Norback Fire Pump Replacement

edm
architecture
•
engineering
•
management

The City *of*
WORCESTER

issued for: Bid Set
date: 02.22.2023
project no. : cow-6095

electrical engineer:

edm
1801 6th Avenue
Suite 200
troy, ny 12180

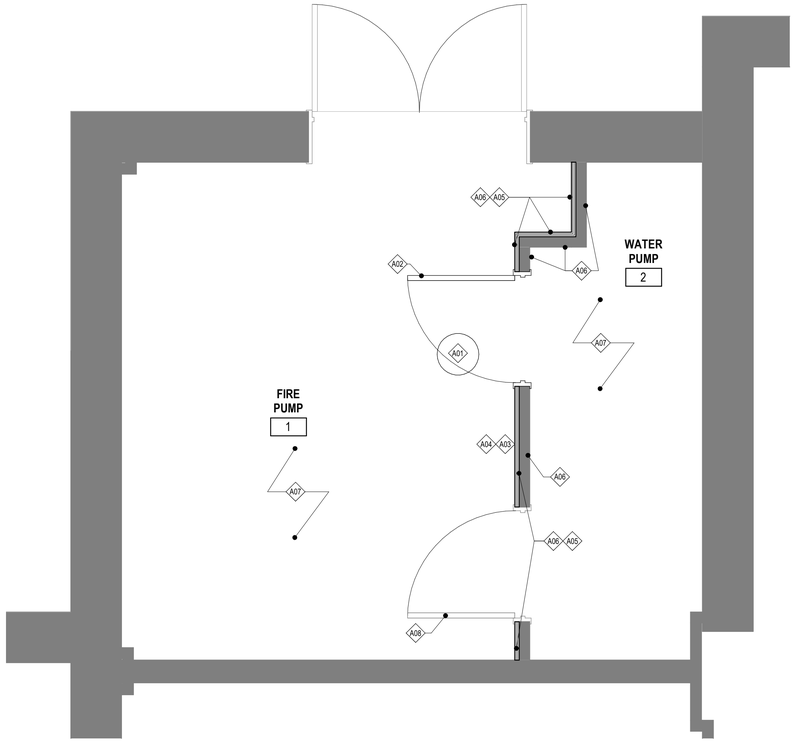
contact: Jeremy Barnes
(518) 272-0274
(413) 443-6057 fax
jbarnes@edm-ae.com

architectural plan general notes

1. SEE SHEET GI-101 FOR TYPICAL SYMBOLS AND DRAWING CONVENTIONS.
2. REPAIR/REPLACE ALL IMPACTED FINISHES TO MATCH EXISTING.
3. ALL WALL AND CEILING PENETRATIONS SHALL BE FIRE STOPPED AS REQUIRED BY CODE.
4. REFER TO MECHANICAL, ELECTRICAL, AND PLUMBING DRAWINGS FOR EQUIPMENT INFORMATION.
5. ALL EXISTING WALLS IN CONSTRUCTION ZONE TO BE REPAIRED, PATCHED, AND FINISHED TO MATCH EXISTING ADJACENT.
6. PAINT ALL WALLS TO MATCH EXISTING.

architectural plan key notes

- A01 EXISTING FLOOR DRAIN TO BE RELOCATED OUT OF DOOR SWING
- A02 REPLACE EXISTING CUT DOOR WITH 90 MINUTE FIRE-RATED DOOR AND CLOSER
- A03 REMOVE EXISTING LOUVER AND INFILL WALL W/ 2 HOUR RATED CONSTRUCTION
- A04 REMOVE EXISTING ACCESS PANEL AND REPLACE WITH 2 HOUR RATED PANEL
- A05 REMOVE EXISTING GYP AS REQUIRED AND REPLACE. PATCH ALL OPENINGS IN WALL CONSTRUCTION
- A06 INSTALL WATER-RESISTANT GYPSUM WALLBOARD FROM FLOOR LEVEL TO 48" AFF
- A07 NEW EPOXY FLOORING
- A08 VERIFY EXISTING DOOR AND FRAME ARE 90 MINUTE FIRE RATED DOOR, REPLACE IF NEEDED.



1 architectural plan - first floor
1/2" = 1'-0"

edm
architecture
engineering
management
pittsfield, ma
unionville, ct
troy, ny
(888) 336-6500
team@edm-ae.com

consultants:

design by: -
drawn by: JP
checked by: JI
approved by: JI

Norback Water and Fire Pump Replacement

44 Malden St,
Worcester, MA 01606

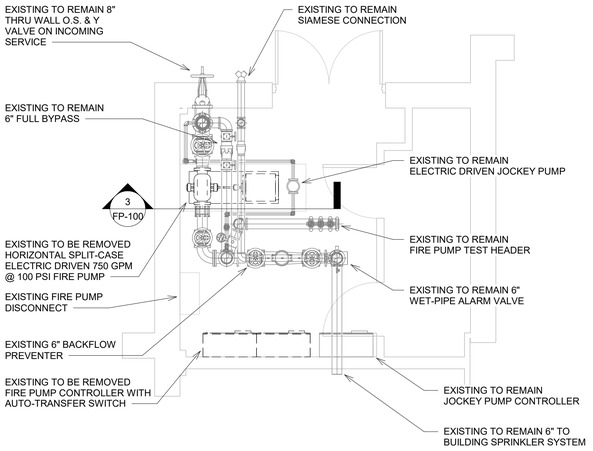
keyplan:

issue / rev.	date:	issued for:	by:

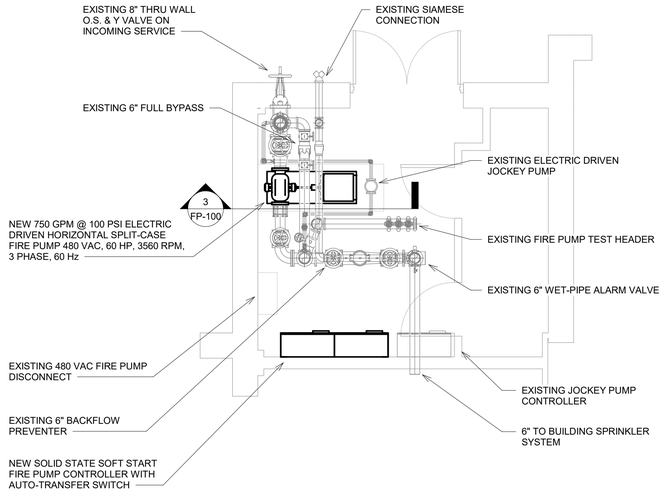
construction plan - first floor

date: 3.3.23
project number: cow-6094
scale: As indicated
drawing number:

A-111



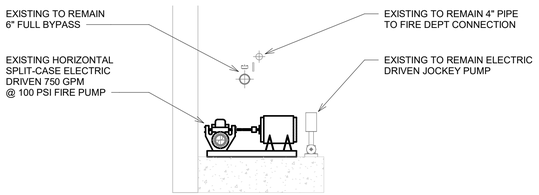
1 Level 1 Fire Pump Room - Existing
1/4" = 1'-0"



2 Level 1 Fire Pump Room - New
1/4" = 1'-0"

NOTES:

1. INSTALLATION TO BE IN ACCORDANCE WITH NFPA-20, 2013 EDITION AND THE COMMONWEALTH OF MASSACHUSETTS STATE BUILDING CODE, 9TH EDITION, AND LOCAL STANDARDS AND ORDINANCES.
2. REPLACE EXISTING ELECTRIC DRIVEN FIRE PUMP WITH NEW 750 GPM @ 100 PSI ELECTRIC DRIVEN HORIZONTAL SPLIT-CASE FIRE PUMP 480 VAC, 60 HP, 3 PHASE, 3560 RPM, 60 Hz.
3. REPLACE EXISTING FIRE PUMP CONTROLLER WITH AUTO-TRANSFER SWITCH WITH NEW SOLID STATE SOFT START FIRE PUMP CONTROLLER WITH AUTO-TRANSFER SWITCH.
4. MAKE CONNECTIONS FROM NEW FIRE PUMP MOTOR TO NEW FIRE PUMP CONTROLLER.
5. MAKE CONNECTIONS FROM EXISTING FIRE PUMP DISCONNECT TO NEW FIRE PUMP CONTROLLER.
6. MAKE SENSING LINE CONNECTIONS FROM SYSTEM TO FIRE PUMP CONTROLLER.
7. TEMPORARILY REMOVED EXISTING JOCKEY PUMP IN ORDER TO REMOVE EXISTING FIRE PUMP AND INSTALL NEW FIRE PUMP.
8. RE-INSTALL JOCKEY PUMP AFTER NEW FIRE PUMP IS INSTALLED.
9. MAKE CONNECTIONS FROM FIRE PUMP CONTROLLER TO FIRE ALARM MONITOR MODULES FOR FIRE PUMP RUNNING, PHASE REVERSAL, POWER LOSS, AND LOSS OF PHASE.
10. PERFORM COMPLETE FIRE PUMP START-UP AND ACCEPTANCE TEST OF FIRE PUMP SYSTEM WITH FACTORY TECHNICIAN.



3 Fire Pump
1/4" = 1'-0"

edm
architecture
engineering
management
pittsfield, ma
unionville, ct
troy, ny
(888) 336-6500
team@edm-ae.com
consultants:
FERNANDEZ & ASSOCIATES
63 LARKIN ROAD
BYFIELD, MA 01922
978-499-0172
WWW.FERNANDEZASSOC.COM

design by: lff | drawn by: lff
checked by: lff
approved by: lff

Norrback School
Fire Pump
Replacement

44 Malden Street
Worcester, Mass. 01606

keyplan:

N

issue / rev.	date:	issued for:	by:

Fire Pump Room

date: 02/22/2023
project number: COW-6094
scale: As indicated
drawing number:

FP-100

SECTION 210000

FIRE PROTECTION SYSTEMS

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

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

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Electric driven slit-case horizontal fire pump, and solid-state soft start fire pump controller with autotransfer switch.
2. Gate valves, check valves, and drain valves.
3. Preparation of complete "Fire Protection Working Drawings/Shop Drawings".
4. Tests of all piping, systems, devices, and alarms.
5. Pressure gauges.
6. Identification of systems, equipment, and valves.
7. Permits, fees and inspections.
8. System and equipment start-ups; instructions.
9. Operation and Maintenance Manuals.
10. Vibration isolators, flexible connectors, expansion fittings.
11. Drilling for installation of inserts.
12. Hoisting equipment for the Work of this Section.
13. Coordination with General Contractor for use of staging, planking, and scaffolding, interior and exterior, which is the responsibility of the General Contractor

B. Alternates: Not Applicable.

C. Items to be Installed Only: Not Applicable.

D. Related Work: The following items are not included in this Section and will be performed under the designated Sections.

1. Division 26 - ELECTRICAL WORK for fire alarm devices and wiring.

E. Perform work and provide material and equipment as shown on Drawings and as specified or indicated in this Section of the Specifications. Completely coordinate work of this Section with work of other trades and provide a complete and fully functional installation.

F. Drawings and Specifications form complimentary requirements; provide work specified and not shown, and work shown and not specified as though explicitly required by both. Although work is not specifically shown or specified, provide supplementary or miscellaneous items, appurtenances, devices, and materials obviously necessary for a sound, secure and complete installation.

G. Give notices, file plans, obtain permits and licenses, pay fees, and back charges, and obtain necessary approvals from authorities that have jurisdiction as required to perform work in accordance with all legal requirements and with Specifications, Drawings, Addenda and Change Orders, all of which are part of Contract Documents.

