

# SPECIFICATIONS & BID DOCUMENTS

## New Fire Alarm System

at

## Gerhardt Civic Center

for

## City of Moraine

January 6, 2020



Bids Due: January 22, 2020

Prepared by:

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Description

Page No.

Electrical

16000-1 – 16000-17

NEW FIRE ALARM SYSTEM AT GERHARDT CIVIC CENTER  
FOR CITY OF MORaine

ELECTRICAL

SECTION 16000

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ELECTRICAL

SECTION 16000

1. SCOPE

- A. The work included under this contract heading shall consist of furnishing all material and labor which is necessary to install the electrical work as hereinafter specified including lighting, receptacles, motor and appliance connections, communication system rough-ins, testing and adjustment of same. Lighting levels are to be in accordance with the recommendations listed in the current edition of the IES lighting handbook. All work shall be done in strict accordance with all applicable codes and regulations including the recommendations of the NFPA and the requirements of the NEC. In no case shall work be installed contrary to or below minimum legal standards. In addition, all electrical components and systems must be UL listed.
- B. All required permits for this portion of the work shall be obtained and paid for by the Electrical Contractor who shall also arrange for all inspections. At the completion of the project the inspection reports, certificates of approval, etc. shall be turned over to the Owner.

2. DESCRIPTION OF WORK

- A. The following is a summary of the principal categories of work under this section. Note, however, that this listing is for general information only and work will not necessarily be limited to these categories. The detailed drawings and the following specifications cover the full extent of the work.
- B. Fire Alarm & Security:
  - 1. A complete new fire alarm system including signals, sending stations, smoke detectors, heat detectors, sprinkler system valve monitoring devices, annunciator, control unit and an independent conduit and wire network.

3. CUTTING, PATCHING, INSERTS AND SLEEVES

- A. Perform all drilling, cutting and patching required for conduit installation. No cutting, drilling, etc. will be permitted in structural members without the sanction of the General Contractor. In addition, provide all necessary sleeves for conduit and conduit fittings.
- B. Floor, roof and rated wall penetrations shall be sealed with a fire, smoke and water barrier sealant. Material shall be noncombustible as defined by ASTM E-136 and shall maintain its integrity and dimensional stability when exposed to the ASTM E-119 time-temperature curve for a time period equivalent to the rating of the assembly penetrated. Sealant material shall be tested to ASTM E-814, UL 2079 or UL 1479. Install in accordance with manufacturer's recommendations.

- C. Pipe penetrations of walls, floors, etc. in exposed areas shall be provided with escutcheons of polished brass or chrome plated steel. Floor penetrations shall be provided with deep pattern floor plates.

4. JUNCTION BOXES

- A. Junction boxes, other than those furnished integrally with specific items of equipment or described elsewhere in the contract documents shall be furnished and installed as required. Note that where conditions dictate, junction boxes shall be watertight.
- B. Boxes shall be code gauge, constructed of galvanized steel with screwed covers. They shall be so located as to be accessible. Where a natural means of access is not available, hinged metal access covers matching the ceiling finish shall be provided by this Contractor. Access covers shall be flush type with hinged door and rigid frame, with screwdriver lock. A removable pan or lay-in ceiling shall be considered as adequate means of access to boxes. Access panels shall be Milcor or approved equal and shall carry the UL 1 ½ hour "B" label when installed in fire rated construction.

5. GROUNDING

- A. Equipment grounding conductors shall be run with the circuit conductors and shall consist of insulated solid or stranded copper conductors. No conduit grounding methods will be permitted.

6. WIRE, CABLE AND CONNECTORS

- A. Unless otherwise indicated, all building feeder and branch circuit wiring shall be type THWN, 600 volt insulation - 75°C copper conductors, complying to NEC Standards.
- B. Conductors shall not be drawn into conduit until that segment of the conduit system is complete, with all terminations properly bushed and conduit free of moisture, foreign material, etc.
- C. All connectors and lugs shall be of the solderless type and large enough to enclose all strands of the conductors with sufficient mechanical strength to withstand vibrations and normal strains.
- D. All connectors for conductors sized #10 AWG and smaller shall be 3-M SCOTCHLOK, Ideal Wingnut or Buchanan B-Cap's. Connections for conductors sized #8 AWG and larger shall be made with pressure type mechanical connectors and then wrapped with electrical tape to 150% of the rating for the conductor insulation.

