted for utility company connection fees.</p> <p>G. Provide all necessary equipment, raceway, circuitry, fittings, lugs, terminations, labor, etc. and connect to all equipment and appliances requiring electrical connections furnished herein, by the Owner, or by other Contractors. Prior to ordering electrical equipment and roughing in for equipment furnished by the Owner or other Contractors, verify all connection types, connection locations, connection heights, voltages, number of phases, conductor sizes, disconnecting means, breaker sizes, etc. Furnish the proper electrical equipment for the equipment actually being supplied.</p> <p>1.3 WORK IN EXISTING FACILITIES</p> <p>A. All work shall be scheduled and coordinated through the General Contractor with the Owner. Provide necessary costs for all work during both normal and premium work hours in bid.</p> <p>B. Provide continuous uninterrupted power to all existing facilities to remain during the entire construction process. Any required power outages must be scheduled and approved by the Owner in writing at least three days prior to the outage.</p> <p>1.4 SCOPE OF WORK IN EXISTING FACILITIES</p> <p>A. Prior to beginning work, survey existing electrical systems. Document, in writing, signed by the Owner any portions of existing systems that are not operating properly before construction begins. Any electrical systems found inoperable at the end of the construction process that has not been so documented shall be repaired at the end of construction.</p> <p>B. Remove electrical equipment in areas being demolished and electrical equipment feeding other equipment being demolished. Remove raceways and circuitry back to the panel of origination. Where raceways are installed in inaccessible areas, remove conductors back to the panel of origination. Where circuits are not being completely demolished, remove conductors back to a junction box or other connection point outside of the renovated area and recruit existing electrical equipment that is to remain as required. Where necessary, completely refeed existing electrical equipment that is to remain. It is the intent of this specification that all existing equipment to remain be left completely operable at the end of the construction process.</p> <p>C. Survey existing panel board circuitry and provide new typewritten directories giving complete as-built circuitry information for all panelboards affected by the construction on this project.</p> <p>D. Where new circuit breakers are installed in existing equipment, the new circuit breakers shall be manufactured for installation in that equipment. The Amperes Interrupting Current (AIC) Rating shall equal the AIC rating of the existing equipment. A breaker with a lower AIC rating may be used if the contractor provides calculations showing that the breaker rating is sufficient to handle the available fault current. Submit these calculations for approval prior to ordering the breaker. An AIC rating on an existing breaker in the panelboard or switchboard does not demonstrate sufficient proof that the available fault current is less than that breaker's AIC rating.</p> <p>1.5 SUBMITTALS AND SHOP DRAWINGS</p> <p>A. Within 30 days after award of Contract and prior to beginning work, provide six bound copies of manufacturers' cut sheets containing information concerning each article of electrical equipment to be furnished on this project. These cut sheets shall contain sufficient information to prove compliance with the contract documents. Information addressing the requirements of the contract documents shall be highlighted. Each bound set shall bear the stamp of the Electrical Contractor as well as the General Contractor.</p> <p>B. Within 30 days after award of Contract and prior to beginning work, provide six sets of full size shop drawings showing exact equipment locations with all equipment drawn to scale. Show all raceways with their junction boxes and pull boxes. Show all connection types, locations, and heights to equipment. Provide mounting and support details for all raceways and equipment. Coordinate with all other trades to ensure that there are no conflicts between systems. Each set of shop drawings shall bear the stamp of the Electrical Contractor, the General Contractor, and all Project Sub-Contractors. Failure to submit these Shop Drawings will render the Electrical Contractor responsible for resolving all conflicts between trades at his own expense.</p> <p>C. Submittals and Shop Drawings are reviewed to determine quality of materials. Approval of submittals and shop drawings does not relieve the Contractor of meeting the requirements and intent of the Contract Documents.</p> <p>D. Outlet, light fixture, and device locations are shown in their approximate locations on the drawings. Coordinate with Architectural drawings to get final locations. Mount all electrical outlets shown at counters such that the bottom of the box is two inches above the backsplash or six inches above a counter with no backsplash. The Owner reserves the right to relocate outlets, light fixtures, and devices a distance not to exceed twenty feet prior to the installation of outlet boxes.</p> <p>PART 2 - PRODUCTS</p> <p>2.1 All electrical equipment and materials shall be new. All equipment and materials shall be stored on the job site in weatherproof enclosures. Electronic equipment shall be stored in facilities where the temperature and humidity are controlled. In addition, comply completely with all manufacturers' requirements for storage and handling.</p> <p>2.2 All equipment shall be UL listed for the application in which it is used and shall be labeled as evidence of its UL listing.