1.3 SUBMITTALS

A. Comply with requirements specified in Division 1 — SUBMITTALS REQUIREMENTS.

B. Shop Drawings: Submittals shall include but not be limited to the following. Shop/working drawings shall be stamped and sealed by a competent professional engineer licensed in the Commonwealth of Massachusetts.

1. Fire Protection Products:

a. Fire pump and fire pump controller.

1.4 DEFINITIONS

A. As used in this Section, "provide" means "furnish and install" and "POS" means "Provided Under Other Sections". "Furnish" means "to purchase and deliver to the project site complete with every necessary appurtenance and support," and "Install" means "to unload at the delivery point at the site and perform every operation necessary to establish secure mounting and correct operation at the proper location in the project."

1.5 CONTRACT DOCUMENTS

A. Listing of Drawings does not limit responsibility of determining full extent of work required by Contract Documents. Refer to Architectural, HVAC, Plumbing, Fire Protection, Electrical, Structural, and other Drawings, and other Sections that indicate types of construction in which work shall be installed and work of other trades with which work of this Section must be coordinated.

B. Except where modified by a specific notation to the contrary, it shall be understood that the indication and/or description of any item, in the drawings or specifications or both, carries with it the instruction to furnish and install the item, regardless of whether or not this instruction is explicitly stated as part of the indication or description.

C. Items referred to in singular number in Contract Documents shall be provided in quantities necessary to complete work.

D. Drawings are diagrammatic. They are not intended to be absolutely precise; they are not intended to specify or to show every offset, fitting, and component. The purpose of the drawings is to indicate a systems concept, the main components of the systems, and the approximate geometrical relationships. Based on the systems concept, the main components, and the approximate geometrical relationships, the contractor shall provide all other components and materials necessary to make the systems fully complete and operational.

E. Information and components shown on riser diagrams but not shown on plans, and vice versa, shall apply or be provided as if expressly required on both.

F. Data that may be furnished electronically by the Designer is diagrammatic. Such electronically furnished information is subject to the same limitation of precision as heretofore described. If furnished, such data is for convenience and generalized reference, and shall not substitute for Designer's sealed or stamped construction documents.

1.6 DISCREPANCIES IN DOCUMENTS

A. Where Drawings or Specifications conflict or are unclear, advise Designer in writing before Award of Contract. Otherwise, Designer's interpretation of Contract Documents shall be final, and no additional compensation shall be permitted due to discrepancies or unclarities thus resolved.

B. Where Drawings or Specifications do not coincide with manufacturers' recommendations, or with applicable codes and standards, alert Designer in writing before installation. Otherwise, make changes in installed work as Designer requires within Contract Price.

C. If the required material, installation, or work can be interpreted differently from drawing to drawing, or between drawings and specs, this contractor shall provide that material, installation, or work which is of the higher standard.

D. It is the intent of these contract documents to have the contractor provide systems and components that are fully complete and operational and fully suitable for the intended use. There may be situations in the documents were insufficient information exists to precisely describe a certain component or subsystem, or the routing of a component. In cases such as this, where the contractor has failed to notify the Designer of the situation in accordance with the paragraph above, the contractor shall provide the specific component or subsystem with all parts necessary for the intended use, fully complete and operational, and installed in workmanlike manner either concealed or exposed per the design intent.

1. In cases covered by the paragraph above, where the contractor believes he needs engineering guidance, he shall submit a sketch identifying his proposed solution and the Designer shall review, note if necessary, and approve the sketch.

1.7 MODIFICATIONS IN LAYOUT

A. Fire Protection Drawings are diagrammatic. They indicate general arrangements of mechanical and electrical systems and other work. They do not show all offsets required for coordination nor do they show the exact routings and locations needed to coordinate with structure and other trades and to meet architectural requirements.

B. In all spaces, prior to installation of visible material and equipment, including access panels, review Architectural Drawings for exact locations and where not definitely indicated, request information from Designer.

C. Check Contract Drawings as well as Shop Drawings of all subcontractors to verify and coordinate spaces in which work of this Section will be installed.

D. Maintain maximum headroom at all locations. All piping and associated components to be as tight to underside of structure as possible.

E. Make reasonable modifications in layout and components needed to prevent conflict with work of other trades and to coordinate according to Paragraphs A, B, C, D above. Systems shall be run in a rectilinear fashion.

F. Where conflicts or potential conflicts exist and engineering guidance is desired, submit sketch of proposed resolution to Designer for review and approval.

1.8 CODES, STANDARDS, AUTHORITIES AND PERMITS

A. Perform work strictly as required by rules, regulations, standards, codes, ordinances, and laws of local, state, and Federal governments, and other authorities that have legal jurisdiction over the site. Materials and equipment shall be manufactured, installed, and tested as specified in latest editions of applicable publications, standards, rulings and determinations of:

1. Local and state building and fire codes.

a. Massachusetts State Building Code, 9th edition.
b. Massachusetts Comprehensive Fire Safety Code, Jan. 1, 2018

2. National Fire Protection Association (NFPA).

a. NFPA 20 “Standard for the Installation of Stationary Pumps for Fire Protection”, 2013 edition.

3. American Insurance Association (A.I.A.) (formerly National Board of Fire Underwriters).
4. Occupational Safety and Health Act (OSHA).
5. Underwriters' Laboratories (UL).
6. American National Standards Institute (ANSI).
7. FM Global (FM).

B. Material and equipment shall be listed by Underwriters' Laboratories (UL), and FM Global for intended service.

C. When requirements cited in this Specification conflict with each other or with Contract Documents, most stringent shall govern work. Designer may relax this requirement when such relaxation does not violate ruling of authorities that have jurisdiction. Approval for such relaxation shall be obtained in writing.

1.9 GUARANTEE AND 24-HOUR SERVICE

A. Guarantee Work of this Section in writing for one year following the date of Substantial Completion. The guarantee shall repair or replace defective materials, equipment, workmanship, and installation that develop within this period, promptly and to Designer's satisfaction and correct damage caused in making necessary repairs and replacements under guarantee within Contract Price.

B. In addition to guarantee requirements of Division 01 and of Subparagraph A above, obtain written equipment and material warranties offered in manufacturer's published data without exclusion or limitation.

C. Replace material and equipment that require excessive service during guarantee period as defined and as directed by Designer.

D. Provide 24-hour service beginning on the date the project is first occupied for public use by the Owner, whether or not fully occupied, and lasting until the termination of the guarantee period. Service shall be at no cost to the Owner. Service can be provided by this contractor or a separate service organization. Choice of service organization shall be subject to Owner’s approval. Submit name and a phone number that will be answered on a 24-hour basis each day of the week, for the duration of the service.

E. Submit copies of equipment and material warranties to Designer before final payment.

F. At end of guarantee period, transfer manufacturers' equipment and material warranties still in force to Owner.

G. This Article shall not be interpreted to limit Owner's rights under applicable codes and laws and under this Contract.

H. Part 2 Paragraphs of this Specification may specify warranty requirements that exceed those of this Paragraph.

I. Provide manufacturer's engineering and technical staff at site to analyze and rectify problems that develop during guarantee period immediately. If problems cannot be rectified immediately to Owner's Project Manager's satisfaction, advise Designer in writing, describe efforts to rectify situation, and provide analysis of cause of problem. Designer will suggest course of action.

1.10 RECORD DRAWINGS

A. Comply with requirements specified in Division 1 — CONTRACT CLOSEOUT.

B. Drawings shall show record condition of details, sections, riser diagrams, control changes and corrections to schedules. Schedules shall show actual manufacturer and make and model numbers of final equipment installation.

1.11 BULLETINS, MANUALS, AND OPERATING INSTRUCTIONS, AND PROTECTION

A. Obtain at time of purchase of equipment, three copies of operation, lubrication, and maintenance manuals for all items. Assemble literature in coordinated manuals with additional information describing combined operation of field assembled units, including as built wiring diagrams. Manual shall contain names and addresses of manufacturers and local representatives who stock or furnish repair parts for items or equipment. Divide manuals into three sections or books as follows:

1. Directions for and sequence of operation of each item of Fire Protection systems. Sequence shall list valves, switches, and other devices used to start, stop and control system. Detail procedure to be followed in case of malfunctions.
2. Detailed maintenance and troubleshooting manuals containing data furnished by manufacturer for complete maintenance. Include copy of balancing report.
3. Lubrication instructions detailing type of lubricant, amount, and intervals recommended by manufacturer for each item of equipment. Include additional instructions necessary for implementation of first-class lubrication program. Include approved summary of lubrication instructions in chart form, where appropriate.

B. Furnish three copies of manuals to Designer for approval and distribution to Owner Project Manager. Deliver manuals no less than 30 days prior to acceptance of equipment to permit Owner's personnel to become familiar with equipment and operation prior to acceptance.

C. Provide framed and glazed charts as follows: mount as directed by Designer.

1. Flow diagrams from first part of manual as described above.
2. Valve directory.
3. Lubrication chart from third part of manual.

D. Operating instructions: Upon completion of installation or when Owner Project Manager accepts portions of building and equipment for operational use, instruct Owner's operating personnel in any or all parts of various systems. Instructions shall be performed by factory trained personnel. Owner shall determine which systems require additional instructions. Duration of instructions shall take equipment through complete cycle of operation (at least two working days). Make adjustments needed under operating conditions.

E. Each contractor shall be responsible for his work and equipment until finally inspected, tested, and accepted. Carefully store materials and equipment which are not immediately installed after delivery to site. Close open ends of work with temporary covers or plug during construction to prevent entry of obstructing material.

F. Each separate contractor shall protect the work and material of other trades that might be damaged by his work or workmen and make good all damage thus caused.

1.12 COORDINATION DRAWINGS

A. Refer to Division 1 — PROJECT MANAGEMENT AND COORDINATION for coordination drawing requirements.

B. Coordination Drawings include but are not necessarily limited to:

1. Major electrical conduit runs, panelboards, feeder conduit and racks of branch conduit.
2. Sprinkler piping and heads.

1.13 SPRINKLER WORKING PLANS

A. Definition: Working plans are the installation shop drawings required by NFPA Standard 13, NFPA Standard 20, and normally prepared by the installing sub-contractor.

B. Prepare working plans according to the requirements of NFPA Standard 13, and 20. Working plans shall be prepared by a NICET-certified Level III or IV automatic sprinkler system engineering technician and be stamped by a professional engineer registered in the jurisdiction of the Project.

C. Submit working plans to the authorities having jurisdiction for approval, including:

1. Building Department.
2. Fire Department.
3. User Agency's Insurance Underwriter.
4. Designer.

D. Deviation from the approved plans will require re-approval by the reviewing authorities.

E. Submit working plans to the Designer in one complete package, after review by the other authorities having jurisdiction. Plans submitted without P.E. stamp will be returned without review.

1.14 WATER SUPPLY TEST DATA

A. Perform hydrant flow test under the work of this Section for water supply characteristics to be used for hydraulic calculations if supplied information is more than 1 year old.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering fire protection system products which may be incorporated in the work include, but are not limited to, the following:

1. Gate Valves:

a. Fairbanks
b. Jenkins
c. Kennedy Valve, Div of ITT Grinnell Valve Co., Inc.
d. Stockham
e. Victaulic Company of America.

2. Swing Check Valves:

a. Fairbanks
b. Jenkins
c. Kennedy Valve, Div of ITT Grinnell Valve Co., Inc.
d. Star Sprinkler Corp.
e. Stockham

3. Grooved Mechanical Couplings:

a. Stockham
b. Victaulic
c. Grinnell

4. Automatic (Ball Drip) Drain Valves:

a. Tyco Fire & Building Products LP
b. Reliable Automatic Sprinkler Co.