- E. Joints or splices in branch circuit wiring and feeders must be located as per NEC. All joints and splices shall be made electrically and mechanically sound in accordance with best practice.
- F. Special low voltage system wiring (such as for signal and control circuits), shall be sized and typed in strict accordance with the individual equipment and/or system manufacturer's specifications and recommendations. Where code requirements dictate, or where specified, run wiring in conduit.

7. CONDUIT AND OUTLET BOXES

- A. Where indicated, all wiring to be installed for this project shall be enclosed in rigid or intermediate metal conduit (RMC or IMC) or electrical metallic tubing conduit (EMT).
- B. All metal conduit shall be steel and in strict accordance with applicable ANSI standards for steel conduit. Each length shall bear the UL label.
- C. Conduit thruout shall be a minimum 1" size.
- D. All conduit installed on the project shall be concealed, wherever possible, unless otherwise noted or indicated on the drawings or unless permission is obtained from the Architect to run exposed. Where conduit is exposed, it shall be run parallel or perpendicular to the building lines.
- E. Steel set screw type fittings or compression type steel couplings and connectors shall be used with EMT and may be used with IMC.
- F. All empty conduit including conduit installed under this section for others, such as telephone conduit and/or conduit for future systems, etc., shall be provided with solid steel pull wire or nylon pull cord.
- G. Watertight conduit expansion joints, bonding jumpers, etc., shall be provided wherever the construction dictates such devices.
- H. Conduit accessories such as outlet boxes, condulets, bends, fittings, etc., shall be manufactured by Appleton, Steel City, Russell and Stoll, Raco, Crouse Hinds or Midwest.
- I. Fixture outlet boxes shall be standard 4" x 4" x 2" deep and shall be octagonal or square with 3/8" fixture studs.
- J. All outlet and device boxes shall be flush mounted in areas with finished surfaces. They shall be rigidly attached to the structure by means of steel straps or channels. Boxes shall be aligned true to building lines. Listed mounting heights and dimensions shall be to the centerline of the box.

8. FIRE ALARM SYSTEM AND MONITORING

A. Related Documents

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specifications, apply to this Section.

B. Summary

1. Section includes:
  - a. Supply and installation of complete and working Fire Protective Signaling System (NFPA 72) suitable for type of occupancy as defined by Local Building Code and as approved by local Fire Marshall.
2. Work Included:
  - a. Supply and installation of equipment;
  - b. Supply and installation of wiring, connectors, and device plates;
  - c. Custom programming of all supplied programmable equipment;
  - d. Detailed installation-level engineering documentation;
  - e. System commissioning, testing, warranty and training.

C. System Description

1. Provide a complete multiplexed intelligent addressable fire alarm system throughout the building as shown on the drawings and in accordance with NFPA 72 and all authorities having jurisdiction. All equipment shall be UL listed. The basis of design is specified as a Notifier system (by R.P. Biederman Co. (513) 863-7900) and any listed catalog numbers shall be based on Notifier.
2. Each smoke detector shall be intelligent/addressable for the exact location in the building, capable of giving a print out of the sensitivity and have a sensitivity adjustment remotely from the console. This sensitivity shall also be adjusted automatically from the system clock if the user wishes changes during a 24-hour period. The system shall use analog data transmission in order to accomplish the previous requirements. Manual stations, sprinkler devices and all other "contact only" closing devices shall be Addressable. An Addressable only system will not be acceptable.