</p> <p>2.3 Each circuit breaker supplying a multiwire branch circuit shall be installed with a manufacturer supplied handle tie to simultaneously disconnect all ungrounded conductors. Each multi-wire branch circuit shall comply with NEC article 210.4.</p> <p>2.4 Products shall be selected to maintain or improve the aesthetics of the facility. Gain approval of the Architect or Engineer prior to ordering or installing any electrical equipment or raceway.</p> <p>PART 3 - EXECUTION</p> <p>3.1 WORKMANSHIP</p> <p>All work shall be performed with an emphasis on neatness. The Engineer, Architect, and Owner retain the right to reject work that is, in their judgment, unsatisfactory.</p> <p>3.2 EXPERIENCE</p> <p>The Contractor shall have completed at least two jobs of similar size and scope within the past five years. The Engineer reserves the right to reject Contractors based on their inability to submit evidence of their experience, or based on experience with the Contractor on previous projects.</p> <p>3.3 PERMITS</p> <p>Obtain and pay for all permits required for work.</p>	<p>3.4 FIREPROOFING</p> <p>A. Fireproof all penetrations through firewalls with a fireproofing compound listed to maintain the rating of the wall through which the raceway passes.</p> <p>B. The fire-stopping caulk shall be a one-part, intumescent, latex elastomer. The caulk shall be capable of expanding a minimum of 3 times at 1000°F. The material shall be thixotropic and be applicable to overhead, vertical and horizontal fire-stops. The caulk shall be listed by independent test agencies such as UL or FM and be tested to, and pass the criteria of, ASTM E 814 Fire Test, tested under positive pressure. It shall comply with the requirements of the NEC (NFPA-70), BOCA, ICBO, SBCCI and NFPA Code 101. Fire-stopping caulk shall be paintable, but shall be non-hardening. Fire-stopping caulk shall be 3M Fire barrier CP or approved equal.</p> <p>C. The fireproofing materials shall be installed by individuals certified to perform such work. Submit evidence of personnel certifications with electrical equipment brochures.</p> <p>D. Where cable trays are shown crossing firewalls, terminate the cable tray on each side of the wall and run the conductors through conduits installed in the wall. Fireproof around the conductors after installation.</p> <p>E. Provide mineral wool packing and all other materials recommended by the manufacturer for a complete installation.</p> <p>3.5 FLASHING</p> <p>Provide all necessary equipment and flash all roof penetrations in such a manner to ensure that all penetrations are completely sealed and all roof warranties remain in effect. Where there are no roof warranties, the Electrical Contractor shall guarantee the electrical penetrations against leaking for a period of one year from project completion. Employ a professional roofing contractor to perform all flashing.</p> <p>3.6 PROTECTION</p> <p>A. Keep energized equipment covered during all phases of construction. Use enclosures, doors, covers, etc., to ensure that neither personnel nor machinery contact live electrical equipment.</p> <p>B. Replace electrical equipment that is damaged during construction.</p> <p>3.7 DAMAGED FACILITIES</p> <p>A. Locate all existing site equipment and utilities prior to beginning construction. Repair all equipment and utilities damaged during construction, or pay for the repair of the equipment and utilities where required by the Owner of the damaged facilities.</p> <p>B. Coordinate the routing of all circuits and the locations of all devices with the Architect or Engineer and the Owner. Shop drawings shall describe completely the locations and elevations of all raceways, boxes, fittings, and equipment.</p> <p>3.8 EXCAVATION AND BACKFILL</p> <p>A. Excavate in such a manner as to minimize erosion of the soil. Backfill trenches around conduits with fine sand that is free of rocks, clods, and debris. Fill sand a minimum of 4" over conduits. Backfill the rest of the trench in six inch increments, wetted, and tamped. Final compaction shall be a minimum of 95% of that of the adjacent earth. Resurface the grade with the same material as that excavated from the grade whether it be paving, concrete, sod, etc. Repair work shall be comparable to the quality of the original site prior to excavation.</p> <p>B. Provide a 3" wide plastic labeled marker tape 12" below grade over all electrical conduits buried underground. Tapes for power circuits shall have a warning such as "Caution: Buried Electrical Line Below." Labels on tapes for telephone, data, cable television, and other facilities shall adequately describe the line over which they are buried.</p> <p>C. Provide a #12 AWG wire in each buried conduit run labeled accordingly on each end.</p> <p>3.9 IDENTIFICATION</p> <p>A. Label all switchboards, panel boards, motor starters, disconnects, and motor control centers furnished under Division 26, 27, and 28 and other divisions of this contract with engraved rigid plastic nameplates having letters at least ¼ inch high. Nameplates shall be bolted to the enclosure. All labels shall indicate the voltage, number of phases, the AIC rating, and the panelboard and circuit number from which the device is fed.</p> <p>B. All circuit breakers in Switchboards, Motor Control Centers, Square D I-Line, and similar panelboards shall be labeled with plastic nameplates (as described in Part A) providing the name of the load served and the ampacity and number of poles of the breaker.</p> <p>C. All Square D NQOD, NF and similar panel boards shall have typewritten circuit directories.</p> <p>D. Label all conductors at all junction boxes, pull boxes, and terminations with typewritten adhesive markers indicating the panel board or switchboard name and circuit number of the conductor. Labels shall be Brady Databat or approved equal.