5. Fire Pump:

a. Peerless Pump Company
b. Patterson Pump Company
c. Fairbank-Morse

6. Fire Pump Controller:

a. Firetrol
b. Joslyn-Clark
c. Metron

2.2 PIPING, FITTINGS AND JOINTS

A. Sprinkler Piping:

1. Steel: 2 inches and smaller: ASTM 135 Schedule 40 black steel with threaded joints for wet-pipe system and galvanized with galvanized threaded joints for drains.
2. Steel: 2-1/2 inches and larger: ASTM 135 Schedule 10 black steel with roll grooved joints for wet-pipe system.

B. Fittings:

1. Galvanized and Uncoated Gray Iron Threaded Fitting: ASME B16.4, Class 125.
2. Malleable Iron: ANSI B16.3.
3. Steel Flange and Flanged Fitting: ASMEI 16.1, Class 125.
4. Cast Iron Flanges: ASME 16.1, Class 150.

C. Grooved Fittings and Couplings:

1. Ductile iron housing clamps to engage and lock pressure-responsive, synthetic rubber sealing gasket, steel bolts, nuts, and washers; galvanized for galvanized pipe.

a. Rigid Type: Rigid Type: Housings shall be cast with offsetting, angle-pattern bolt pads to provide system rigidity and support and hanging in accordance with NFPA 13. Tongue and recess rigid type couplings shall only be permitted if the contractor uses a torque wrench for installation. Required torque shall be in accordance with the manufacturer's recommendations. Contractor shall remove and replace any improperly installed joints.

1) 1-1/4" thru 4": "Installation Ready" rigid type coupling designed for direct "stab" installation onto grooved end pipe without prior disassembly of the coupling equal to Victaulic FireLock® EZ Style 009.
2) 5" and Larger: Standard rigid joint equal to Victaulic FireLock® Style 005 or Style 07 Zero-Flex®.

b. Flexible Type: Use in seismic areas where required by NFPA 13. Victaulic Style 75, 004, or 77.
c. Coupling gaskets shall be listed for use as follows:

Fire Protection Service	Temperature Range	Gasket Recommendation
Dry Systems	Ambient	FlushSeal® or EZ Style 009 design, Grade EPDM, Type A
Freezer Applications	-40°F to 0°F	FlushSeal®, Grade L, Silicone
Water/Wet Systems	Ambient	C-Shape or EZ Style 009 design, Grade EPDM, Type A

2. Flange Adapters: Victaulic flange adapters shall be ASTM A536 ductile iron, flat faced, for incorporating flanged components with ANSI Class 125 and 150 bolt-hole patterns to a grooved piping system. Victaulic Style 741 or 744.
3. Compatibility: Couplings and fittings shall be of a single manufacturer or shall be certified as compatible by both manufacturers.

2.3 JOINING MATERIALS

A. Gasket Materials: Thickness, material, and type suitable for fluid or gas to be handled, and design temperatures and pressures.

2.4 GENERAL DUTY VALVES

A. Gate valves, 2 inches and smaller shall be outside screw and yoke, bronze, rising stem, wedge disc type, threaded, conforming to MSS SP-80. Gate valve 2-1/2 inches and larger shall be iron body, bronze trim, outside screw and yoke, flanged, UL/FM listed conforming to MSS SP-70. All valves shall be UL listed for at least 175 psi working water pressure (wwp).

B. Globe and angle valves may be used as auxiliary valves (drain valves, test valves, trim valves, and valves on compressed air piping) for diameters not over 2 in. They shall be bronze, rising stem, with bronze disc, threaded, conforming to MSS SP-80 Class 150.

C. Check valves shall be swing type except as noted. Valves 2 inches and smaller shall be bronze, regrinding type with renewable disc, screwed caps, threaded, class 150 conforming to MSS SP-80. Check valves 2-1/2 inches and greater shall be iron body, bronze trim, bolted cover, flanged, conforming to MSS SP-71, UL listed for 175 psi wwp.

2.5 PIPE AND HANGER SUPPORTS

A. Provide pipe supports, sway braces, hangers, and clamps conforming to NFPA 13 and listed by UL and approved by FM. Provide protection of piping against earthquake damage in accordance with NFPA 13.

B. Piping 2-1/2” and smaller: Carbon Steel, adjustable swivel.

C. Piping 3” and larger: Carbon Steel, adjustable clevis.

D. Hanger Rods: Electro-Galvanized mild steel threaded both ends, threaded one end, or continuous threaded.

E. Riser Clamps: Carbon Steel riser clamp.

F. Floor Supports: Schedule 40 black steel adjustable pipe saddle, lock nut, nipple, floor flange and concrete pier or steel support.

2.6 FIRE PUMP AND ACCESSORIES

A. Description: Factory-assembled and -tested fire-pump and driver unit.

B. Base: Fabricated and attached to fire-pump and driver unit, with reinforcement to resist movement of pump during seismic events when base is anchored to building substrate.

C. Finish: Red paint applied to factory-assembled and -tested unit before shipping.

D. Provide an electrical driven horizontal split-case fire pump, designed in accordance with the requirements of NFPA 20. Equipment to be stored in factory until installation date, where it shall then be delivered to the site. Coordinate the lifting and installation of pump, motor, and all required connections.

E. The fire-pumping system shall be designed to deliver 750 GPM when operating at 100 PSI using a 60 HP Motor. The pump shall also deliver not less than 150% of rated capacity at a pressure not less than 65% of rated pressure. Motor and pump speed shall not exceed 3560 RPM. Supply power to the system shall be 480 Volts, 3 phase, 60 Hertz. Pump is to be mounted horizontally with both pump and drive on the same base for Fire Pump service Constructed in accordance with NFPA-20, UL 448 and approved by U.L. and F.M.

F. Pump:

1. Standard: UL 448, for split-case pumps for fire service.
2. Casing: Axially split case, cast iron, with ASME B16.1 pipe-flange connections.
3. Impeller: Double suction, cast bronze, statically and dynamically balanced, and keyed to shaft.
4. Wear Rings: Replaceable bronze.
5. Shaft and Sleeve: Alloy steel shaft with bronze sleeve.

a. Shaft Bearings: Grease-lubricated ball bearings in cast-iron housing.
b. Seals: Stuffing box with minimum of four rings of graphite-impregnated braided yarn and bronze packing gland.

6. Mounting: Pump and driver shafts are horizontal, with pump and driver on same base.

G. Coupling: Flexible and capable of absorbing torsional vibration and shaft misalignment. Include metal coupling guard.

H. Driver:

1. Standard: UL 1004A.
2. Type: Electric motor; NEMA MG 1, polyphase Design B.

I. Capacities and Characteristics:
1. Rated Capacity: 750 GPM.
2. Total Rated Head: 100 psi.
3. Inlet Flange: Class 125.
4. Outlet Flange: Class 125.
5. Motor Horsepower: 60 hp.
6. Motor Speed: 3560 rpm.
7. Electrical Characteristics:
a. Volts: 480V.
b. Phase: Three.
c. Hertz: 60.

J. Pump shall include:

1. Pressures gauges.
2. Circulation relief valve.
3. Automatic air release valve.
4. Concentric discharge increase.
5. Concentric suction reducer.

K. Submittal drawings shall include certified dimensional prints, bill of material, and curves of performance characteristics on pump unit proposed. Pumps shall be hydrostatically tested to twice shut-off pressure, or to 250 psi, whichever is greater.

L. Automatic Air-Release Valves: Comply with NFPA 20 for installation in fire-pump casing.

M. Circulation Relief Valves: UL 1478, brass, spring loaded; for installation in pump discharge piping.

N. Outlet Fitting: Concentric tapered reducer at pump discharge outlet.

O. Provide services of factory technician to supervise installation and to conduct final field acceptance tests.

edm
architecture
engineering
management
pittsfield, ma
unionville, ct
troy, ny
(888) 336-6500
team@edm-ae.com

consultants:

FERNANDEZ & ASSOCIATES
63 LARKIN ROAD
BYFIELD, MA 01922
978-499-0172
WWW.FERNANDEZASSOC.COM

design by: lff | drawn by: lff
checked by: lff
approved by: lff

Norrback School
Fire Pump
Replacement

44 Malden Street
Worcester, Mass. 01606

keyplan:

N

issue / rev.	date:	issued for:	by:

Fire Protection Specifications

date:
02/22/2023

project number:
COW-6094

scale:

drawing number:

FP-101

2.7 AUTOMATIC FIRE PUMP CONTROLLER

A. The fire pump controller shall be a UL/FM labeled combination manual and automatic type. Provide controller with floor mounted start/stop push buttons, 0-300# pressure transducer, minimum run timer Firetrol Mark III FTA1930/FTA950 Solid State Reduced Current Starting or equal.

B. The enclosure NEMA 2 floor mounted and meeting the requirements of the most recently mandated edition of NFPA 20 and shall be listed by Underwriters Laboratories and approved by Factory Mutual.

C. The withstand rating of the controller shall not be less than 100,000 RMS Symmetrical at 480 volts.

D. The controller shall include a motor rated combination isolating disconnect switch/circuit breaker, mechanically interlocked, and operated with a single, externally mounted handle. When moving the handle from OFF to ON, the interlocking mechanism shall sequence the isolating disconnect switch ON first and then the circuit breaker. When the handle is moved from ON to OFF, the mechanism shall sequence the circuit breaker open first, and then the isolating disconnect switch. The isolating disconnect switch and circuit breaker shall be mechanically interlocked so that the enclosure door cannot be opened with the handle in the ON position except by a hidden tool operated defeater mechanism.

E. The controller shall have a minimum running period timer set for ten minutes. Terminals shall be provided to field convert the controller from automatic to manual shutdown.

F. The controller shall have externally mounted, individual visual indicators for:

1. Power available
2. Low pressure
3. Local start
4. Remote start
5. Phase failure
6. Phase reversal
7. Interlock on
8. Pump running
9. Low room temperature
10. Run timer on.

G. The controller shall be supplied with duplicate individual alarm contacts for:

1. Phase reversal
2. Phase failure
3. Pump running
4. Low room temperature.

H. The controller shall have a USB port for recording pressure.

I. The power transfer switch shall be designed for use with Generator set emergency power source. The power transfer switch shall include a motor rated disconnect/isolating switch capable of interrupting the motor locked rotor current. The disconnect/isolating switch shall be mechanically interlocked so that the enclosure door cannot be opened with the handle in the ON position except by a hidden tool operated defeater mechanism.

J. The transfer switch circuitry shall be capable of sensing both the normal power source and the emergency source. The normal power source pick up shall be set at 90% nominal voltage and 95% nominal frequency. All voltage sensing, frequency sensing, and time delays shall be field adjustable. The transfer signal shall be delayed for one second, delaying the transfer and engine start signals so as to override momentary normal power outages.

K. The transfer switch shall have TRANSFER SWITCH NORMAL, TRANSFER SWITCH EMERGENCY, and EMERGENCY ISOLATING SWITCH OFF pilot lights, TEST, and SILENCE ALARM pushbuttons mounted on the flange of the enclosure. The transfer switch shall be electrically operated and mechanically held and shall be capable of being operated by a manual transfer mechanism located on the switch.

L. The transfer switch must be manufactured by the fire pump controller manufacturer and be in the same enclosure and rated for fire service. The maximum width on the fire pump controller shall be 64".

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine rough-in for pipe penetrations to verify actual locations of piping connections prior to installing.

B. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PIPE APPLICATIONS

A. Install piping in accordance with NFPA 13 for sprinkler system, and hose system, and NFPA 20 for fire pump system.

B. Install Schedule 40 steel pipe with threaded joints and fittings for 2-inch and smaller on wet-pipe sprinklers.

C. Install Schedule 10 steel pipe with roll-grooved ends and grooved mechanical couplings for piping 2-1/2 inch and larger on wet-pipe sprinklers.