D. Quality Assurance

1. The contractor performing the work of this section shall have been in the full time business of installing, programming, and maintaining fire alarm systems.
2. Contractor shall be able to demonstrate through valid references and other means determined necessary by the Designer / Consultant that it has completed at least 25 systems successfully. Upon request, Contractor shall provide detailed information on these reference systems within 16 business hours of request. Reference system shall be of like type and scope to that specified herein.
3. The Contractor shall provide for the assistance of manufacturer/factory personnel as needed to assist in the technical review of work being performed, as well as in commissioning of the systems and resolutions of problems arising during the course of the project.

E. References

1. Current applicable provisions of the following standards:
  - a. National Fire Protection Standards
    1. Central Station Signaling Systems - Protected Premises Unit, NFPA 71
    2. National Fire Alarm Code, NFPA 72
    3. Automatic Fire Detectors, NFPA 72
  - b. National Electric Code (including Article 760)
  - c. Local and State building codes
  - d. All requirements of the Local Authority Having Jurisdiction (AHJ)
  - e. The system and all components shall be listed by Underwriters Laboratories, Inc. for use in Fire Protective Signaling Systems under the following standards as applicable:
    1. Control Units for Fire Protective Signaling Systems (including UUKL sublisting), UL 864
    2. Smoke Detectors for Fire Protective Signaling Systems, UL 268
    3. Smoke Detectors, Single and Multiple Stations, UL 217



4. Head Detectors for Fire Protective Signaling Systems, UL 521
5. Audible Signaling Appliances, UL 464
6. Visual Signaling Appliances, UL 1638
7. Visual Notification Appliances / Signaling Devices for the Hearing Impaired, UL 1971
8. Manually Actuated Signaling Boxes, UL 38
9. Sprinkler valve tamper Indicators for Fire Protective Signaling Systems, UL 346
10. Power Supplies for Fire Protective Signaling Systems, UL 1481

F. Submittals

1. Contractor's submittal package shall be a complete and detailed package that includes all of the information required by these specifications and as otherwise necessary to coordinate, install, and service the specified work. The shop drawing portion of the submittal shall be considered "installation-level" and "manufacturer-level" documentation, as applicable. It shall be complete and include all information necessary for the fabrication of custom items (parts lists, material types, dimensions, finish, color, labeling, etc.), wire labeling types and details, signal termination details, physical mounting details of equipment, as well as scaled drawings of all types necessary for special and spatial coordination. Contractor shall be considered in non-compliance should it fail to generate and provide all shop drawings applicable to the project.
2. The Fire Alarm System supplier shall furnish detailed wiring diagrams and riser diagrams showing color-coding of all wiring per manufacturer recommendations. Include calculations showing adequate capacity of the standby batteries as required by prevailing codes. The point-to-point wiring drawings the Contractor generates for this work shall include the full part number / model number of every piece of equipment to be integrated into the system(s). Every point of signal shall be fully and clearly identified, even in cases where not all connection points are used.
3. The Fire Alarm System supplier shall furnish a complete set of floor plan drawings showing conduit sizes and number of conductors required to all components plus detailed wiring connections required at each type of device. The Fire Alarm System supplier shall furnish detailed submittals clearly showing the intended location of all field devices and their connections to the

system. Submittals shall be prepared utilizing AutoCad Release 2000 Computer Aided Drafting System. Contractor shall not be permitted to resubmit the Engineer's drawings for submittal purposes. The Engineer's drawings, in coordination with the specification, are intended to communicate scope, quality, capability, performance, functionality, and where appropriate, spatial intent. Work of this Contractor shall include preparation of Installation-level detailed shop drawings.

4. The Fire Alarm System supplier shall submit complete documentation for the Fire Alarm / Life Safety System showing the Model Number, type, rating, size, style, Manufacturer's Names, and Manufacturer's Catalog Data Sheets for all items to ensure compliance with these specifications.
5. The Authority Having Jurisdiction (AHJ) shall be notified prior to installation or alteration of equipment and wiring.
6. Successful vendor shall pay all inspection fees and shall provide all necessary product data submittals, shop drawing submittals, working drawings, supervision, etc. and shall have submittals approved in writing by the State Fire Marshal's office and/or the local authority having jurisdiction prior to submittal to Engineer for review. Copies of this information shall be submitted to the Engineer within 30 calendar days after award of this work and shall be subject to the review of the Engineer.
7. Submit maintenance data and parts lists for each type of fire alarm equipment installed, including furnished specialties and accessories. Include this data, product data, and shop drawings in maintenance manual, in accordance with requirements described in section Record Drawings.