</p> <p>E. Label all junction boxes and pull boxes with stenciled painted letters containing the name of the panel board and circuit numbers of the circuits contained within. Use black paint for normal circuits, red paint for emergency circuits, and orange paint for fire alarm circuits. The Contractor may select other colors for junction boxes and pull boxes for auxiliary systems.</p> <p>F. Label all conduits in the most likely direction of access and view every 50' and on both ends of each bend with stenciled painted letters containing the name of the panel board and circuit numbers of the circuits contained within. Use black paint for normal circuits, red paint for emergency circuits, and orange paint for fire alarm circuits. The Contractor may select other colors for conduits for auxiliary systems.</p> <p>3.10 AS-BUILT DRAWINGS</p> <p>Maintain one set of drawings during construction for as-built markings. Mark these drawings in red to indicate field changes. Provide these drawings to the Engineer at the end of the construction process. Where required under the General Conditions, Special Conditions, or other portions of this contract, provide revised computer drawn as-built drawings to the Engineer at the end of construction.</p> <p>3.11 TESTING</p> <p>A. Test all systems, or pay testing agencies as required, for compliance with the requirements of all regulatory agencies.</p> <p>B. Test the electrical power service ground using a Biddle Three-Terminal Ground Resistance Tester, or approved equal. Grounds shall meet the requirements of the NEC, or of Specification 26 05 26, whichever is more stringent. Test grounds only when the earth is dry. Provide additional ground rods as necessary to achieve the required results.</p> <p>C. Prior to making final equipment connections, test all service, feeder, and branch circuit conductors for continuity, phase-to-phase faults, and phase-to-ground faults using a Megger BM100 or approved equal test instrument generating 500 Vdc. Insulation resistance shall be a minimum of 500,000 Ohms between any conductor and ground and 1,000,000 Ohms between any two conductors.</p> <p>D. Test other systems as required in their respective specifications.</p> <p>E. Provide three bound copies of all test results to the Engineer at the end of the construction process. No Recommendation of Substantial Completion will be granted until all testing reports have been submitted.</p> <p>3.12 WARRANTY</p> <p>Provide the Owner a written guarantee to repair, or replace, all faulty equipment and systems for a period of one year from date of Substantial Completion. During this one-year period, a representative of the Contractor shall be on the site actively working on the repairs within 24 hours of the Owner's telephone call. During this period of time, the Owner shall not be charged for any repair work or expenses related with the repair work unless the Contractor can prove that the Owner has damaged the equipment or system.</p> <p>END OF SECTION</p>	<p>2.6 Conductors used for operating room isolation panels and associated branch circuits shall be copper stranded conductor having a cross-linked polyethylene insulation or equivalent with a dielectric constant of 3.5 or less. Wire-pulling compounds that increase the dielectric constant shall not be used on the secondary conductors of isolation panels. The isolated circuit conductors shall be identified as follows:</p> <p>Isolated Circuit #1 - Orange Isolated Circuit #2 - Brown</p> <p>For 125 volt, 15 & 20 ampere receptacles: The orange conductor shall be connected to the terminal on the receptacle that is identified in accordance with NEC 200.10(B) for connection to the grounded circuit conductor.</p> <p>2.7 Conductors used for services shall be type SE for aerial services or type USE-2 for underground services.</p> <p>2.8 Sizes #10 and #12 shall be solid conductors except where used for controls. All controls conductors shall be stranded.</p> <p>2.9 Use minimum #14 AWG conductors for controls and auxiliary circuits. Use larger conductors as required to compensate for voltage drops exceeding 3% of the system voltage.</p> <p>2.10 Conductors shall be furnished in the colors described below unless local ordinances require different colors. Conductors #8 and smaller shall be furnished with colored insulation; conductors larger than #8 shall be taped with the appropriately colored tape for a length of at least 2" at each panelboard, junction box, pull box, load, or other exposed location. Ground conductors shall be taped green for their entire exposed length.</p> <table><tr><td>SYSTEM VOLTAGE</td><td>208Y/120V, 3 PHASE, 4 WIRE</td><td>120/240V, 3 PHASE, 4 WIRE</td><td>480Y/277V, 3 PHASE, 4 WIRE</td></tr><tr><td>PHASE A</td><td>BLACK</td><td>BLACK</td><td>BROWN</td></tr><tr><td>PHASE B</td><td>RED</td><td>ORANGE</td><td>ORANGE</td></tr><tr><td>PHASE C</td><td>BLUE</td><td>BLUE</td><td>YELLOW</td></tr><tr><td>NEUTRAL</td><td>WHITE</td><td>WHITE</td><td>WHITE</td></tr><tr><td>GROUND</td><td>GREEN</td><td>GREEN</td><td>GREEN</td></tr></table> <p>2.11 Conductor sizing chart:</p> <p>A. Circuit sizes indicated on the drawings are minimum NEC requirements. Refer to this chart for upsizing conductors based on circuit length.</p> <p>B. Do not connect conductors larger than #10 directly to a receptacle or a switch. Provide a junction box to downsize the conductor to #12 at the device.</p> <p>C. For circuits longer than those listed above, consult with the Engineer for conductor sizes.