D. Install Schedule 40 galvanized steel pipe with threaded joints and fittings for 2-inch and smaller on drains.

3.3 HANGERS AND SUPPORT

A. Support all piping included in the Work of this Section with hangers and rods attached to the building structure. Hang piping in compliance with NFPA Standards and the requirements of this Section.

B. Space hangers and supports for horizontal steel sprinkler piping according to the following schedule:

Pipe Size:	Maximum Hanger Spacing:
1-1/4 inches and smaller	8'-0"
1-1/2 inches to 3 inches	10'-0"
4 inches to 5 inches	12'-0"
6 inch and larger	15'-0"

C. Hang sprinkler piping to support the weight of the water filled pipe plus 250 pounds at the hanger.

D. Hang horizontal fire line piping to support the weight of five times the weight of the water filled pipe plus 250 pounds at the hanger.

E. Provide steel angle supports attached to the building structure to support piping below ductwork.

3.4 PIPING INSTALLATIONS

A. Locations and Arrangements: Drawings (plans, schematics, and diagrams) indicate the general location and arrangement of piping systems. So far as practical, install piping as indicated.

1. Deviations from approved "Working Plans" for sprinkler piping, require written approval of the authority having jurisdiction. Written approval shall be on file with the Designer prior to deviating for the approved "Working Plans."

B. Install sprinkler piping to provide for system drainage in accordance with NFPA 13.

C. Use approved fittings to make all changes in direction, branch takeoffs from mains, and reductions in pipe sizes.

D. Install unions in pipes 2-inch and smaller, adjacent to each valve. Unions are not required on flanged devices or in piping installations using grooved mechanical couplings.

E. Install flanges or flange adaptors on valves, apparatus, and equipment having 2-1/2 inch and larger connections.

F. Hangers and Supports: Comply with the requirements of NFPA 13. Hanger and support spacing and locations for piping joined with grooved mechanical couplings shall be in accordance with the grooved mechanical coupling manufacturer's written instructions, for rigid systems. Provide protection from damage where subject to earthquake in accordance with NFPA 13.

G. Use galvanized pipe and fittings for all drain lines.

H. Die cut screw joints with full cut standard taper pipe threads with red lead and linseed oil or other non_toxic joint compound applied to male threads only.

I. Install valves with stems upright or horizontal, not inverted. Remove protective coating after installation.

J. Flush entire piping system of foreign matter.

3.5 PIPE JOINT CONSTRUCTION

A. Threaded Joints: Conform to ANSI B1.20.1, tapered pipe threads for field cut threads. Join pipe, fittings, and valves as follows:

1. Note the internal length of threads in fittings or valve ends, and proximity of internal seat or wall, to determine how far pipe should be threaded into joint.
2. Align threads at point of assembly.
3. Apply appropriate tape or thread compound to the external pipe threads.
4. Assemble joint to appropriate thread depth. When using a wrench on valves, place the wrench on the valve end into which the pipe is being threaded.
5. Damaged Threads: Do no use pipe with threads which are corroded, or damaged. If a weld opens during cutting or threading operations, that portion of pipe shall not be used.
6. Flanged Joints: Align flanges surfaces parallel. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly to appropriate torque specified by the bolt manufacturer.
7. Mechanical Grooved Joints: Cut or roll grooves on pipe ends dimensionally compatible with the couplings.
8. End Treatment: After cutting pipe lengths, remove burrs and fins from pipe ends.

3.6 VALVE INSTALLATION

A. General: Install fire protection specialty valves, fittings, and specialties in accordance with the manufacturer's written instructions, NFPA 13, and the authority having jurisdiction.

B. Gate Valves: Install supervised-open gate valves so located to control all sources of water supply except fire department connections. Where there is more than one control valve, provide permanently marked identification signs indicating the portion of the system controlled by each valve.

3.7 FIRE PUMP INSTALLATION

A. Install complete fire pump system in compliance with NFPA-20.

B. Completely align and level pump, motor, and base. Where pumps and motor are shipped as a unit, realign them in the field.

C. Grout fire pump base plate completely to provide a non-deflecting support.

D. Secure pumps to bases with proper size anchor bolts.

E. Pump manufacturer to set packing, adjust impellers and check alignment prior to start-up.

F. Construct all apparatus of materials and pressure ratings suitable for the conditions encountered during continuous operation.

G. Provide casing connections for vent, drain, suction and discharge pressure gauges.

H. Balance impellers and all other moving components statically and dynamically.

I. Pump must operate stably without pulsation, vibration, or internal recirculation. Pump operating characteristics at the design point must be such that a variation of 10% in head results in not more than a 15% variation in gpm and does not affect the stability of operation of the pump.

J. Pipe all drains to the existing floor drain.

K. Pipe relief valve to the existing floor drain.

L. Connect fire pump sensing line after system check valve to fire pump controller.

M. Connect power to fire pump controller and pump motor.

N. Install and connect power and wiring for fire pump remote monitoring by building fire alarm system.

3.8 SIGNS

A. Signs and nameplates in accordance with NFPA standards and/or these specifications shall be provided at all drains, test, alarm valves and other areas as required by NFPA 13 Standards, NFPA 20 Standards as well as fire pump room, and sprinkler valve rooms as required by Massachusetts State Building Code.

3.9 FIELD QUALITY CONTROL

A. Flush, test and inspect fire pump system in accordance with NFPA 20.

B. Replace piping system components which do not pass the test procedures specified, and retest repaired portion of the system.

3.10 TESTING

A. Testing and flushing of the fire protection systems shall be done at the expense of this Subcontractor and with equipment furnished by him. Testing shall be done in the presence of duly authorized inspectors and representatives of the Designer and Owner's Project Manager within forty-eight (48) hour notice given those authorities. Prior to testing, the system shall be thoroughly flushed with clean water.

B. The system shall be repaired and retested until made perfect, without additional expense to Owner.

C. Fire Pump — perform acceptance test in accordance with NFPA 20 with a factory technician present at start up and field acceptance test.

D. A factory certified pump performance test shall be performed at the factory prior to shipping.

E. Training shall be onsite instruction to owner's representatives for system review and operation. A minimum of 5 (five) days' notice is to be given to the owner to establish a time for this review.

F. Fire pump manufacturer will be required to submit a notarized Certificate of Compliance certifying that all components of the fire pump unit were in fact supplied by the fire pump manufacturer and acknowledging its responsibility for the proper function of the unit.

G. Material and test certificates must be signed by the Owner's Project Manager prior to and upon completion of testing. Final test reports must be approved in writing by local authorities.

H. Results of tests shall be recorded and submitted using the forms in NFPA #13, for review by the Engineer. The Material and Test Certificate shall also be sent to the Owner's Project Manager.

I. Provide all necessary and appropriate personnel to participate in and coordinate fire protection systems with all fire alarm testing, or other systems testing which may interface with fire protection system. Participation shall include all preliminary testing, walk-through testing prior to official walk-through testing and any re-testing if required.

END OF SECTION

edm
architecture
engineering
management
pittsfield, ma
unionville, ct
troy, ny
(888) 336-6500
team@edm-ae.com

consultants:

FERNANDEZ & ASSOCIATES
63 LARKIN ROAD
BYFIELD, MA 01922
978-499-0172
WWW.FERNANDEZASSOC.COM

design by: lff | drawn by: lff
checked by: lff
approved by: lff

Norrback School
Fire Pump
Replacement

44 Malden Street
Worcester, Mass. 01606

keyplan:

N

issue / rev.:	date:	issued for:	by:

Fire Protection Specifications

date: 02/22/2023
project number: COW-6094
scale:
drawing number:

FP-102

DIVISION 26 - GENERAL PROVISIONS FOR ELECTRICAL WORK
GENERAL PROVISIONS FOR ELECTRICAL WORK

1. REFERENCES

- THIS SECTION COVERS THE GENERAL REQUIREMENTS FOR ELECTRICAL WORK; EXAMINE ALL CONTRACT DRAWINGS AND ALL OTHER SECTIONS OF THE SPECIFICATIONS FOR ADDITIONAL WORK RELATED TO THE WORK OF THIS DIVISION.

2. DEFINITIONS

- 'PROVIDE' - TO FURNISH, INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION OF PARTICULAR WORK REFERRED TO UNLESS, SPECIFICALLY OTHERWISE NOTED.
- 'INSTALL' - TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
- 'WORK' - LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS REQUIRED FOR PROPER AND COMPLETE INSTALLATION.
- 'WIRING' - RACEWAY, FITTINGS, WIRE, BOXES, MOUNTING HARDWARE AND RELATED ITEMS.
- 'CONCEALED' - EMBEDDED IN MASONRY OR OTHER CONSTRUCTION CAVITY, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS.
- 'SIMILAR' OR 'EQUAL' - EQUAL MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.
- 'CONTRACTOR' - THE ELECTRICAL CONTRACTOR.
- 'NOTED' - AS INDICATED ON THE DRAWINGS AND/OR SPECIFICATIONS.
- 'EQUIPMENT' - DESIGNATES A GENERAL FORM, INCLUDING FITTINGS, DEVICES, APPLIANCES, LUMINARIES, APPARATUS, MACHINERY AND THE LIKE USED AS A PART OF, OR IN CONNECTION WITH AN ELECTRICAL INSTALLATION.

3. SCOPE

- THIS WORK SHALL CONSIST OF THE FURNISHINGS OF ALL LABOR, MATERIALS AND SERVICES REQUIRED COMPLETE, READY FOR CORRECT OPERATION FOR ALL ELECTRICAL WORK CALL FOR BY THE ACCOMPANYING DRAWINGS AND SPECIFICATIONS. ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, STATE AND LOCAL CODES.
- THE DATA INDICATED IN THESE DRAWINGS AND SPECIFICATIONS ARE AS EXACT AS COULD BE SECURED. BUT THEIR ABSOLUTE ACCURACY IS NOT GUARANTEED. DO NOT SCALE DRAWINGS. EXACT LOCATIONS, DISTANCES, LEVELS AND OTHER CONDITIONS WILL BE GOVERNED BY THE BUILDING. USE THE DRAWINGS AND SPECIFICATIONS FOR GUIDANCE AND SECURE THE ENGINEER'S APPROVAL OF CHANGES IN LOCATIONS. CIRCUITS, WHERE SHOWN ON AN ELECTRICAL DRAWINGS, ARE SO INDICATED PRIMARILY FOR THE PURPOSE OF INDICATING THE GENERAL CIRCUIT PLAN AND DO NOT NECESSARILY INDICATE THE EXACT LOCATION OF ROUTING OF THE RACEWAYS UNLESS SPECIFICALLY INDICATED.
- BEFORE SUBMITTING A BID, THE CONTRACTOR SHALL VISIT THE SITE AND BECOME THOROUGHLY FAMILIAR WITH ALL EXISTING CONDITIONS UNDER WHICH THE WORK OF ALL TRADES WILL BE INSTALLED. CONTRACTOR SHALL INCLUDE ANY MODIFICATIONS REQUIRED IN EXISTING ELECTRICAL EQUIPMENT FOR INSTALLATION OF NEW ELECTRICAL EQUIPMENT AND NEW EQUIPMENT OF OTHER TRADES. ALL NEW AND EXISTING EQUIPMENT AND SYSTEMS SHALL BE FULLY OPERATIONAL UNDER THIS CONTRACT BEFORE THE PROJECT IS CONSIDERED COMPLETE. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY ASSUMPTIONS THAT ARE MADE, ANY OMISSIONS OR ERRORS MADE AS A RESULT OF FAILURE TO VISIT THE SITE AND BECOME THOROUGHLY FAMILIAR WITH THE EXISTING CONDITIONS AND CONTRACT DOCUMENTS OF ALL TRADES.

