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ADDENDUM

ADDENDUM NO. [1] **Date: March 15, 2018**

RE: **EAU CLAIRE AREA SCHOOL DISTRICT**
McKINLEY CHARTER SCHOOL
1266 McKINLEY RD
EAU CLAIRE, WISCONSIN 54701
HSR PROJECT NO. 17057

FROM: HSR Associates, Inc
100 Milwaukee Street
La Crosse, WI 54603
(608) 784-1830

To: Prospective Bidders

This addendum forms a part of the Contract Documents and modifies the original Bidding Documents dated March 2018. Acknowledge receipt of this Addendum in the space provided on the bid form. Failure to do so may subject the Bidder to disqualification.

This Addendum consists of [3] pages, [8] Specification Sections, and [7] 30 x 42 drawings.

CHANGES TO SPECIFICATIONS:

1. Section 07 53 00 ELASTOMERIC MEMBRANE ROOFING
    a. 2.05: Delete Item 8. VOC compliant on exterior adhesives not required.
2. Section 23 05 13 MOTORS
    a. Paragraph 3.03 C. Each of the following devices shall be provided with a separate VFD, add Pumps HWP-1 and HWP-2.
3. Section 23 09 14 ELECTRIC INSTRUMENTATION AND CONTROL DEVICES FOR HVAC
    a. Paragraph 1.04 ACCEPTABLE CONTRACTORS: Add “WHV – Lacrosse, WI.”
4. Section 23 09 23 DIRECT DIGITAL CONTROL SYSTEM FOR HVAC
    a. Paragraph 2.01, A: Acceptable DDC control system manufacturers shall be: Add “Automated Logic.”
5. Section 26 05 36 CABLE TRAYS
    a. Add section to Contract Documents.
6. Section 26 09 16 ELECTRONIC CONTROLS AND RELAYS
    a. Add section to Contract Documents.
7. Section 26 24 16 PANELBOARDS
    a. Add section to Contract Documents.
8. Section 26 27 01 ELECTRIC SERVICE ENTRANCE
    a. Add section to Contract Documents.
9. Section 26 27 17 EQUIPMENT WIRING
    a. Replaces section in original Bid Documents.

10. Section 26 41 14 TRANSIENT VOLTAGE SURGE SUPPRESSION
    a. Add section to Contract Documents.

11. Section 27 51 16 PUBLIC ADDRESS SYSTEM
    a. Add section to Contract Documents.

12. Section 27 53 13 WIRELESS CLOCK SYSTEM
    a. Add section to Contract Documents

CHANGES TO DRAWINGS

13. Sheet A010R CODE PLAN 30 x 42 attached hereto
    a. Revisions clouded on Drawing.
    b. Exiting directions revised.

14. Sheet A100R FIRST FLOOR 30 x 42 attached hereto
    a. Revisions clouded on Drawing.
    b. The 2 hour wall rating between the existing building and new addition has been eliminated.

15. Sheet A120 ROOF PLAN
    a. At the roof hatch location, the two lines running north/south should be deleted.
    b. Add a walkway pad at the south end of the roof hatch.

16. Sheet A300 WALL SECTIONS
    a. 5A300: Change wall type B4 to B2. The 2 hour wall rating has been eliminated.

17. Sheet A301 WALL SECTIONS
    a. 6A301: Change wall type B2b to B2. 2 hour rating has been eliminated.

18. Sheet A400 ENLARGED FLOOR PLANS AND WALL TYPES
    a. Delete Wall Type B2b. 2 hour wall no longer applies.

19. Sheet M600R MECHANICAL SCHEDULES 30 x 42 attached hereto
    a. Revisions clouded on Drawing.

20. Sheet E001R ELECTRICAL SITE PLAN 30 x 42 attached hereto
    a. Drawing reissued to replace original bid drawing.

21. Sheet E090R ELECTRICAL REMOVAL PLAN 30 x 42 attached hereto
    a. Drawing reissued to replace original bid drawing.

22. Sheet E100R ELECTRICAL POWER PLAN 30 x 42 attached hereto
    a. Drawing reissued to replace original bid drawing.

23. Sheet E101R ELECTRICAL LIGHTING PLAN 30 x 42 attached hereto
    a. Drawing reissued to replace original bid drawing

PRIOR APPROVALS

1. Section 07 13 00 SHEET WATERPROOFING
    a. PW: 100/60 Waterproofing System

2. Section 07 62 00 SHEET METAL FLASHING AND TRIM
    b. Snap on style of roof edge flashing comparable to Metal Era's Perma-Tite System 200 Fascia.
3. Section 23 63 13 AIR COOLED CONDENSING UNITS
    a. Aaon

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SECTION 26 05 36

CABLE TRAYS FOR ELECTRICAL SYSTEMS

PART 1: GENERAL

1.01 SECTION INCLUDES

A. Cable trays and accessories.

1.02 RELATED SECTIONS

A. Section 07 84 00 – Fire Stopping.

B. Section 26 05 29 – Hangers and Supports for Electrical Systems

1.03 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code.