</p> <table><tr><th colspan="3">VOLTAGE DROP CHART FOR 20amp SINGLE POLE CIRCUITS</th></tr><tr><th>VOLTAGE</th><th>CIRCUIT LENGTH</th><th>CONDUCTOR SIZE (AWG)</th></tr><tr><td>120</td><td>< 90'</td><td>#12</td></tr><tr><td>120</td><td>> 90'</td><td>#10</td></tr><tr><td>120</td><td>> 145'</td><td>#8</td></tr><tr><td>120</td><td>> 230'</td><td>#6</td></tr><tr><td colspan="3"></td></tr><tr><td>277</td><td>< 200'</td><td>#12</td></tr><tr><td>277</td><td>> 200'</td><td>#10</td></tr><tr><td>277</td><td>> 325'</td><td>#8</td></tr><tr><td>277</td><td>> 525'</td><td>#6</td></tr></table> <p>PART 3 - EXECUTION</p> <p>3.1 Install conductors carefully using a minimum of two tradesmen - one feeding the conductors into the conduit, and the other pulling the conductors into the conduit.</p> <p>3.2 Join stranded conductors with appropriate mechanical or compression lugs. Wire nuts may be used for solid conductors only.</p> <p>3.3 Splices shall only be made in approved enclosures. Splices shall not be pulled inside conduits.</p> <p>3.4 Provide cable supports and strain relief connectors as required by the NEC.</p> <p>3.5 Furnish junction boxes, pull boxes, handholes, manholes, etc. as required to ensure that the maximum number of bends allowed by the NEC are not exceeded and to ensure that the cables are not damaged during installation.</p> <p>END OF SECTION</p>	SYSTEM VOLTAGE	208Y/120V, 3 PHASE, 4 WIRE	120/240V, 3 PHASE, 4 WIRE	480Y/277V, 3 PHASE, 4 WIRE	PHASE A	BLACK	BLACK	BROWN	PHASE B	RED	ORANGE	ORANGE	PHASE C	BLUE	BLUE	YELLOW	NEUTRAL	WHITE	WHITE	WHITE	GROUND	GREEN	GREEN	GREEN	VOLTAGE DROP CHART FOR 20amp SINGLE POLE CIRCUITS			VOLTAGE	CIRCUIT LENGTH	CONDUCTOR SIZE (AWG)	120	< 90'	#12	120	> 90'	#10	120	> 145'	#8	120	> 230'	#6				277	< 200'	#12	277	> 200'	#10	277	> 325'	#8	277	> 525'	#6
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Columbia High School
Boiler Replacement

Columbia School District

613 Wildcat Way
Columbia, MS 39429

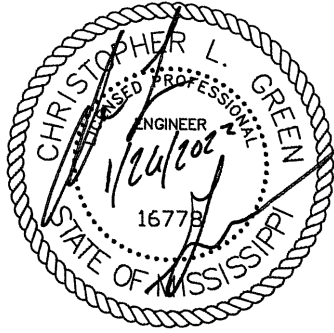
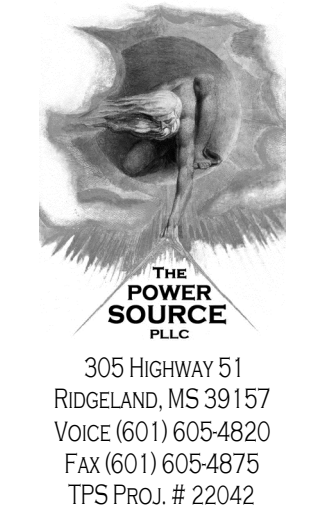
January 26, 2022

Contract Documents
WBA # 21-007

REVISIONS		
NO.	DESCRIPTION	DATE

E001

SPECIFICATIONS																																																			
SECTION 26-05-20 LOW-VOLTAGE POWER CONDUCTORS AND CABLES (CONT.)		SECTION 26-05-33 OUTLET BOXES AND JUNCTION BOXES	SECTION 26-05-33 OUTLET BOXES AND JUNCTION BOXES (CONT.)																																																
<p>J. Conductors shall be furnished in the colors described below unless local ordinances require different colors. Conductors #8 and smaller shall be furnished with colored insulation; conductors larger than #8 shall be taped with the appropriately colored tape for a length of at least 2" at each panelboard, junction box, pull box, load, or other exposed location. Ground conductors shall be taped green for their entire exposed length.</p> <table><tr><td>SYSTEM VOLTAGE</td><td>208Y/120V, 3 PHASE, 4 WIRE</td><td>120/240V, 3 PHASE, 4 WIRE</td><td>480Y/277V, 3 PHASE, 4 WIRE</td></tr><tr><td>PHASE A</td><td>BLACK</td><td>BLACK</td><td>BROWN</td></tr><tr><td>PHASE B</td><td>RED</td><td>ORANGE</td><td>ORANGE</td></tr><tr><td>PHASE C</td><td>BLUE</td><td>BLUE</td><td>YELLOW</td></tr><tr><td>NEUTRAL</td><td>WHITE</td><td>WHITE</td><td>GRAY</td></tr><tr><td>GROUND</td><td>GREEN</td><td>GREEN</td><td>GREEN</td></tr></table> <p>2.1 Metal Clad Cable</p> <p>A. Shall be UL listed as type MC. It shall meet the requirements of UL 1569. It shall also be constructed in accordance with NEC 334 C.</p> <p>B. Fittings shall be manufactured and UL listed for the application in which they are used.</p> <p>C. MC cable shall have an interlocked armor made of aluminum alloy or galvanized steel.</p> <p>D. All electrical conductors shall be soft-drawn annealed copper having 98% conductivity and an insulation rating of 600V.</p> <p>E. Conductors shall have PVC insulation and a Nylon outer jacket. They shall be THHN/THWN or XHHW-2.</p> <p>F. Sizes #10 and #12 shall be solid conductors. Other conductors shall be stranded.</p> <p>G. Conductors shall be furnished in the colors described below unless local ordinances require different colors. Conductors #8 and smaller shall be furnished with colored insulation; conductors larger than #8 shall be taped with the appropriately colored tape for a length of at least 2" at each panelboard, junction box, pull box, load, or other exposed location. Ground conductors shall be taped green for their entire exposed length.</p> <table><tr><td>SYSTEM VOLTAGE</td><td>208Y/120V, 3 PHASE, 4 WIRE</td><td>120/240V, 3 PHASE, 4 WIRE</td><td>480Y/277V, 3 PHASE, 4 WIRE</td></tr><tr><td>PHASE A</td><td>BLACK</td><td>BLACK</td><td>BROWN</td></tr><tr><td>PHASE B</td><td>RED</td><td>ORANGE</td><td>ORANGE</td></tr><tr><td>PHASE C</td><td>BLUE</td><td>BLUE</td><td>YELLOW</td></tr><tr><td>NEUTRAL</td><td>WHITE</td><td>WHITE</td><td>WHITE</td></tr><tr><td>GROUND</td><td>GREEN</td><td>GREEN</td><td>GREEN</td></tr></table> <p>PART 3 - EXECUTION</p> <p>3.1 CONDUCTORS</p> <p>A. Install conductors carefully using a minimum of two tradesmen - one feeding the conductors into the conduit, and the other pulling the conductors into the conduit.</p> <p>B. Join stranded conductors with appropriate mechanical or compression lugs. Wire nuts may be used for solid conductors only.</p> <p>C. Splices shall only be made in approved enclosures. Splices shall not be pulled inside conduits.</p> <p>D. Provide cable supports and strain relief connectors as required by the NEC.</p> <p>E. Furnish junction boxes, pull boxes, handholes, manholes, etc. as required to ensure that the maximum number of bends allowed by the NEC are not exceeded and to ensure that the cables are not damaged during installation.</p> <p>3.2 METAL CLAD CABLE EXECUTION</p> <p>A. Install MC Cable per the requirements of NEC 334 B.