4. CODES, REGULATIONS AND STANDARDS

- ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE FOLLOWING APPROVED CODES:
  1. STATE DEMOLITION CODE
  2. STATE BUILDING CODE
  3. STATE FIRE SAFETY CODE
  4. LOCAL BUILDING CODE
  5. IBC - INTERNATIONAL BUILDING CODE
  6. NFPA - NATIONAL FIRE PROTECTION CODE
  7. ANSI - AMERICAN NATIONAL STANDARDS INSTITUTE
  8. ASTM - AMERICAN SOCIETY FOR TESTING AND MATERIALS
  9. OSHA - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
  10. U.L. - UNDERWRITERS LABORATORIES
  11. NFPA 101 - LIFE SAFETY CODE
  12. NFPA 99 - HEALTH FACILITIES CODE
  13. NFPA 70 - NATIONAL ELECTRICAL CODE
  14. NFPA 72 - NATIONAL FIRE ALARM CODE
  15. EPA - ENVIRONMENTAL PROTECTION AGENCY
  16. IEEE - INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS
  17. NEMA - NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
  18. IECC - INTERNATIONAL ENERGY CONSERVATION CODE
  19. ICC/ANSI A117.1 ACCESSIBLE AND USABLE BUILDINGS AND FACILITIES

5. PERMITS, FEES AND INSPECTIONS

- THE CONTRACTOR SHALL GIVE ALL NECESSARY NOTICES, OBTAIN ALL PERMITS, PAY FOR ALL GOVERNMENT, STATE SALES TAXES AND APPLICABLE FEES. THE CONTRACTOR SHALL FILE ALL DRAWINGS, COMPLETE ALL DOCUMENTS AND OBTAIN ALL NECESSARY APPROVALS FROM THE PROPER AUTHORITY OR AGENCY HAVING JURISDICTION. OBTAIN ALL REQUIRED CERTIFICATES OF INSPECTION COVERING WORK. THE CONTRACTOR SHALL SEE THAT ALL REQUIRED INSPECTIONS AND TESTS ARE MADE AND SHALL COOPERATE TO MAKE THESE TESTS AS THOROUGH AND AS READILY MADE AS POSSIBLE.

6. MATERIALS AND WORKMANSHIP

- ALL MATERIALS AND APPARATUS REQUIRED FOR THE WORK, EXCEPT AS OTHERWISE SPECIFIED, SHALL BE NEW AND OF FIRST-CLASS QUALITY. IT SHALL BE FURNISHED, DELIVERED, ERECTED, CONNECTED, FINISHED IN EVERY DETAIL.
- ALL EQUIPMENT AND MATERIALS SHALL BE SPECIFICATION GRADE AND BEAR THE UNDERWRITER'S LABEL. NO SUBSTITUTE OR ALTERNATE EQUIPMENT, MATERIAL, ETC. WILL BE CONSIDERED FOR THIS PROJECT.
- ALL WORK SHALL BE OF A QUALITY CONSISTENT WITH GOOD TRADE PRACTICE AND SHALL BE INSTALLED IN A NEAT, WORKMANLIKE MANNER. THE ENGINEER/OWNER RESERVES THE RIGHT TO REJECT ANY WORK WHICH, IN HIS OPINION, HAS BEEN INSTALLED IN A SUBSTANDARD, DANGEROUS OR IN A UNSERVICEABLE MANNER. THE CONTRACTOR SHALL REPLACE REJECTED WORK IN A SATISFACTORY MANNER AT NO EXTRA COST TO THE OWNER.

7. GUARANTEES

- ALL WORKMANSHIP AND MATERIALS SHALL BE FULLY GUARANTEED FOR A PERIOD OF ONE YEAR AFTER ACCEPTANCE OF THE ENTIRE INSTALLATION COVERED BY THIS CONTRACT. SHOULD ANY DEFECTS OCCUR DURING THE GUARANTEED PERIOD, THE CONTRACTOR SHALL REPAIR AND/OR REPLACE ALL DEFECTIVE EQUIPMENT, MATERIAL AND/OR WORK AT NO EXTRA CHARGE TO THE OWNER.

8. RECORD DRAWINGS

- MAINTAIN, AT THE JOB SITE, A SET OF ELECTRICAL DRAWINGS INDICATING ALL CHANGES IN LOCATION OF THE EQUIPMENT, PANELS, DEVICES, ETC. FROM THE ORIGINAL LAYOUT. CLEARLY MARK IN RED ALL CHANGES ON THE DRAWINGS. AT THE COMPLETION OF THE PROJECT THE CONTRACTOR SHALL TURN OVER THE RECORD DRAWINGS TO THE ENGINEER/OWNER.

9. COORDINATION

- ALL WORK SHALL BE CARRIED OUT IN CONJUNCTION WITH OTHER TRADES AND FULL COOPERATION SHALL BE GIVEN IN ORDER THAT ALL WORK MAY PROCEED WITH A MINIMUM OF DELAY AND INTERFERENCE.

10. SHOP DRAWINGS

- SUBMIT ELECTRONIC COPIES FOR REVIEW, DETAILED SHOP DRAWINGS OF ALL EQUIPMENT AND MATERIAL SPECIFIED. THE CONTRACTOR SHALL REVIEW ALL SHOP DRAWINGS PRIOR TO SUBMISSION TO THE ENGINEER FOR REVIEW. NO MATERIAL OR EQUIPMENT MAY BE DELIVERED TO THE JOB SITE OR INSTALLED UNTIL CONTRACTOR HAS IN THEIR POSSESSION, APPROVED SHOP DRAWINGS FOR THE PARTICULAR MATERIAL OR EQUIPMENT. SHOP DRAWINGS SHALL BE SPECIFIC WITH ITEMS SUBMITTED FOR APPROVAL CLEARLY IDENTIFIED.
- THE FOLLOWING IS A LIST OF ELECTRICAL ITEMS THAT MUST BE SUBMITTED FOR REVIEW:
  1. CONDUIT, WIRE AND CABLE

11. EQUIPMENT PROTECTION

- PROPERLY AND COMPLETELY PROTECT AGAINST ALL DAMAGE, ALL APPARATUS, EQUIPMENT, ETC., INCLUDED IN THIS CONTRACT. THE CONTRACTOR WILL BE HELD RESPONSIBLE FOR ANY DAMAGE TO FURNISHED APPARATUS, EQUIPMENT, ETC., UNTIL FINAL ACCEPTANCE.

12. PROPERTY PROTECTION

- THE CONTRACTOR SHALL TAKE WHATEVER MEANS NECESSARY AND/OR REQUIRED TO PROTECT OWNER'S PROPERTY WITHIN THE WORKING AREAS FROM DUST, DEBRIS AND OTHER MATTER GENERATED BY THE WORK. NO WORK SHALL COMMENCE IN AREAS WHERE PROTECTION IS REQUIRED UNTIL APPROVAL HAS BEEN GIVEN TO THE CONTRACTOR BY THE OWNER.

13. MANUFACTURER'S INSTRUCTION

- INSTALL ALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS OR REQUIREMENTS FOR PROPER OPERATION AND MAINTENANCE.

14. EQUIPMENT PAINTING AND CLEANING

- THOROUGHLY CLEAN ALL ELECTRICAL EQUIPMENT DEVICES AND ENCLOSURES UPON COMPLETION OF ALL WORK. REPAINT ANY EQUIPMENT WHOSE FINISH IS DAMAGED OR RUSTED. MATCH MANUFACTURER'S ORIGINAL FINISH.

15. PENETRATION SEALANT

- ALL PENETRATIONS SHALL BE SEALED WITH 3M INTUMESCENT FIRE BARRIER PENETRATION SEALANT, APPLIED PER MANUFACTURER'S AND U.L. GUIDELINES.

16. CUTTING, PATCHING, REPAIRING AND PAINTING

- THE GENERAL CONTRACTOR SHALL PERFORM ALL CUTTING, PATCHING, REPAIRING AND PAINTING FOR ALL ELECTRICAL ITEMS AND EQUIPMENT CALLED FOR UNDER THIS CONTRACT.

19. TEMPORARY LIGHTING

- FURNISH AND INSTALL TEMPORARY LIGHTING USE BY ALL TRADE CONTRACTORS DURING THE COURSE OF CONSTRUCTION. ALL TEMPORARY WORK SHALL BE DONE IN COMPLIANCE WITH ALL APPLICABLE ARTICLES IN THE NATIONAL ELECTRICAL CODE, O.S.H.A. AND WITH ALL REQUIREMENTS OF ANY AUTHORITY HAVING JURISDICTION OVER THE WORK.

PART 2 – PRODUCTS
PRODUCTS

1. DESCRIPTION

- ALL MATERIALS AND EQUIPMENT PROVIDED UNDER THIS SECTION SHALL BE NEW, FIRST GRADE, BEST OF THEIR RESPECTIVE KINDS AND IN NO WAY SHALL THEY BE LESS THAN THE QUALITY AND INTENT SET FOURTH UNDER THIS SECTION. THEY SHALL MEET THE REQUIREMENTS OF ALL STANDARDS SET UP TO GOVERN THE MANUFACTURER OF ELECTRICAL MATERIALS AND COMPLY WITH ALL APPLICABLE CODES AND STANDARDS.

2. WIRE

- CONDUCTORS SHALL BE U.L. LISTED, 600 VOLTS, 90 DEG. C., SINGLE CONDUCTOR TYPE THWN/THHN. 98% CONDUCTIVITY, ANNEALED UNCOATED COPPER WITH PVC INSULATION COVERED WITH NYLON SHEATH JACKET. TESTED IN ACCORDANCE WITH THE REQUIREMENTS OF UNDERWRITERS LABORATORIES STANDARD 83. WIRE SHALL BE IDENTIFIED BY SURFACE MARKING INDICATING MANUFACTURER'S IDENTIFICATION CONDUCTOR SIZE AND METAL, VOLTAGE RATING, U.L. SYMBOL AND TYPE DESIGNATION. CONDUCTORS SHALL BE STRANDED. MINIMUM SIZE SHALL BE #12 AWG UNLESS OTHERWISE INDICATED. MANUFACTURED BY ROME CABLE, TRIANGLE WIRE & CABLE, GENERAL CABLE OR ESSEX WIRE & CABLE. NONMETALLIC SHEATHED CABLE IS NOT ACCEPTABLE, UNLESS ALLOWED BY CODE.

4. ELECTRIC METALLIC TUBING (EMT)

- ELECTRICAL METALLIC TUBING SHALL BE GALVANIZED THIN WALL STEEL CONDUIT. MANUFACTURED BY TRIANGLE WIRE AND CABLE, ALLIED TUBE AND CONDUIT, REPUBLIC OR STEELDUCT. THE CONNECTORS AND COUPLINGS SHALL BE HEAVY DUTY, STEEL-ZINC PLATED, SET SCREW TYPE.

5. RIGID GALVANIZED STEEL (RGS)

- ELECTRICAL METALLIC TUBING SHALL BE GALVANIZED THICK WALL STEEL CONDUIT. MANUFACTURED BY TRIANGLE WIRE AND CABLE, ALLIED TUBE AND CONDUIT, REPUBLIC OR STEELDUCT. THE CONNECTORS AND COUPLINGS SHALL BE HEAVY DUTY, GALVANIZED STEEL OR STEEL-ZINC PLATED, THREADED TYPE.