G. Period of Correction (AKA Warranty)

1. The Contractor shall provide the owner with a one (1) year service contract. Indicate the cost of renewing this contract for an additional one, two and three year period at the owner's option.

H. Training

1. Schedule training at least 14 days in advance.
2. Train Owner's maintenance personnel on the procedures and schedules involved in operating, general troubleshooting, and preventative maintenance of the system. Provide minimum of (16) hours of total training time, not to exceed (4) independent trips to project site.
3. Training shall include a full hands-on demonstration on how to set up and use the system.

I. Products - General

1. Contractor shall not presume that all equipment necessary to provide a complete and working system is fully enumerated within these specifications. Contractor shall use these specifications in conjunction with the information provided in the drawings to conclude the requirements and intent. Wherever the Contractor finds a conflict between these specifications and the drawings, the higher quality, higher quantity, and more stringent requirement shall apply.
2. Contractor shall provide all specified items, plus all incidentals and required items necessary to provide a complete and working system, installed in a professional manner, and in accordance with applicable codes and industry accepted "best practices".
3. Where specified brands and models are listed on the drawings, the Contractor shall presume that these products set the Standard-of-Quality that represents the characteristics, and minimum performance and feature-set considered acceptable. Where approved manufacturers are listed, it shall be interpreted by the Contractor only to mean that the Contractor may select and use a product from the list of alternate manufacturers that either by itself, or in combination with other projects, meets or exceeds all specifications and capabilities of the product listed. It shall not be interpreted to mean that the approved alternate manufacturer has a single product that is an exact equal in its product line.
4. Contractor is cautioned to be aware of physical characteristics, including size, of the products listed as the Standard of Quality. Any and all additional costs associated with the approved use of an alternate product is the exclusive responsibility of the Contractor, including but not limited to additional costs incurred by the project's Design team and construction trades working on the projects.

J. Equipment

1. Main Fire Alarm Control Panel (FACP/FAP)
  - a. Provide a CPU (central processing unit) which contains all programming. The programming shall not be lost if a power failure occurs. The communication transmission shall be analog. A history of the last 650 activities shall be provided.
  - b. The display interface board shall be an 80-character liquid crystal display command center. The display shall provide a 16 key alpha-numeric pad for local programming and command functions. Two different passwords shall be required for programming. Nine LED's shall be provided for AC Power, Fire Alarm, Pre-Alarm, Security

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Alarm, Supervisory signal, System Trouble, Disabled points and Alarm Silenced.

- c. Main power supply for the panel and for peripheral devices with 120VAC 60HZ input power. The power supply shall come with an integral charger for batteries and 5 amps usable for peripherals.
- d. Provide SIC data loop board(s) capable of handling 99 intelligent detectors and 99 control / monitor functions per board.
- e. Provide ceiling mounted smoke detector located above the Fire Alarm Control Panel (FACP).
- f. Battery backup shall comply with NFPA 72.
- g. Provide a control panel that is equipped with the following capacities:
  - 1. Data loops: 1
  - 2. Intelligent detectors: 99
  - 3. Control / Monitor functions: 99
  - 4. Programmable horn circuits: 2
- h. Standard of Quality: Notifier NFW-100X intelligent multiplex panel.

2. Circuits

- a. All A/V alarm device and data loop circuits shall have 15% capacity for future expansion.
- b. Standard of Quality: Notifier Co. by R.P. Biederman Co.
- c. Additional Approved Manufacturers: Cerberus Pyrotronics, Simplex Co.