</p> <p>B. Join stranded conductors with appropriate mechanical or compression lugs. Wire nuts may be used for solid conductors only.</p> <p>C. Provide cable supports as required by the NEC.</p> <p>D. Furnish junction boxes, pull boxes, handholes, manholes, etc. as required to ensure that the maximum number of bends allowed by the NEC are not exceeded and to ensure that the cables are not damaged during installation. Do not enclose junction boxes in areas that will be inaccessible at the end of construction.</p> <p>E. MC Cable shall be run complete between junction boxes or outlet boxes. Splices are not allowed.</p> <p>END OF SECTION</p>		SYSTEM VOLTAGE	208Y/120V, 3 PHASE, 4 WIRE	120/240V, 3 PHASE, 4 WIRE	480Y/277V, 3 PHASE, 4 WIRE	PHASE A	BLACK	BLACK	BROWN	PHASE B	RED	ORANGE	ORANGE	PHASE C	BLUE	BLUE	YELLOW	NEUTRAL	WHITE	WHITE	GRAY	GROUND	GREEN	GREEN	GREEN	SYSTEM VOLTAGE	208Y/120V, 3 PHASE, 4 WIRE	120/240V, 3 PHASE, 4 WIRE	480Y/277V, 3 PHASE, 4 WIRE	PHASE A	BLACK	BLACK	BROWN	PHASE B	RED	ORANGE	ORANGE	PHASE C	BLUE	BLUE	YELLOW	NEUTRAL	WHITE	WHITE	WHITE	GROUND	GREEN	GREEN	GREEN	<p>PART 1 - GENERAL</p> <p>1.1 GENERAL</p> <p>A. All electrical systems circuitry shall be contained in raceways unless expressly listed in the specification for that system.</p> <p>B. Outlet Boxes and Junction Boxes</p> <p>1. Furnish and install all outlet boxes and junction boxes in accordance with this specification and the requirements of the NEC.</p> <p>2. Provide outlet boxes for all switches, receptacles, luminaires, telephone jacks, cable jacks, and other devices furnished in this Contract. Provide all necessary hardware including, but not limited to, additional structural support, support brackets, screws, bolts, fixture studs, etc.</p> <p>3. Outlet boxes and junction boxes in dry locations shall be galvanized stamped steel boxes sized per the latest edition of the National Electrical Code (NEC), but no less than 4" x 4" x 2 1/8" deep. The thickness of the steel shall be in compliance with the requirements of the NEC. Provide stamped steel covers for all junction boxes manufactured to fit the particular box on which it is used.</p> <p>4. Outlet boxes used in concrete and masonry walls and ceilings shall be of the concrete type manufactured for such applications.</p> <p>5. Outlet boxes and junction boxes in wet locations shall be of cast metal construction with gasketed waterproof covers. All conduit connections to the boxes shall be made watertight.</p> <p>6. Wall outlet boxes shall be 4" x 4" x 2 1/8", or larger as required, with plaster rings provided for final flush installation. Plaster rings shall have single-gang openings unless the equipment mounted inside requires two-gang installation.</p> <p>7. Floor boxes in slabs on grade shall be deep rectangular, cast iron, fully adjustable boxes with brass rings. Covers shall be made of brass and shall provide flip top access to the power or data jacks inside. Screw-on covers are not acceptable unless a flip-top cover is unavailable for the device installed in the floor box. Provide the box sized as required for the number of devices shown installed. Boxes shall be as follows, or approved equal:</p> <p>a. Single-Gang Boxes: Hubbell B2436</p> <p>b. Single-Gang Cover Plates: Hubbell S3825</p> <p>c. Double-Gang Boxes: Hubbell B4233</p> <p>d. Double-Gang Cover Plates: Two Hubbell S3825 Cover Plates</p> <p>e. Triple-Gang Boxes: Hubbell B4333</p> <p>f. Triple-Gang Cover Plates: Three Hubbell S3825 Cover Plates</p> <p>8. In slabs above grade, use cast iron, semi-adjustable shallow boxes as follows, or approved equal:</p> <p>a. Single-Gang Boxes: Hubbell B2414</p> <p>b. Two-Gang Boxes: Hubbell B4214</p> <p>c. Three-Gang Boxes: Hubbell B4314</p> <p>9. Receptacles installed in floor boxes shall be as described in Specification 26 09 23. Switches and Receptacles. Data, Telephone, or Combination Data and Telephone Outlets shall consist of Category 5 rated RJ45 jacks mounted in a Hubbell DJOI strap for use under a S3825 flip top cover plate.</p> <p>10. In existing above grade, use poke thru boxes as follows, or equal:</p> <p>a. Hubbell System One</p> <p>11. Size all boxes per the requirements of the latest NEC.</p> <p>1.2 SCOPE OF WORK</p> <p>A. Raceways</p> <p>1. Provide all raceways, fittings, couplings, anchors, supports, hangers, etc. for complete raceway systems.</p> <p>2. Use Schedule 40 polyvinyl chloride (PVC) conduit for circuits run underground and in slabs on grade level. Provide PVC-coated galvanized rigid steel elbows and PVC-coated galvanized rigid steel conduit for all vertical runs extending to a point at least 6" above grade. Galvanized Rigid steel conduit coated with two complete coats of asphaltum or bituminous paint may be used in lieu of PVC-coated galvanized rigid steel conduit.</p> <p>3. Use Galvanized Rigid Steel (GRS) conduit for all applications where circuits are run above ground exposed to the weather.</p> <p>4. Use Intermediate Metal Conduit (IMC) for all branch circuits, feeders, and auxiliary circuits requiring conduit 1 1/4" nominal trade size or larger in dry locations.</p> <p>5. Use Electrical Metallic Tubing (EMT) for all branch circuits and feeders less than 1 1/4" nominal trade size in dry locations and in slabs above grade level.</p> <p>PART 2 - PRODUCTS</p> <p>2.1 Products for Raceways</p> <p>A. PVC conduits, fittings, couplings, adapters, and accessories shall be UL listed and approved for use with 90 degree Celsius conductors. The UL label shall be affixed to each ten foot length of conduit and each fitting. Conduits shall comply with NEMA Specification TC-2 and UL 651. Fittings shall comply with NEMA TC-3 and UL 514b.