B. ASTM A 123 - Specification for Zinc (Hot-Galvanized) Coatings on Products Fabricated from Rolled, Pressed, and Forged Steel Shapes, Plates, Bars, and Strip.

C. ASTM A 525 - General Requirements for Steel Sheet, Zinc- Coated Galvanized by the Hot-Dip Process.

D. NEMA VE 1 - Metallic Cable Tray Systems.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Shop Drawings: Indicate tray type, dimensions, support points, and finishes.

C. Product Data: Provide data for fittings and accessories.

D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.05 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 01 70 00.

B. Record actual routing of cable tray and locations of supports.

1.06 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum three years documented experience.

1.07 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

PART 2: PRODUCTS

2.01 MANUFACTURERS

A. GS Metal Corp.

B. MP Husky

C. B-Line

D. Cablofil

E. Mono-Systems.

2.02 MESH -TYPE CABLE TRAY

A. Description: Cable Management system. 4 in. x 2 in. welded wire mesh.

B. Material: Steel

C. Finish: Electro Zinc plated steel wire or Pre-Galvanized steel wire.

D. Inside Width: 12”

E. Inside Depth: 3”.

F. Fittings: Cable management fittings to be field manufactured from straight sections, through use of hardware and instructions supplied by manufacturer

G. Provide manufacturer's standard clamps, hangers, brackets, splice plates, reducer plates, blind ends, barrier strips, connectors, and grounding straps.

PART 3: EXECUTION

3.01 INSTALLATION

G. Install in accordance with manufacturer's instructions.

H. Install metallic cable tray in accordance with NEMA VE 1.

I. Support trays in accordance with Section 26 05 29. Provide supports at each connection point, at the end of each run.

J. Use expansion connectors where required.

K. Ground and bond cable tray under provisions of Section 26 05 26.
1. Provide continuity between tray components.

END OF SECTION

SECTION 26 09 16

ELECTRIC CONTROLS AND RELAYS

PART 1: GENERAL

1.01 SECTION INCLUDES

A. Contactors.

B. Time clocks for hot water return pump control.

1.02 REFERENCES

A. NEMA ICS 6 - Enclosures for Industrial Controls and Systems.

1.03 SUBMITTALS

A. Submit shop drawings under provisions of Section 01 30 00.

PART 2: PRODUCTS

2.01 CONTACTORS

A. Mechanically held.

B. Rated 20 amps per pole at 600 volts.

C. Heavy duty silver contacts.

D. 24 volt control circuit voltage.(wired to BAS)

E. NEMA 1 enclosure.

F. Manufacturers:
1. Zenith
2. ASCO
3. Cutler-Hammer
4. Square D

2.03 TIME CLOCKS - HOT WATER RETURN PUMP CONTROL

. Digital maintained contact, one channel clock.

A. 7 day/32 set points.

B. AM/PM or 24 hour format - user selectable.

C. Daylight saving and leap year compensation.

D. Manual override and battery back-up.

E. Manufacturer:
1. Tork #DGU 100.
2. Paragon
3. Intermatic
4. Substitutions: Under provisions of Section 01 30 00.

PART 3: EXECUTION

3.01 INSTALLATION

A. Install in accordance with manufacturer's instructions.

END OF SECTION

SECTION 26 24 16

PANELBOARDS

PART 1: GENERAL

1.01 SECTION INCLUDES

A. Distribution panelboards.

B. Branch circuit panelboards.

1.02 RELATED WORK

A. Section 26 05 29 – Hangers and Supports for Electrical Systems

B. Section 26 05 53 – Identification of Electrical Systems

C. Section 26 05 26 – Grounding and Bonding of Electrical Systems

1.03 REFERENCES

A. NECA (National Electrical Contractors Association) "Standard of Installation."

B. NEMA AB 1 - Molded Case Circuit Breakers.

C. NEMA ICS 2 - Industrial Control Devices, Controllers, and Assemblies.

D. NEMA KS 1 - Enclosed Switches.

E. NEMA PB 1 - Panelboards.

F. NEMA PB 1.1 - Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.

G. NFPA 70 - National Electrical Code.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker arrangement.

C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.05 QUALITY ASSURANCE

A. Perform Work in accordance with NECA Standard of Installation.

B. Maintain one copy of each document on site.

1.06 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.