7. LIQUID TIGHT FLEXIBLE METAL CONDUIT(LMFC)

- LIQUID TIGHT FLEXIBLE METAL CONDUIT SHALL BE FORMED FROM A ZINC COATED GALVANIZED LOW CARBON STEEL STRIP HAVING A UNIFORM WIDTH AND THICKNESS. FLEXIBLE STEEL CONDUIT SHALL BE COATED WITH A FLAME AND OIL RESISTANT PVC JACKET AND COMPLY WITH UL 360.. MANUFACTURED BY AFC CABLE SYSTEMS, SOUTHWIRE, ALLIED TUBE AND CONDUIT, OR APPROVED EQUAL.

8. LIQUID TIGHT FLEXIBLE NONMETALIC CONDUIT(LFNC)

- LIQUID TIGHT FLEXIBLE NONMETALIC CONDUIT AND FITTINGS SHALL BE LISTED AND LABELED AS DEFINED IN NFPA 70 AND COMPLY WITH UL 1660.. MARKED FOR INTENDED LOCATION AND APPLICATION.

9. FITTINGS

- CONDUIT BODIES FOR ELECTRICAL METALLIC TUBING (EMT) SHALL BE CAST ALUMINUM-ALUMINUM ENAMEL FINISH WITH SET SCREW HUBS AND ALUMINUM COVER.
- INSULATION BUSHINGS SHALL BE HIGH IMPACT THERMOPLASTIC PHENOLIC WITH 150 DEG. C. UL TEMPERATURE RATING.
- INSULATED GROUNDING BUSHINGS SHALL BE MALLEABLE IRON ZINC PLATED WITH MOLDED ON PHENOLIC INSULATION AND LAY-IN GROUNDING LUG.
- CONDUIT LOCKNUTS SHALL BE HEAVY NUT STOCK STEEL-ZINC PLATED.
- OFFSET NIPPLES SHALL BE MALLEABLE IRON ZINC PLATED WITH RIGID CONDUIT THREADING AND 3/4" OFFSET.
- CONNECTORS AND COUPLINGS FOR ELECTRICAL METALLIC TUBING (EMT) SHALL BE HEAVY STEEL-ZINC PLATED WITH PRE-SET/PRE-SHAKED SET SCREWS.
- CONDUIT STRAPS SHALL BE SNAP-TYPE, DOUBLE RIBBED STEEL-ZINC PLATED.
- METAL CLAD CABLE AND FLEXIBLE METALLIC CONDUIT CONNECTORS SHALL BE MALLEABLE IRON-ZINC PLATED, MALE HUB THREADS WITH LOCKNUT.

10. SUPPORT FITTINGS

- SUPPORT CHANNEL SHALL BE ROLL-FORMED #12 GAUGE STEEL, SOLID BASE OR BOLT HOLE BASE - HOT DIP GALVANIZED FINISH. COMPLETE WITH ANGLE FITTINGS, SPRING NUTS, CONDUIT SUPPORTS, 3/8" OR 1/2" THREADED RODS (SIZE REQUIRED FOR LOAD), ETC.

11. CABLE TIES

- CABLE TIES SHALL BE FABRICATED OF ONE-PIECE HALLAR WITH NO METAL PARTS. MANUFACTURED BY BURNDY, T&B, PANDUIT OR BLACKBURN.

15. JUNCTION BOXES, PULLBOXES AND WIREWAYS

- JUNCTION BOXES, PULLBOXES AND WIREWAYS SHALL BE OF PROPER TYPE AND SIZES AS REQUIRED. CODE GAUGE, GALVANIZED STEEL WITH KNOCKOUTS AND FLANGES TO RECEIVE THE COVERS. COVERS SHALL BE FLAT, OF THE SAME MATERIAL AS THE BOX AND FASTENED TO THE BOX WITH MACHINE SCREWS. MANUFACTURED BY HOFFMAN, SQUARE 'D', OR LEE PRODUCTS.

PART 3 - EXECUTION

1. INSTALLATION

- ALL WORK, MATERIALS AND MANNER OF INSTALLATION SHALL BE IN STRICT ACCORDANCE WITH THE LATEST REQUIREMENTS OF THE NATIONAL ELECTRIC CODE.
- ALL CONDUIT AND WIRING SHALL BE INSTALLED CONCEALED UNLESS OTHERWISE NOTED.
- CIRCUITS SHALL BE RUN IN SUIT CONDITIONS CONSIDERING STRUCTURAL FEATURES, OTHER TRADES, CONSTRUCTION METHODS AND GOOD INSTALLATION PRACTICE.

2. RACEWAYS

- RACEWAYS, ENCLOSURES AND BOXES SHALL BE MECHANICALLY JOINED TO FORM A CONTINUOUS ELECTRICAL PATH.
- THE CONTRACTOR SHALL PROVIDE APPROVED TYPE PULL BOXES AS REQUIRED.
- MINIMUM SIZE CONDUIT SHALL BE 3/4" UNLESS OTHERWISE NOTED.
- FURNISH NYLON PULL STRINGS IN ALL EMPTY CONDUIT RUNS.
- FURNISH LOCKNUTS AND BUSHINGS FOR ALL CONDUIT TERMINATIONS IN ALL OUTLET BOXES, PANELS, PULL BOXES, CONDUIT STUBS, ETC.
- ALL CONDUIT SHALL BE INSTALLED IN PARALLEL AND PERPENDICULAR TO THE BUILDING LINES.
- ALL CONDUIT SHALL BE SUPPORTED USING CADMIUM PLATED CONDUIT STRAPS AND HANGERS.

3. WIRING

- PROVIDE WIRING TO ALL OUTLETS, EQUIPMENT, APPARATUS AND OTHER SPECIALTIES UNDER THIS DIVISION THAT WHICH FURNISHED OR PROVIDED UNDER OTHER DIVISIONS OR BY THE OWNER.
- ALL WIRING ON DRAWINGS IS SIZED FOR TYPE THWN/THHN COPPER CONDUCTORS.
- EXERCISE CAUTION IN PULLING CONDUCTORS INTO RACEWAYS SO AS NOT TO DAMAGE THE INSULATION. CABLE PULLING LUBRICANT SHALL BE USED TO ASSIST IN PULLING.
- CONDUCTOR WITHIN PANELBOARDS, JUNCTION BOXES, TROUGHS AND OTHER EQUIPMENT WHERE CONCENTRATIONS OF CONDUCTORS ARE ENCLOSED, SHALL BE NEATLY ARRANGED AND TIED WITH CABLE TIES.
- COMMON NEUTRAL FOR MULTIPLE BRANCH CIRCUITS IS NOT ACCEPTABLE. PROVIDE SEPARATE NEUTRAL FOR EACH BRANCH CIRCUIT.
- WIRING IN OUTLET BOXES, JUNCTION BOXES, CABINET PANELBOARDS OR EQUIPMENT SHALL HAVE A MINIMUM OF EIGHT (8") INCHES LENGTH LEADS FOR CONNECTING WIRING DEVICES TO MAKE UP CIRCUIT SPLICES.
- PROVIDE FLEXIBLE METAL CONDUIT FOR MOTOR, LIGHT FIXTURES, AND OTHER VIBRATING EQUIPMENT CONNECTIONS. LENGTH OF FLEXIBLE METAL CONDUIT DO NOT EXCEED THREE FEET (3').
- INSTALL COPPER GREEN INSULATED GROUNDING CONDUCTOR IN ALL CONDUITS AND RACEWAYS.

4. SPLICING

- SPLICING SHALL BE DONE WITH INSULATED OR NON-INSULATED CONNECTORS OF APPROPRIATE TYPES AND CURRENT-CARRYING CAPACITY. NON-INSULATED CONNECTORS SHALL BE WRAPPED WITH INSULATING TAPE TO THE THICKNESS OF THE INSULATION OF THE CONDUCTORS BEING SPLICED. ELECTRICAL TAPE SHALL BE 3M OR SUPER 88 SCOTCH VINYL FLAME-RETARDANT , COLD AND WEATHER RESISTANT.
- SPLICES FOR CONDUCTORS, SIZES #10 AWG OR SMALLER SHALL BE MADE WITH U.L. LISTED SPRING-TYPE CONNECTORS OR APPROPRIATE CURRENT CARRYING CAPACITY.
- SPLICES, TAPS AND TERMINALS FOR CONDUCTORS #8 AWG OR LARGER SHALL BE MADE WITH U.L. LISTED BOLTED PRESSURE CONNECTORS OF BRONZE OR COPPER CONSTRUCTION, OF APPROPRIATE CURRENT CARRYING CAPACITY. EQUAL TO O/Z GEDENY, BURNDY OR BLACKBURN.

5. CONDUCTOR IDENTIFICATION

- CONDUCTORS #8 AWG AND SMALLER SHALL HAVE A COLOR-CODED INSULATION.
- CONDUCTORS #6 AWG AND LARGER SHALL BE IDENTIFIED WITH TAPES APPLIED NEAR THE ENDS OF THE CONDUCTORS.
- FEEDERS AND BRANCH CIRCUIT CONDUCTORS SHALL BE IDENTIFIED FOR PHASE ROTATION.
- ALL FEEDERS, MAINS AND BRANCH CIRCUIT CONDUCTORS SHALL BE TAGGED AT BOTH ENDS WITH WIRE MARKERS IN ALL PANELS, MOTOR CONTROLS, GENERATORS, TRANSFER SWITCHES, JUNCTION BOXES, OUTLET BOXES AND DEVICE BOXES.

6. IDENTIFICATION

- FURNISH AND INSTALL NAMEPLATES FOR ALL ELECTRICAL EQUIPMENT, IDENTIFYING ITEMS BY NAME, FUNCTION AND/OR CONTROL.
- IDENTIFYING NAMEPLATES SHALL BE LAMINATED, PLASTIC TYPE, CONSISTING OF TWO BLACK PLASTIC SHEETS WITH ONE WHITE PLASTIC SHEET BONDED TO AND BETWEEN THE TWO OUTER BLACK SHEETS AND HAVING THE LETTERS ENGRAVED IN ONE BLACK TO THE DEPTH OF THE WHITE PLASTIC. FASTEN NAMEPLATES TO EQUIPMENT WITH SUITABLE ADHESIVES OR STAINLESS STEEL SCREWS. IN ADDITION TO THE PANELBOARD IDENTIFYING NAMEPLATE.
- USE PLASTIC-COATED WIRE MARKERS OF THE SELF-ADHESIVE. WRAPAROUND TYPE WITH PERMANENT FACTORY-PRINTED NUMBER, LETTERS AND SYMBOLS.
- WIRE MARKERS SHALL BE SECURELY ATTACHED AT BOTH ENDS, IDENTIFYING PANEL AND CIRCUIT BREAKER NUMBERS.
- ALL CONDUCTORS SHALL BE PERMANENTLY TAGGED AT TIME OF INSTALLATION. LABELS SHALL BE EQUAL TO T&B, PANDUIT OR IDEAL.