</p> <p>B. PVC-coated conduits, fittings, couplings, adapters, and accessories shall be UL listed with PVC as the primary corrosion protection. They shall be hot dipped galvanized rigid steel conduit with threads electro-galvanized after cutting. The conduit shall meet UL 6. The fittings shall meet UL 514B. The PVC coating shall be uniformly applied to the interior and exterior of all conduit and fittings. The coating shall be nominally 2 mils thick. The PVC coating shall extend one pipe diameter or two inches, whichever is less, at every male fitting except unions to fit over the joining female connection. Couplings shall contain a series of longitudinal ribs, 40 mils in thickness, to protect the coating from damage by tools during installation. PVC-coated conduits shall be ETL Verified PVC-001. Fittings shall be manufactured to the same standard. PVC-coated conduit shall be Robroy Plastibond or approved equal.</p> <p>C. GRS conduits, fittings, couplings, adapters, and accessories shall be UL listed. They shall be hot-dipped galvanized steel. They shall meet the safety standards of UL 6, and shall be manufactured to ANSI C80.1. Threads shall be hot galvanized after cutting.</p> <p>D. IMC conduits, fittings, couplings, adapters, and accessories shall be UL listed. They shall be hot-galvanized steel. Fittings, couplings, adapters, and accessories shall be the same as those for GRS conduit described above. IMC shall meet UL 1242 and ANSI C80.6. Threads shall be hot galvanized after cutting. The inside of the conduit shall be finished with a corrosion-resistant coating.</p> <p>E. EMT conduits, fittings, couplings, adapters, and accessories shall be UL listed. They shall be hot galvanized steel and shall be produced in accordance with UL 797 and ANSI C80.3. The inside shall be finished with a corrosion-resistant lubricating coating.</p> <p>F. Conduit fittings used with EMT conduits may be set screw indenter type or compression type. All metallic fittings for IMC and Rigid conduit shall be compression type fittings.</p> <p>G. Flexible metallic conduit shall be constructed of galvanized steel and shall be UL listed as compliant with UL 1 and UL 1479.</p> <p>H. Liquidtight flexible conduit shall be constructed of galvanized steel and shall be coated with a PVC jacket to resist liquids, dirt, grease, and oils. All fittings shall be designed, constructed, and installed to maintain the integrity of the liquidtight connections. Liquidtight flexible conduit shall comply with UL 360.</p> <p>2.2 Acceptable Manufacturers for Outlet Boxes and Junction Boxes.</p> <p>A. Outlet boxes and junction boxes shall be manufactured by Raco, Steel City, Crouse Hinds, or Appleton.</p> <p>PART 3 - EXECUTION</p> <p>3.1 Conduit Execution</p> <p>A. Conduits run underground shall be buried no less than 24" deep. Services and primary conduits feeding transformers shall be buried no less than 48" deep.</p> <p>B. Do not install conduits in or below ground floor slabs, except for service conduits, site lighting, and where specifically indicated on the drawings.</p> <p>C. Do not install conduits within 6" of the deck where a screw down type roof system is utilized.</p> <p>D. PVC-coated conduits may be field-bent provided that manufacturer-approved tools are used. Individuals installing PVC-coated conduits shall be trained for installation by factory-certified trainers. Provide evidence of training with equipment brochures.</p> <p>E. Support and install all conduits per the latest edition of the National Electrical Code. Support groups of conduits with electrical strut supported by threaded rods anchored to the building structure. Supports shall be designed to hold no less than twice the weight of the conduit and conductors to be supported plus an additional 250 pounds at midspan.</p> <p>F. All conduits shall be grouped and run parallel to each other and to building walls.</p> <p>G. All conduits shall be assembled according to the manufacturer's instructions.</p> <p>H. Conduits run underground shall be assembled to be watertight.</p> <p>I. Cap all conduits during installation. Pull a mandrel sized for that conduit and a cleaning brush through each conduit before installation of any conductors.</p>	<p>J. Conduits that are obviously damaged and field bends that are obviously out of round shall be replaced.</p> <p>K. Provide final connections to equipment with flexible metallic conduit. In wet or damp locations, use liquidtight flexible conduit. Flexible conduit shall not exceed 72".</p> <p>L. Terminate conduits entering boxes with a locknut inside the box and a locknut outside the box. Provide protective bushings on all conduit threads. Use watertight hubs where conduit terminations are exposed to moisture.</p> <p>M. Use grounding bushings on all feeder conduits, all underground conduits, and where required by the National Electrical Code.</p> <p>N. Conduits shall be run no closer than 12" to hot water pipes.</p> <p>O. Where conduits are run through the ceiling and are required to make connections to equipment within the room that is not located near a wall, support the conduit from the structural ceiling and provide a flange bolted to the floor. Install a tee conduit fitting in the vertical run of conduit, and make the connection to the equipment with a piece of flexible conduit extending from the tee conduit fitting to the equipment.</p> <p>P. Provide expansion fittings where conduits cross building expansion joints. Provide grounding jumpers between the conduits.</p> <p>Q. Provide EMT conduit sleeves where conduits pass through walls, floors, or footings sized a minimum of two nominal trade sizes larger than the conduit that must pass through the sleeve.</p> <p>R. Equip all empty conduits with a pullwire or string capable of withstanding 200 pounds of pulling tension.