B. Furnish products listed and classified by UL as suitable for purpose specified and indicated.

PART 2: PRODUCTS

2.01 MANUFACTURERS

A. Cutler-Hammer

B. General Electric

C. Siemens

D. Square D.

E. Substitutions: Under provisions of Section 01 63 00.

2.02 DISTRIBUTION PANELBOARDS

A. Panelboards: NEMA PB 1, circuit breaker type.

B. Panelboard Bus: Copper, ratings as indicated. Provide copper ground bus in each panelboard.

C. Molded Case Circuit Breakers: NEMA AB 1. Provide circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as Type HACR for air conditioning equipment branch circuits.

D. Cabinet Front: Flush or surface type, fastened with concealed trim clamps. Provide hinged door with flush lock. Finish in manufacturer's standard gray enamel.

E. Minimum integrated short circuit rating: 35,000 amperes rms symmetrical

2.03 BRANCH CIRCUIT PANELBOARDS

A. Lighting and Appliance Branch Circuit Panelboards: NEMA PB1, circuit breaker type.

B. Panelboard Bus: Copper, ratings as indicated. Provide copper ground bus in each panelboard.

C. Minimum integrated short circuit rating: 10,000 amperes rms symmetrical for 240 volt panelboards.

D. 120/208V branch circuit panelboards shall have UL Listed 200% rated neutrals for non-linear loads where indicated in the Panelboard Schedule.

E. Molded Case Circuit Breakers: NEMA AB 1, bolt-on type thermal magnetic trip circuit breakers, with common trip handle for all poles. Provide circuit breakers UL listed as Type SWD for lighting circuits. Provide UL Class A ground fault interrupter circuit breakers where scheduled. Do not use tandem circuit breakers.

F. Enclosure: NEMA PB 1, Type 1.

G. Cabinet box: 6 inches deep; width: 20 inches. All multi-section panelboards shall be the same physical size for all sections.

H. Cabinet Front: Flush or surface cabinet front with concealed trim clamps, concealed hinge, and flush lock all keyed alike. Finish in manufacturer's standard gray enamel.

PART 3: EXECUTION

3.01 INSTALLATION

A. Install panelboards in accordance with NEMA PB 1.1.

B. Install panelboards plumb. Install recessed panelboards flush with wall finishes. Provide supports in accordance with Section 26 05 29.

C. Height: 6 ft (2 M) to top of panelboard; install panelboards taller than 6 ft (2 M) with bottom no more than 4 inches (10 cm) above floor.

D. Provide filler plates for unused spaces in panelboards.

E. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads.

F. Provide spare conduits out of each recessed panelboard to an accessible location above ceiling. Minimum spare conduits: 5 empty 3/4 inch. Identify each as SPARE.

G. Circuit numbers indicated on drawings are for reference. Contractor to arrange branch circuits as required for wiring and load balancing. Indicate actual panelboard circuit numbers on record/as-built drawings.

3.02 FIELD QUALITY CONTROL

A. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits.

B. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers.

END OF SECTION

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SECTION 26 27 01

ELECTRIC SERVICE ENTRANCE

PART 1: GENERAL

1.01 SECTION INCLUDES

A. Arrangement with Utility Company for permanent electric service.

B. Cable termination cabinets.

C. Meter Sockets

1.02 RELATED SECTIONS

A. Section 26 05 34 - Conduit.

B. Section 26 05 26 - Grounding and Bonding.

C. Section 26 24 16 - Panelboards

1.03 UTILITY ALLOWANCE

A. No allowance shall be included in the Bid. All electric service charges will be paid directly to the Utility by the Owner.

1.04 REFERENCES

A. ANSI/NFPA 70 - National Electrical Code.

1.05 SYSTEM DESCRIPTION

A. Utility Company: Xcel Energy

B. System Characteristics: 208Y/120 volts, three phase, four- wire, 60 Hertz.

1.06 QUALITY ASSURANCE

A. Perform Work in accordance with Utility Company written requirements.

1.07 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

PART 2: PRODUCTS

2.01 UTILITY METERS

A. Meters will be furnished by Utility Company.

2.02 UTILITY METER BASE

A. The Electrical Contractor shall purchase meter base from Xcel Energy.

2.03 CABLE TERMINATION CABINET W/ CURRENT TRANSFORMER PROVISIONS – WALL MOUNTED

A. NEMA 3R rated and 85,000 rms symmetrical withstand with no cable lashing required.

B. Suitable for outdoor applications. Made from galvanized code gauge steel and are provided with four mounting holes and interiors installed. Enclosure shall be primed and painted transformer green enamel.