3. Initiation Devices

- a. Addressable Manual Pull Stations
  - 1. Standard of Quality: Notifier NOT-BG12LX
  - 2. Additional Approved Manufacturers: Cerberus Pyrotronics, Simplex Co.

b. Ceiling / Wall Smoke Detectors

1. Smoke detector locations shall not exceed the rated coverage of the detector and, in general, shall be no more than 15 feet from a wall or 30 feet apart.
2. Smoke detectors shall not be installed within 3 feet from a supply air diffuser.
3. Intelligent addressable photo smoke detectors shall be Notifier NP-200 with base.
4. Standard of Quality: Notifier Co. by Premier Distributor
5. Additional Approved Manufacturers: Cerberus Pyrotronics, Simplex Co.

4. HVAC Airstream Smoke Detectors

- a. The shut down of the air handler shall be via NC-100R control/relay module, unless specifically forbidden by the AHJ, in which case provide auxiliary contact as required to shut down equipment and wire into the stop circuit of the associated air handler starter.
- b. Provide all required power and control wiring so that upon detection of smoke, the following sequence of operations occurs:
  1. An alarm signal (any area smoke detector) is sent to the fire alarm control panel and to the monitoring central station.
  2. The HVAC unit shuts down (including applicable dampers).
  3. Standard of Quality: Notifier NC-100R, intelligent addressable relay module.
  4. Additional Approved Manufacturers: Cerberus Pyrotronics, Simplex Co.

5. Heat Detectors

- a. The heat detector shall be both rate of rise and fixed temperature with 140 degree F. alarm threshold.
- b. Standard of Quality: Notifier NH-200 with base, intelligent addressable heat detector.
- c. Additional Approved Manufacturers: Cerberus Pyrotronics, Simplex Co.

6. Alarm Devices

a. Horn / Strobe Units

1. The unit shall be red, with semi-flush mounting plates (ADA-compliant strobes), wall mounted at 6'-8" as shown on plans.
2. Strobe units shall be synchronized wherever required by authority having jurisdiction, including ADAAG. Additionally, where required by local authority having jurisdiction, the horn strobes shall meet ANSI S3.41 temporal code.
3. Standard of Quality: Notifier P2WL, electronic horn / strobe.
4. Additional Approved Manufacturers: Cerberus Pyrotronics, Simplex Co.
5. Provide Notifier STI #6520 protective cover for strobe and horn / strobe units in gymnasiums.

b. Strobe-Only Units

1. The "visual only" alarms shall be red ADA compliant strobe units (ADA-compliant strobes) wall mounted at 6'8" as shown on plans.
2. Strobe units shall be synchronized wherever required by authority having jurisdiction, including ADAAG.
3. Standard of Quality: Notifier #SWL.
4. Additional Approved Manufacturers: Cerberus Pyrotronics, Simplex Co.

7. Accessory Devices

a. Remote Annunciators (FARA / FAA)

1. Provide a liquid crystal display remote annunciator near main entrance at a location approved by the local fire department.
2. The annunciator shall show all alarms and troubles on two forty character displays and shall give an audible signal.
3. Standard of Quality: Notifier N-ANN-80W.

4. Additional Approved Manufacturers: Cerberus Pyrotronics, Simplex Co.
- b. Isolation Modules
1. Provide isolation modules to isolate wire to wire shorts on a data loop to limit the number of other modules or detectors that are incapacitated by the short circuit fault and / or grounds.
  2. Isolation modules shall be part of the smoke detector base.
  3. The isolation modules shall permit the entire system to operate independently of the area disconnected by the isolation module due to wiring faults.
  4. Standard of Quality: Notifier #ISO-X
  5. Additional Approved Manufacturers: Cerberus Pyrotronics, Simplex Co.
- c. Monitor Modules
1. Provide number as required to interface "non-intelligent" devices into the system as shown on the drawings (i.e. Sprinkler Flow Switches, Tamper Switches, Pressure Switches, Kitchen Hoods, Elevator applications, etc. as applicable).
  2. Standard of Quality: Notifier NMM-100P or NMM-1 monitor modules
  3. Additional Approved Manufacturers: Cerberus Pyrotronics, Simplex Co.
- d. Control / Relay Modules
1. Provide control/relay modules for all auxiliary devices including door closures and all supervised control functions such as air handler shut-downs.
  2. Standard of Quality: Notifier NC-100R control/relay modules
  3. Additional Approved Manufacturers: Cerberus Pyrotronics, Simplex Co.