</p> <p>3.2 Execution for Outlet Boxes and Junction Boxes.</p> <p>A. All devices shall be flush mounted unless specific written permission is obtained from the Engineer for a particular device in a particular location.</p> <p>B. Install outlet boxes in walls, and provide plaster rings such that wall finish contractor's finish is flush against the edge of the plaster ring. Workmanship will not be accepted where the hole in the wall shows behind the cover plate, or the wall finish is uneven or unpainted at the edge of the cover plate.</p> <p>C. Use round or square ceiling outlet boxes as required for the device being installed. The ceiling shall be finished flush against the box; the fixture shall completely cover the box and mount tight against the ceiling. Coordinate the requirements of the fixture prior to installing the box.</p> <p>D. Provide junction boxes, pull boxes, and conduit fittings where required by the NEC to limit the number of bends in the raceway, and where required to prevent damage to conductors due to long runs.</p> <p>E. Junction boxes and pull boxes installed in the ground outside shall be Quazite Composites or approved equal. Mount the boxes over 24" of washed gravel fill. If splices are to be made inside the boxes, the boxes shall be of the type furnished with a bottom, and all conduit connections shall be watertight. In addition, all conductor splices shall be made watertight using an appropriate splice kit as manufactured by 3M, or an approved equal.</p> <p>END OF SECTION</p>
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Columbia High School Boiler Replacement

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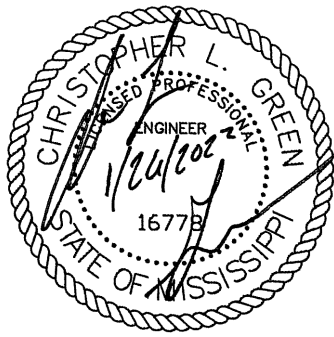
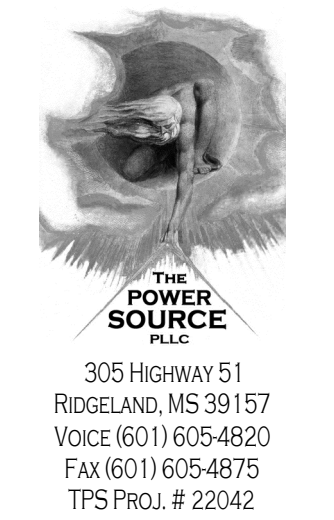
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E002

SPECIFICATIONS	
SECTION 26-09-23 SWITCHES AND RECEPTACLES	SECTION 26-28-00 DISCONNECTS AND SEPARATELY-MOUNTED CIRCUIT BREAKERS (CONT.)
<p>PART 1 - GENERAL</p> <p>Furnish and install all switches and receptacles in accordance with this specification and the requirements of the NEC.</p> <p>PART 2 - PRODUCTS</p> <p>2.1 ACCEPTABLE MANUFACTURERS</p> <p>Switches and receptacles shall be manufactured by Hubbell, Cooper Wiring Devices, Leviton, or Pass & Seymour.</p> <p>2.2 GENERAL</p> <p>A. Switches and receptacles shall be specification grade. They shall have ampacity and voltage ratings suitable for the application in which they are used.</p> <p>B. Consult architect or engineer for device colors prior to ordering devices.</p> <p>C. Provide brushed stainless steel cover plates for all devices. A single cover plate shall cover all devices in one box.</p> <p>D. Light switches shall be 20 Ampere, 120-277V back-wired and side-wired toggle switches. They shall be rated up to 2 HP at 240V. Each switch shall be equipped with a grounding screw. Switches shall be Hubbell CSB series or approved equal.</p> <p>E. Duplex NEMA 5-20R receptacles shall be Hubbell HBL 5362A or approved equal.</p> <p>F. Duplex GFI NEMA 5-20R receptacles shall be Hubbell HBL GF5362A or approved equal.</p> <p>G. Weatherproof while-in-use cover plates shall be Teddico #34017-7 or approved equal. Cover plates shall be single gang, lockable, and constructed of heavy duty die cast metal.</p> <p>H. All 125V, 15 and 20 ampere receptacles installed in dwelling units shall be of the tamper-resistant type.</p> <p>I. All 15 and 20 ampere, 125 and 250V non-locking receptacles installed in wet or damp locations shall be listed as the weather-resistant type.</p> <p>J. Devices furnished in this Contract, but not listed above, shall be of the same standard of quality as those items listed.</p> <p>PART 3 - EXECUTION</p> <p>3.1 Flush mount all devices unless specific written permission is obtained from the Engineer for a particular device in a particular location.</p> <p>3.2 Install all devices vertically unless the drawings specifically state that the particular device should be mounted horizontally.</p> <p>3.3 Install receptacles with the ground slot up.</p> <p>END OF SECTION</p>	<p>F. Circuit breakers with straight voltage ratings, such as 240V or 480V, shall be used in systems other than solidly grounded systems (Corner-Grounded Delta, Ungrounded, Impedance Grounded, etc.) where the nominal voltage between any two conductors does not exceed the circuit breaker's voltage rating. A two-pole circuit breaker shall not be used to protect a three-phase, Corner-Grounded Delta system unless the circuit breaker is marked 1Φ-3Φ.</p> <p>G. Disconnect and individually-mounted circuit breaker ampere interrupting current (AIC) ratings shall equal the rating of the panelboard from which they are fed unless otherwise noted.</p> <p>H. Buses shall be constructed of 98% conductivity copper or equivalently rated aluminum.</p> <p>I. Switches shall be horsepower rated where used to serve motors.</p> <p>J. Enclosures shall be NEMA 1 when they are to be mounted indoors, NEMA 3R when they are to be mounted outdoors, and NEMA 4X where they are subject to washdown. Provide special enclosures where shown on the Contract Drawings.</p> <p>2.2 ACCEPTABLE MANUFACTURERS</p> <p>Disconnects and separately-mounted circuit breakers shall be manufactured by Siemens, Square D, General Electric, or Cutler Hammer.</p> <p>PART 3 - EXECUTION</p> <p>3.1 Install disconnects and individually-mounted circuit breakers in complete compliance with all manufacturers' installation instructions. Where necessary, provide structural supports and bracing for installation.</p> <p>3.2 Disconnects are to be surface-mounted.</p> <p>3.3 Individually-mounted circuit breakers are to be flush-mounted unless otherwise shown.</p> <p>END OF SECTION</p>
SECTION 26-22-00 TRANSFORMERS (CONT.)	