C. Door is provided as standard hinged on left side, with 3-point heavy duty handle on right side to accommodate sealing rings, padlocks and/or barrel locks. Wind latch holds door in open position for field work.

D. All cabinets shall be U.L. labeled for 3R application per U.L. 50 and U.L. 414. They shall meet all National Electrical Code, NEMA and utility company standards.

E. Manufacturer: EMI, Electro-Mechanical Industries, Inc. (Verify model number with XCEL Energy - local utility Company).

2.04 TRANSFORMER

A. Transformer(s) provided by Utility company.

B. Contractor to provide concrete transformer pad.

C. Provide (2) 5” rigid metal long sweep elbow for primary service conductors. Verify size and location with utility.

PART 3: EXECUTION

3.01 EXAMINATION

A. Verify that service equipment is ready to be connected and energized.

3.02 PREPARATION

A. Make arrangements with Utility Company to obtain permanent electric service to the Project.

B. Coordinate location of Utility Company's facilities to ensure proper access is available.

3.03 INSTALLATION

A. Install conduits from transformer to the service entrance equipment. Utility Company will provide service lateral from the transformer to the service equipment.

END OF SECTION

SECTION 26 27 17

EQUIPMENT WIRING

PART 1: GENERAL

1.01 SECTION INCLUDES

A. Electrical connections to equipment specified under other sections.

1.02 RELATED SECTIONS

A. Division 22 - Plumbing Equipment.

B. Division 23 - HVAC Equipment.

C. Section 26 05 34 - Conduit.

D. Section 26 05 19 – Low-voltage power Conductors and Cables.

E. Section 26 05 37 - Boxes.

1.03 REFERENCES

A. NEMA WD 1 - General Purpose Wiring Devices.

B. NEMA WD 6 - Wiring Device Configurations.

C. ANSI/NFPA 70 - National Electrical Code.

1.04 SUBMITTALS

A. Submit under provisions of Section 01 30 00.

B. Product Data: Provide wiring device manufacturer's catalog information showing dimensions, configurations, and construction.

C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.05 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.

B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and shown.

1.06 COORDINATION

A. Obtain and review shop drawings, product data, and manufacturer's instructions for equipment furnished under other sections.

B. Determine connection locations and requirements.

C. Sequence rough-in of electrical connections to coordinate with installation schedule for equipment.

D. Sequence electrical connections to coordinate with start- up schedule for equipment.

PART 2: PRODUCTS

2.01 CORDS AND CAPS

A. Attachment Plug Construction: Conform to NEMA WD 1.

B. Configuration: NEMA WD 6; match receptacle configuration at outlet provided for equipment.

C. Cord Construction: ANSI/NFPA 70, Type SO multi-conductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.

D. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.

PART 3: EXECUTION

3.01 ELECTRICAL CONNECTIONS

A. Make electrical connections in accordance with equipment manufacturer's instructions.

B. Make conduit connections to equipment using flexible conduit. Use liquid-tight flexible conduit with watertight connectors in damp or wet locations.

C. Make wiring connections using wire and cable with insulation suitable for temperatures encountered in heat producing equipment.

D. Provide receptacle outlet where connection with attachment plug is indicated. Provide cord and cap where field- supplied attachment plug is indicated.

E. Install disconnect switches, controllers, control stations, and control devices as indicated.

F. Provide interconnecting conduit and wiring between devices and equipment where indicated.

END OF SECTION

SECTION 26 41 14

TRANSIENT VOLTAGE SURGE SUPPRESSION

PART 1: GENERAL

1.01 SECTION INCLUDES

A. Automatic transient voltage surge suppression (TVSS) for electrical distribution systems.

1.02 REFERENCES

A. ANSI/NFPA 70 – National Electrical Code

B. ANSI Standard C62.41 and C62.45.

C. UL 1449 and 1283.

1.03 SUBMITTTALS

A. Submit under provisions of Section 01300.

B. Shop Drawings: Device dimensions, nameplate nomenclature, and electrical ratings.

C. Product data sheets with installation instructions.

D. Voltage current characteristic curves for each size and type of device.

E. Maximum Surge Current Rating test documentation. Tests will be performed with fuses and all disconnects intact.

F. Test documentation demonstrating that the TVSS is cable of surviving the specified number of ANSI/IEEE C62.41, Category C3 impulses without failure or performance degradation.