7. GROUNDING

- ALL ELECTRICAL WORK SHALL BE GROUNDED AND BONDED IN FULL CONFORMANCE WITH THE LATEST APPROVED EDITION OF THE NATIONAL ELECTRICAL CODE AND LOCAL REQUIREMENTS.
- ALL ELECTRICAL EQUIPMENT, SAFETY SWITCHES, METAL ENCLOSURES, ELECTRICAL DEVICE ENCLOSURES AND ALL OTHER EQUIPMENT SHALL BE MADE TO FORM A CONTINUOUS CONDUCTING, GROUND PATH OF LOW IMPEDANCE FOR GROUND FAULT CIRCUITS AND OPERATION OF THE CIRCUIT PROTECTIVE DEVICES WITHIN EACH CIRCUIT.
- PROVIDE GROUNDING CONDUCTOR IN ALL RACEWAYS.
- GROUND CONNECTIONS WITH THE GROUNDING CONDUCTORS SHALL BE MADE AT EACH OUTLET BOX, LIGHTING FIXTURE, MOTOR AND OTHER EQUIPMENT COMPONENTS BY MEANS OF A POSITIVELY SECURED GROUNDING CLAMP, SCREW OR CLIP. CONNECTIONS TO GROUNDING RODS, OTHER GROUNDING ELECTRODE CONDUCTORS SHALL BE MADE WITH CADWELL TYPE, EXOTHEMIC WELD PROCESS UNLESS OTHERWISE NOTED. CONNECTIONS TO PIPES SHALL BE MADE WITH APPROVED BRONZE OR BRASS CLAMPS.
- BONDING SHALL BE PROVIDED TO ASSURE ELECTRICAL CONTINUITY AND THE CAPACITY TO SAFELY CONDUCT ANY FAULT CURRENT LIKELY TO BE IMPOSED.
- ALL DEVICES (SWITCHES, RECEPTACLES, ETC.), SHALL BE GROUNDED TO CONDUIT SYSTEM WITH SIX (6") INCH SOLID COPPER #12 AWG INSULATED WIRE (GREEN) CONNECTED TO GROUND SCREW IN DEVICE AND FASTENED TO BACKBOX WITH 10-32x3/8" SLOTTED HEXAGON HEAD WASHER FACE GROUND WITH GREEN DYE FINISH.

END OF ELECTRICAL SPECIFICATIONS

general notes

G-1 THE FOLLOWING GENERAL NOTES APPLY TO ALL DRAWINGS AND TRADES ASSOCIATED WITH THOSE DRAWINGS.

G-2 THE ENGINEER WAIVES ANY AND ALL RESPONSIBILITY AND LIABILITY FOR PROBLEMS WHICH ARISE FROM FAILURE TO FOLLOW THESE PLANS, SPECIFICATIONS, AND/OR THE DESIGN INTENT THEY CONVEY, OR FOR PROBLEMS WHICH ARISE FROM OTHERS FAILURE TO OBTAIN AND/OR FOLLOW THE GUIDANCE OF THE ENGINEER.

G-3 ALL WORK SHALL CONFORM TO THE 2020 NATIONAL ELECTRIC CODE (NEC), THE NINTH EDITION OF THE MASSACHUSETTS BUILDING CODE WITH AMENDMENTS AND NFPA 20.

G-4 CONTRACTOR AND ALL SUBCONTRACTORS SHALL PROTECT THE WORK SITE, SURROUNDING AREAS AND OCCUPANTS FROM DAMAGE AND INJURY.

G-5 CONTRACTOR AND ALL SUBCONTRACTORS SHALL FAMILIARIZE THEMSELVES WITH THE CONTRACT DOCUMENTS. ALL DRAWINGS OF ANY PARTICULAR TRADE SHALL BE USED IN CONJUNCTION WITH DRAWINGS OF ALL OTHER TRADES TO COORDINATE ALL CONSTRUCTION. ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER AND ARCHITECT BEFORE PROCEEDING WITH THE AFFECTED WORK. ANY PROPOSED CHANGES, VARIATIONS, OR SUBSTITUTIONS MUST BE REVIEWED AND ACCEPTED BY THE ENGINEER AND ARCHITECT PRIOR TO IMPLEMENTATION.

G-6 PROVIDE AND ENSURE FIREPROOFING OF ALL CONDUIT, CABLING AND ANY OTHER ELECTRICAL DEVICES THROUGH FIRE RATED ASSEMBLIES.

G-7 EC SHALL OBTAIN AND PAY FOR ALL PERMITS.

G-8 THE GENERAL CONTRACTOR SHALL BE RESPONSIBLE TO ASSURE THAT ALL WORK BY THE SUBCONTRACTORS IS INSTALLED AND COMPLETED IN ACCORDANCE WITH THE DRAWINGS AND SPECIFICATIONS AND THAT ALL ELECTRICAL WORK IS 100% COMPLETE AT THE TIME OF BENEFICIAL OCCUPANCY.

G-9 THE WORK SHALL INCLUDE PROVIDING ALL LABOR, MATERIAL, EQUIPMENT AND SERVICES TO CONSTRUCT AND INSTALL THE EQUIPMENT AND SYSTEMS NECESSARY TO COMPLETE THE WORK INDICATED ON DRAWINGS.

G-10 TEST ALL EQUIPMENT AND SYSTEMS INSTALLED TO CERTIFY COMPLIANCE WITH DRAWINGS, SPECIFICATIONS, CODES, LOCAL AUTHORITIES AND REGULATIONS, INCLUDE LABOR AND COSTS FOR TESTING, REVIEWS, APPROVALS AND CERTIFICATIONS.

G-11 IN GENERAL DRAWINGS ARE DIAGRAMMATIC ONLY. EXACT LOCATION, MOUNTING HEIGHTS OF EQUIPMENT AND ROUTING OF RACEWAYS SHALL BE COORDINATED WITH THE EQUIPMENT REQUIREMENTS AND FIELD CONDITIONS.

G-12 SUPPORT ALL WORK FROM THE BUILDING STRUCTURE, INDEPENDENTLY FROM OTHER TRADES.

G-13 WIRE AND CONDUIT SIZES INDICATED ON HOMERUNS SHALL BE CONTINUOUS THROUGHOUT CIRCUIT, UNLESS NOTED OTHERWISE.

G-14 USE CAUTION TO AVOID DAMAGE TO EXISTING UTILITY LINES AND/OR HARM TO PERSONNEL WORKING IN THESE AREAS.

G-15 TEMPORARY LIGHTING AND POWER SHALL BE PROVIDED AS REQUIRED BY OSHA, CODES AND LOCAL AUTHORITIES. REMOVE ALL TEMPORARY FACILITIES AT PROJECT COMPLETION.

G-16 ALL CONSTRUCTION PHASING AND, MAINTAINING OF ELECTRICAL POWER TO ALL BUILDING AREAS SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL INSTALLER.

G-17 COORDINATE ANY SHUTDOWN, ANY DISRUPTION OF SERVICE AND ANY WORK OUTSIDE OF RENOVATED AREAS FOR THIS PROJECT WITH OWNER FACILITIES, OWNER PROJECT DELIVERY STANDARDS AND CONSTRUCTION MANAGER.

electrical abbreviations

AFF	ABOVE FINISHED FLOOR	HP	HORSEPOWER
AV	AUDIO/VISUAL	KEC	KITCHEN EQUIPMENT CONTRACTOR
C/B	CIRCUIT BREAKER	MC	MECHANICAL CONTRACTOR
CKT	CIRCUIT	MH	MOUNTING HEIGHT
CLG	CEILING	NL	NIGHT LIGHT
DWG	DRAWING	NTS	NOT TO SCALE
EC	ELECTRICAL CONTRACTOR	PC	PLUMBING CONTRACTOR
EM	EMERGENCY	TYP	TYPICAL
FAC	FIRE ALARM CONTRACTOR	U.G.	UNDERGROUND
FLR	FLOOR	UON	UNLESS OTHERWISE NOTED
GFI	GROUND FAULT INTERRUPTING	WP	WEATHER PROOF

277V BRANCH CIRCUIT VOLTAGE DROP TABLE	
CIRCUIT LENGTH	**277V WIRE SIZE**
0'-140'	#12
141'-225'	#10
226'-350'	#8
TABLE IS BASED ON A 277V CIRCUIT LOAD OF 3880 WATTS (14 AMPS)	

120V BRANCH CIRCUIT VOLTAGE DROP TABLE	
CIRCUIT LENGTH	**120V WIRE SIZE**
0'-60'	#12
61'-100'	#10
101'-160'	#8
TABLE IS BASED ON A 120V CIRCUIT LOAD OF 1680 WATTS (14 AMPS)	

VOLTAGE DROP NOTE:
A. WHERE UNGROUNDED CONDUCTORS ARE INCREASED IN SIZE TO COMPENSATE FOR VOLTAGE DROP, THE EQUIPMENT GROUNDING CONDUCTOR NEEDS TO BE INCREASED IN SIZE, PROPORTIONALLY ACCORDING TO THE CIRCULAR MIL AREA OF THE UNGROUNDED CONDUCTORS, PER NEC 250.122(B).
B. CIRCUIT LENGTHS AND ASSOCIATED CONDUCTOR UPSIZING IS SHOWN FOR REFERENCE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR UPSIZING BRANCH CIRCUITS AND FEEDERS THAT EXCEED LENGTHS IDENTIFIED ON THESE TABLES, PER REQUIREMENTS DEFINES IN THE NATIONAL ELECTRIC CODE.

demolition notes

A THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFYING THE INTEGRITY AND CONDITION OF THE EXISTING BRANCH CIRCUIT WIRING WHICH IS TO BE REUSED FOR NEW EQUIPMENT CIRCUITING ACCORDING TO THE NATIONAL ELECTRIC CODE. ALL DAMAGED WIRING OR WIRING FOUND TO BE NONFUNCTIONAL SHALL BE REPLACED.

B EXISTING BRANCH CIRCUITS SHALL BE EXTENDED AND CONNECTED TO ALL EXISTING RELOCATED EQUIPMENT, AS REQUIRED FOR A COMPLETE WORKING SYSTEM.

C DEMOLITION WORK SHALL BE DONE BY THE ELECTRICAL CONTRACTOR. THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL WORK CONCERNING EXISTING EQUIPMENT AND SERVICES REMAINING IN THE BUILDING.

D IF APPLICABLE, ANY CHANGES TO THE ELECTRICAL SYSTEM WHICH NECESSITATE AN ARC-FLASH RE-CALCULATION / RE-CERTIFICATION SHALL BE THE RESPONSIBILITY OF THE OWNER.

E THE ELECTRICAL DEMOLITION PLANS INDICATE GENERAL INTENT AND ARE NOT INTENDED TO SHOW ALL COMPONENTS AND ITEMS TO BE REMOVED OR RETAINED. THE ELECTRICAL CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMISSION OF THEIR BID TO BECOME FAMILIAR WITH THE ACTUAL WORKING CONDITIONS AND EXTENT OF WORK. DEVICES AND EQUIPMENT LOCATED ON WALLS AND/OR CEILINGS DESIGNATED TO BE REMOVED SHALL BE DISCONNECTED AND MADE SAFE. THE ELECTRICAL CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNERS REPRESENTATIVE AND ARCHITECT OF ANY UNANTICIPATED OR HIDDEN CONDITIONS ENCOUNTERED DURING DEMOLITION.

F THE ELECTRICAL CONTRACTOR SHALL CIRCUIT TRACE AND LABEL ALL EXISTING BRANCH CIRCUITS AND FEEDERS WITHIN OR ASSOCIATED WITH THE DEMOLITION SCOPE, PRIOR TO THE START OF WORK. ALL THAT ORIGINATE FROM PANELBOARDS, LOAD CENTERS, MOTOR CONTROL CENTERS AND SWITCHBOARDS IDENTIFIED FOR REMOVAL SHALL BE TRACED AND FIELD LABELED TO ENSURE THAT NO AREA OUTSIDE THE DEMOLITION SCOPE IS AFFECTED.

G THE ELECTRICAL CONTRACTOR SHALL IDENTIFY ALL BRANCH CIRCUITS, FEEDERS AND SYSTEM COMPONENTS WHICH ARE TO REMAIN WITHIN THE AREA OF DEMOLITION SCOPE. THERE SHALL BE NO INTERRUPTION OF SERVICE TO ANY AREA OUTSIDE THE SCOPE LIMITS WITHOUT WRITTEN APPROVAL FROM THE OWNERS REPRESENTATIVE. EXISTING EQUIPMENT TO REMAIN SHALL BE LEFT IN A CODE COMPLIANT CONDITION.