<p>PART 3 - EXECUTION</p> <p>3.1 Install transformers in strict compliance with the manufacturer's instructions and the latest version of the National Electrical Code.</p> <p>3.2 Provide concrete housekeeping pads for transformers mounted indoors. Housekeeping pads shall consist of 3.5" thick pads containing #4 reinforcing bars on 6" centers in both horizontal directions in the center of 3000 psi concrete. Where transformers are located outside, the pad shall extend at least 6" above grade and shall have a 12" wide footing at least 4" below the frost line; the footing shall be a minimum of 12" deep.</p> <p>3.3 Transformers not exceeding 75 KVA may be wall-mounted where sufficient proof is provided that the structure can support the weight and where factory-provided wall brackets are used.</p> <p>END OF SECTION</p>	
SECTION 26-28-00 DISCONNECTS AND SEPARATELY-MOUNTED CIRCUIT BREAKERS	
<p>PART 1 - GENERAL</p> <p>Furnish and install all disconnects and separately mounted circuit breakers as shown on the drawings, specified herein, and required by the NEC.</p> <p>PART 2 - PRODUCTS</p> <p>2.1 GENERAL</p> <p>A. Disconnects shall be of the heavy-duty type, and shall be UL listed for service entrance use. They shall meet or exceed the requirements of NEMA Standard KS1. Provide fuses sized to appropriately protect the load served. Equipment manufacturer's recommendations shall take precedence over the Contract Drawings.</p> <p>B. Fuses shall be dual element, time-delay, Class J fuses. They shall be Bussman Low-Peak or approved equal.</p> <p>C. Circuit breakers shall be thermal magnetic, molded-case with quick-make, quick-break contact action. They shall have thermal and magnetic tripping elements on each pole. Breakers with multiple poles shall have common tripping of all poles. Circuit breaker ampere ratings shall be stamped on the handle. Interrupting ratings of the circuit breakers shall be equivalent to the specified AIC rating of the panelboard. Breakers handles shall reside in a position between "ON" and "OFF" after a trip condition. Breakers shall be rated HACR when used for heating, air-conditioning, and refrigeration; HID when used with High Intensity Discharge fixtures; and shall be rated SWD when used for switching duty.</p> <p>D. Circuit breaker sizes for motor loads are based on Square D recommendations for use of their breakers at the motor horsepower listed on the mechanical drawings. If equipment is used other than Square D, adjust breaker sizes per the manufacturer's recommendations.</p> <p>E. Circuit breakers with slash ratings, such as 120/240V or 480Y/277V, shall be used in solidly grounded systems where the nominal voltage of any conductor to ground does not exceed the lower of the two values of the breaker's voltage rating and the nominal voltage between any two conductors does not exceed the higher value of the circuit breaker's voltage rating.</p>	
SECTION 26-28-00 DISCONNECTS AND SEPARATELY-MOUNTED CIRCUIT BREAKERS (CONT.)	
<p>F. Circuit breakers with straight voltage ratings, such as 240V or 480V, shall be used in systems other than solidly grounded systems (Corner-Grounded Delta, Ungrounded, Impedance Grounded, etc.) where the nominal voltage between any two conductors does not exceed the circuit breaker's voltage rating. A two-pole circuit breaker shall not be used to protect a three-phase, Corner-Grounded Delta system unless the circuit breaker is marked 1Φ-3Φ.</p> <p>G. Disconnect and individually-mounted circuit breaker ampere interrupting current (AIC) ratings shall equal the rating of the panelboard from which they are fed unless otherwise noted.</p> <p>H. Buses shall be constructed of 98% conductivity copper or equivalently rated aluminum.</p> <p>I. Switches shall be horsepower rated where used to serve motors.</p> <p>J. Enclosures shall be NEMA 1 when they are to be mounted indoors, NEMA 3R when they are to be mounted outdoors, and NEMA 4X where they are subject to washdown. Provide special enclosures where shown on the Contract Drawings.</p> <p>2.2 ACCEPTABLE MANUFACTURERS</p> <p>Disconnects and separately-mounted circuit breakers shall be manufactured by Siemens, Square D, General Electric, or Cutler Hammer.</p> <p>PART 3 - EXECUTION</p> <p>3.1 Install disconnects and individually-mounted circuit breakers in complete compliance with all manufacturers' installation instructions. Where necessary, provide structural supports and bracing for installation.</p> <p>3.2 Disconnects are to be surface-mounted.</p> <p>3.3 Individually-mounted circuit breakers are to be flush-mounted unless otherwise shown.</p> <p>END OF SECTION</p>	



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