8. Digital Communicator (“Dialer”)

- a. Install owner provided remote mounted digital communicator on the telephone equipment panel, programmed to report to the owners UL approved CENTRAL STATION monitoring agency.
- b. Digital Communicator shall be UL listed for fire alarm use, mounted in single equipment housing containing battery charger and battery with coupler cable.
- c. Owner will provide one duplex telephone outlet (with two RJ31X connecting block jacks) within two feet of the Fire Alarm Panel/Digital Communicator for connection to telephone system. Each jack shall be connected to a separate phone line and shall be the first in-house device tied to the respective phone line. The jacks shall not be connected to a party line or a “ground start” telephone circuit.
- d. Digital Communicator shall be connected to operate from two sets of dry contacts on fire alarm control panel; one set for alarm and one set for trouble.
- e. The digital dialer shall be capable of sending three distinct signals. The digital dialer shall be in its own cabinet with battery back-up.
- f. Coordinate purchase of Dialer with owner at the start of work so unit receipt does not hold up project.

K. Execution

1. The work performed under this section shall be conducted by a team of qualified individuals.

L. Installation

1. Provide all required 20A/120VAC power as required to energize all components of the fire alarm system. This shall not only include home-runs for fire alarm control panels, but shall also include home-runs and wiring for any accessory devices such as remote power supplies/panels, printer, dialer, etc. as applicable. This requirement applies whether or not such power work is shown on the drawings. Branch circuits serving fire alarm equipment shall be dedicated to fire alarm equipment only.
2. All 120VAC power for fire alarm equipment shall be connected to a dedicated 120VAC, 20 amp fire alarm (red handle) branch circuit breaker. Circuit shall be identified FIRE ALARM CIRCUIT.



M. Software Development and Programming

1. When a fire alarm condition is detected by one of the system initiating devices, the following functions shall occur simultaneously:
  - a. System point shall be shown on the panel by type of device, location and time of day.
  - b. The audio-visual alarm devices shall activate throughout the building.
  - c. The digital dialer shall notify the monitoring company that an alarm condition exists.
2. When a trouble or supervisory condition occurs, the following functions shall occur simultaneously:
  - a. System point shall be shown on the panel by type of device, location and time of day.
  - b. A distinct trouble sound shall occur at the panel.
  - c. The digital dialer shall notify the monitoring company that a trouble condition exists.
3. The system shall monitor for head sensitivity and give a warning message if the smoke or duct detector needs cleaning.
4. The system shall be fully field-programmable with the equipment on site. While programming, the system shall continue to operate, polling devices currently in the program.
5. Other features of the system shall include the following:
  - a. Walk test
  - b. Enable disable of device
  - c. Read status of any point
  - d. Field programmable at keyboard
  - e. Multiple password protection
  - f. Manual on / off for any output point
  - g. Time of day clock
  - h. Calibrated smoke detector test

N. Performance

1. The following table shows the schematic sequence of operations for the Fire Alarm System.

O. Testing

1. Upon completion of the installation, the system shall be checked and tested by a fire alarm inspector that is State-Licensed, NICET Level II Certified, or approved equivalent.

P. Pre-Test Submittal

1. Provide a single copy of the system Owner's Manual and a copy of the latest as-built drawings. The owner's manual will be reviewed and returned for updating and submission with final closeout documentation. Preliminary as-built drawings will be not returned and do not count towards the Contractor's closeout documentation requirement.
2. Provide type-written and signed certification that the system is complete, working fully and complies with the drawings and specifications and is now ready for acceptance testing.