H THE ELECTRICAL CONTRACTOR SHALL DE-ENERGIZE AND REMOVE ALL CONDUCTORS AND RACEWAYS WITHIN THE AREA OF DEMOLITION SCOPE TO THEIR POINT OF ORIGIN. EQUIPMENT AND WIRING THAT IS IDENTIFIED FOR DEMOLITION SHALL NOT BE ABANDONED IN PLACE. RACEWAYS THAT ENTER MASONRY WALLS AND FLOORS SHALL BE CUT FLUSH AT THE SURFACE FOR PATCHING BY OTHERS. ALL CIRCUIT BREAKERS ASSOCIATED WITH THE DEMOLITION SHALL BE DE-ENERGIZED, TRIPPED TO THE "OFF" POSITION AND RE-LABELED AS SPARE UNLESS OTHERWISE NOTED. NEW TYPED UPDATED CIRCUIT DIRECTORIES SHALL ALSO BE PROVIDED.

I THE ELECTRICAL CONTRACTOR SHALL PROVIDE TEMPORARY SUPPORT FOR ALL ITEMS DESIGNATED TO REMAIN THAT ARE AFFECTED BY THE DEMOLITION OF BUILDING STRUCTURAL COMPONENTS (WALLS, CEILINGS, PARTITIONS, ECT.). CONTRACTOR SHALL PROVIDE PERMANENT SUPPORTS WHEN FINALIZED STRUCTURES ARE IN PLACE.

J THE ELECTRICAL CONTRACTOR SHALL RETURN ALL REMOVED EXISTING EQUIPMENT TO THE OWNER AT A LOCATION DESIGNATED BY THE OWNER. COORDINATE WITH GSA PROJECT MANAGER ON FIXTURES AND EQUIPMENT TO BE SALVAGED

K RECONNECT ALL EXISTING CIRCUITING WHICH ORIGINATES OR PASSES THROUGH THE RENOVATED AREAS BUT SERVES OTHER AREAS NOT BEING RENOVATED. EXTEND THESE CIRCUITS AS MAY BE NECESSARY TO THE EXISTING PANELBOARDS. UTILIZE SPARE CIRCUIT BREAKERS.

demolition legend

LIGHT SOLID LINE DENOTES EXISTING EQUIPMENT.

DARK DASHED LINE DENOTES DEMOLITION EQUIPMENT.

X. EXISTING EQUIPMENT TO BE REMOVED AND DELIVERED TO OWNER. CIRCUIT SHALL BE PULLED BACK FROM NEXT ACTIVE OUTLET/BACK TO PANEL. REMOVE JUNCTION BOXES, AND PATCH WALL. BLANK PLATES NOT PERMITTED.

XM. EXISTING EQUIPMENT TO REMAIN.

XN. EXISTING EQUIPMENT TO BE REMOVED AND NEW EQUIPMENT AS SPECIFIED INSTALLED ON EXISTING CIRCUIT IN ORIGINAL LOCATION.

XE. EXISTING DEVICE TO BE REMOVED, OUTLET BLANKED AND CIRCUIT EXTENDED TO NEW EQUIPMENT AS SHOWN.

XR. EXISTING EQUIPMENT TO BE REMOVED AND RELOCATED. REMOVE JUNCTION BOXES, AND PATCH WALL. BLANK PLATES NOT PERMITTED.

XL. NEW LOCATION OF RELOCATED EXISTING EQUIPMENT.

key notes

D# SHEET SPECIFIC DEMOLITION KEYED NOTES

\# SHEET SPECIFIC NEW WORK KEYED NOTES

edm
architecture • engineering • management
pittsfield, ma
unionville, ct
troy, ny
(888) 336-6500
team@edm-ae.com

design by: jm | drawn by: jm
checked by: jb
approved by: jb

Norback School
Fire Pump
Replacement

keyplan:

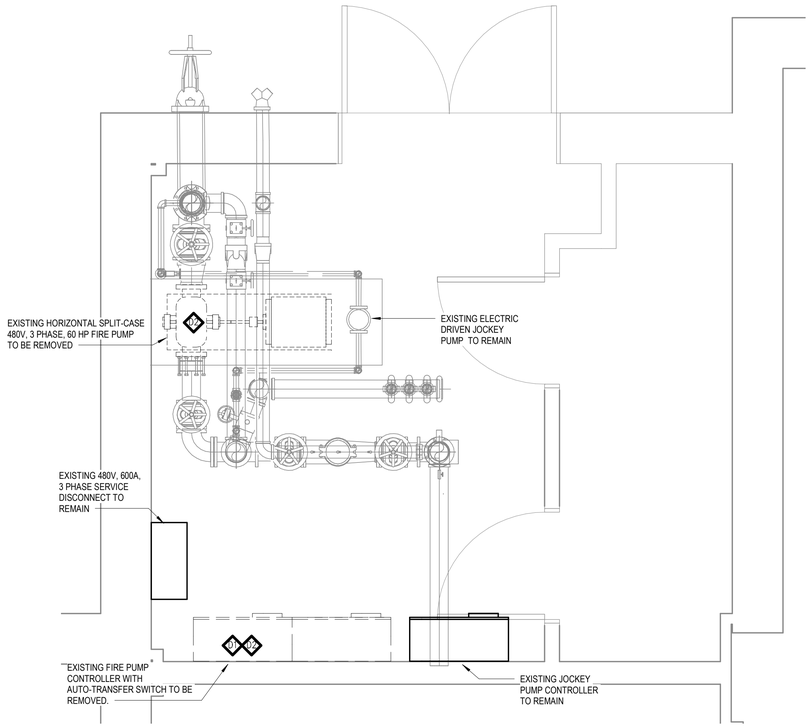
project north

issue / rev.:	date:	issued for:	by:

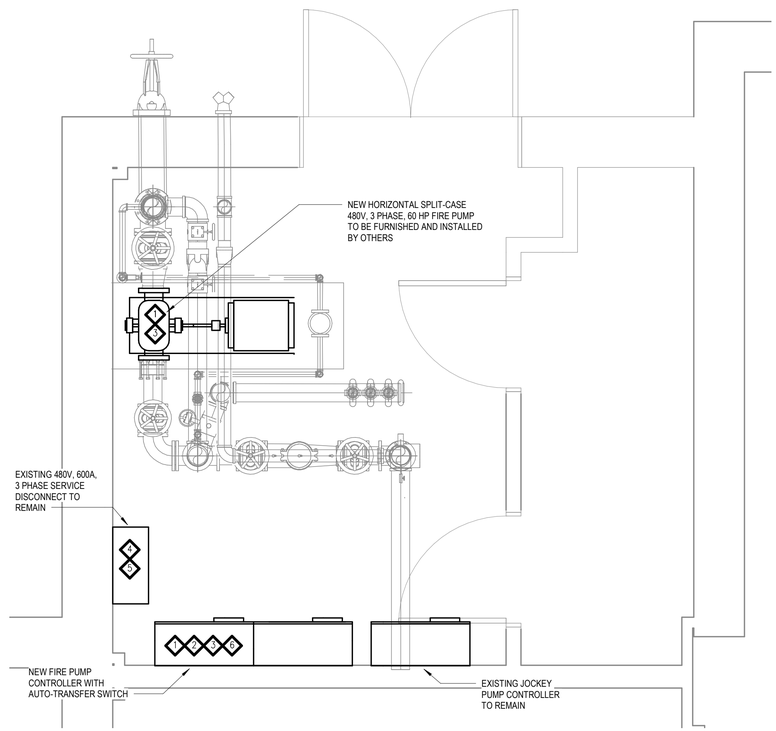
general electrical notes and legends

date: 02.22.2023
project number: cow-6095
scale: As indicated
drawing number:

EN-001



1 fire pump demolition plan
1/2" = 1'-0"



2 fire pump power plan
1/2" = 1'-0"

keyed electrical demolition notes

D1 DENERGIZE AND DISCONNECT LINE SIDE UTILITY AND GENERATOR WIRING TO FIRE PUMP CONTROLLER AND TRANSFER (FPCT)SWITCH. WIRING SHALL BE MADE SAFE TO ALLOW FOR THE REMOVAL OF THE EXISTING FPCT. COORDINATE WITH FIRE PROTECTION CONTRACTOR.

D2 DENERGIZE AND DISCONNECT LOAD SIDE WIRING FROM FPCT TO THE FIRE PUMP. WIRING SHALL BE MADE SAFE TO ALLOW FOR THE REMOVAL OF THE EXISTING FIRE PUMP. COORDINATE WITH FIRE PROTECTION CONTRACTOR.

keyed electrical notes

1. CONTRACTOR SHALL VERIFY THE INTEGRITY OF EXISTING WIRING PRIOR TO BID. IF WIRING IS FOUND TO BE IN OTHER THAN OPTIMAL WORKING CONDITION, CONTRACTOR SHALL PROVIDE NEW WIRING. NEW WIRING SHALL CONSIST OF (4) #2 AND (1) #8 GROUND.
2. EXTEND LINE SIDE UTILITY AND GENERATOR WIRING TO NEW FIRE PUMP CONTROLLER AND TRANSFER (FPCT)SWITCH. RECONNECT WIRING TO NEW CONTROLLER AND TRANSFER SWITCH PER MANUFACTURERS INSTRUCTIONS. EXTENDED WIRING SHALL BE SIZED AS IN NOTE 1 ABOVE.
3. EXTEND LOAD SIDE WIRING FROM NEW FIRE PUMP CONTROLLER AND TRANSFER SWITCH TO NEW FIRE PUMP. RECONNECT WIRING TO NEW CONTROLLER AND TRANSFER SWITCH PER MANUFACTURERS INSTRUCTIONS. CONNECT WIRING TO FIRE PUMP IN ACCORDANCE WITH THE FIRE PUMPS CONNECTION DIAGRAM. EXTENDED WIRING SHALL BE SIZED AS IN NOTE 1 ABOVE. WIRING FROM TRANSFER SWITCH TO FIRE PUMP SHALL BE ROUTED THROUGH EXISTING IN SLAB CONDUITS.
4. PER NFPA 20, SECTION 9.2.3.1, THE EXISTING FIRE PUMP DISCONNECT SWITCH SHALL LOCKABLE IN BOTH THE CLOSED POSITION AND THE OPEN POSITION. IF THE EXISTING CONFIGURATION DOES NOT MEET THIS REQUIREMENT, THE CONTRACTOR SHALL MODIFY AS NECESSARY
5. PER NFPA 20, SECTION 9.2.3.1, THE DISCONNECT SHALL BE MARKED, "FIRE PUMP DISCONNECTING MEANS" IN LETTERS THAT ARE NO LESS THAN 1 INCH IN HEIGHT AND THAT CAN BE SEEN WITHOUT HAVING TO OPEN ENCLOSURE DOORS OR COVERS. IF THE EXISTING CONFIGURATION DOES NOT MEET THIS REQUIREMENT, THE CONTRACTOR SHALL MODIFY AS NECESSARY.
6. PROVIDE A PLACARD ADJACENT TO THE FIRE PUMP CONTROLLER STATING THE LOCATION OF THE SERVICE DISCONNECT SWITCH AND THE LOCATION OF THE KEY NEEDED TO UNCLOK THE DISCONNECT.

edm
architecture
•
engineering
•
management
pittsfield, ma
unionville, ct
troy, ny
(888) 336-6500
team@edm-ae.com

design by: jm | drawn by: jm
checked by: jb
approved by: jb

Norback School
Fire Pump
Replacement

keyplan:

project north

issue / rev.:	date:	issued for:	by:

demolition and power plan

date: 02.22.2023
project number: cow-6095
scale: 1/2" = 1'-0"
drawing number:

EP-101