Q. Acceptance Testing

1. Upon the Designer's receipt of and approval of the Contractor's pre-test submittal, the Contractor shall contract the Designer to schedule acceptance testing. Contractor shall provide not less than 10-business days of advance notice to the Designer.
2. In the presence of the Designer, the inspecting authority, and the owners, the Contractor shall demonstrate the presence of all specified equipment, cabling and installation methods. The Contractor shall demonstrate the operation of the system and shall be prepared to make any electronic, physical or software related adjustments to the system or any of its components to the satisfaction of the Designer, as required, to demonstrate and achieve full compliance with the specifications.
3. The Contractor shall have available at the project site test equipment, cables, tools and personnel necessary to demonstrate full compliance with these specifications. The Contractor shall have presented a copy of the most up-to-date as-built documentation at this time.
4. The Contractor shall provide all required labor services required by the Designer to completely verify and test the systems in the presence of the Designer.

5. Rectify deficiencies indicated by tests and completely retest work affected by such deficiencies at Contractor's expense. Verify by the system test that the total system meets the specifications and complies with applicable standards.

R. Training

1. Schedule training with Owner at least 14 days in advance.
2. Video tape all training sessions.

S. Close Out Documentation

1. Provide all record and closeout documentation as identified in Section 16010.
2. Submit (3) duplicate sets of Compact Disc(s) containing complete electronic documentation of the system including the most up-to-date equipment configuration files for 100% of all software configurable/programmable products used in the project. These files shall include the editable source code files necessary to make changes. Where permissible by manufacturer software licensing agreements, include copies of all pertinent applications necessary for viewing and editing of the supplied configuration/programming source code files. Include copies of all applicable manufacturer and third-party software license agreements. This information is in addition to all other closeout documentation requirements applicable to this section. This information shall be submitted with transmittal directly to the Engineer where it will be distributed to other party's as appropriate.
3. ALL OTHER CLOSEOUT DOCUMENTATION SHALL BE SUBMITTED THROUGH NORMAL PROJECT CHANNELS.

9. EQUIPMENT PREPARATION

- A. At the completion of the job, or at such time as a portion of the work is to be turned over to the Owner, thoroughly clean all equipment installed under this section of the work. This includes switchgear, lighting fixtures, wall plates, etc. and involves the removal of all traces of grease, dirt, dust, etc., as well as temporary labels, shipping tags and the like. Equipment shall be turned over in factory inspected condition.

10. RECORD DRAWINGS

- A. Provide and keep on the job two complete print sets of the contract working drawings on which shall be legibly recorded any variations from such contract drawings, change orders or alterations to the work made during construction. Record print sets shall show any changes in:
  1. Size, type, capacity, etc., of material, device or piece of equipment;

2. Location of devices or equipment;
  3. Location of outlet or source in building service systems;
  4. Routing of feeders, bus ducts, or other building services;
  5. Schedule data;
- B. These prints shall also show the location of all concealed pull boxes, feeders, etc., as well as electric services, obtained by actual field-measured dimensions to each such item from readily identifiable and accessible walls or corners of the building. Changes, modifications, etc., shall be recorded daily. In addition, the Contractor will be given an electronic set of drawings (disks) on which to permanently record such changes at the completion of the project.
- C. During the course of the project these prints shall be kept clean and undamaged and shall not be used for any purpose other than recording deviations from contract drawings and exact locations of concealed work. They shall be available at all times for the Owner's and/or the Engineer's inspection.
- D. When the job is completed, record prints shall be turned over to the Engineer for review. Subsequent to this review, the prints will be returned to the Contractor for use in preparing the updated electronic file. Unless otherwise indicated, this shall be done in either AutoCad 14 or AutoCad 2000 format.
- E. Note that providing the completed "as built" electronic file is a requirement for project close-out.

11. WARRANTY

- A. Provide warrants to the Owner and the Architect that the materials and equipment furnished will be new, unless otherwise specified, and that all work will be of good quality, free from faults and defects and in conformance with the Contract Documents.
- B. If, within one year after the date of substantial completion of the work or within one year after acceptance by the Owner or within such longer period of time as maybe prescribed by the terms of any applicable special warranty required by the Contract Documents, any of the work is found to be defective or not in accordance with the Contract Documents, it shall be promptly corrected upon receipt of official notification to do so. This obligation shall survive termination of the contract.

\* \* \* END OF SECTION \* \* \*