G. UL 1440, Second Edition documentation.

H. Complete test documentation package per the recommendations of NEMA LS1-1992.

1.04 REGULATORY REQUIREMENTS

A. ANSI/NFPA 70 – National Electrical Code

B. Furnish products listed and classified by Underwriters Laboratories Inc.

PART 2: PRODUCTS

2.01 MANUFACTURER

A. Liebert Corporation.

B. Current Technology.

C. Square D.

D. Substitutions: Under provisions of Section 01 63 00.

2.01 BRANCH PANEL SUPPRESSOR

A. Surface mounted enclosure.

B. Operating voltage: 120/208 volt, three phase, 3 wire.

C. Surge capacity: 65kA per mode (equivalent to 136 kA per phase).

D. The TVSS will be design tested to survive a minimum of 6,000 repetitive ANSI/IEEE C62.41, Category C3 impulses without failure or performance of degradation of more than 10%.

E. UL 1449 Second Edition Listed, 1283 Complimentary Listed and CUL.

F. Suppression modes: L-N, N-G, L-G. UL-1449, Second Edition Suppressed Voltage Rating shall be 400V for each listed suppression mode.

G. All MOV'S will be individually fused.

H. Manufacturer: Liebert Accuvar Series or Current Technology CG Plus Series.

PART 3: EXECUTION

3.01 INSPECTION

A. Examine equipment for size and type of arrester to ensure physical compatibility.

3.02 INSTALLATION

A. Install in accordance with manufacturer's written instructions, applicable requirements of NEC and NECA's "Standard of Installation," and in accordance with recognized industry practices.

B. Service entrance TVSS will be connected to the service entrance equipment via a 60A, 3-pole circuit breaker. The TVSS will be located as close as possible to the phase, neutral and ground bus bars or lugs.

C. The branch panel TVSS will be located as close as possible to the panelboard neutral lug. A 60A, 3 pole circuit breaker will be provided by the panelboard manufacturer and will be located as close as possible to the TVSS location. All lead lengths will be kept short as possible avoiding unnecessary bends. When possible, twist the phase conductors around the neutral conductor.

END OF SECTION

SECTION 27 51 16 - PUBLIC ADDRESS SYSTEM

PART 1 – GENERAL

1.0 BRIEF DESCRIPTION

A. Quantum Multicom IP Paging System – Rack-Mount
   1. Small campus to multi-campus facilities; 2 stations to 18,750 stations per facility
   2. Small to large sized School Districts (1 to 99 facilities) for a total capacity of up to 1,856,250 stations)
   3. Any combination of administrative display phones, administrative VoIP phones, administrative phones, call buttons, speakers, or Telemedia media control in the office areas, workrooms, staff areas, and classrooms
   4. Programming and audio distribution via the LAN setup via the LAN or WAN
   5. Any or all of the ports can be setup as an administrative port

1.1 GENERAL REQUIREMENTS

A. The conditions of the General Contract (General, Supplementary, and other Conditions) and the General Requirements are hereby made a part of this Section.

B. All bids shall be based on the equipment as specified herein. The catalog numbers and model designations are that of the Quantum Multicom IP.

C. No Substitutions. System will be provided by **Audio Architects – contact Nancy Carlson 715-723-4900 or nancy@audio-architects.com**.

D. The contractor for this work shall be held to have read all of the bidding requirements, the general requirements of division 1, and contract proposal forms, and the execution of this work. The contractor will be bound by all of the conditions and requirements therein.

E. The contractor shall be responsible for providing a complete functional system including all necessary components whether included in this specification or not.

F. In preparing the bid, the contractor should consider that no claim will be made against the owner for any costs incurred by the contractor for any equipment demonstrations which the owner requests.

1.2 SCOPE OF WORK

A. Furnish and install all equipment, accessories, and materials in accordance with these specifications and drawings to provide a complete and operating school communications system including but not limited to:
   1. Administrative phone
   2. Classroom speaker(s), ceiling- or wall-mounted
   3. Built in Master Clock with 1024 events, 32 Schedules, including Daylight Savings Time, and up to 32 custom holiday events that can be assigned to any of the 64 time zones
   4. Wall-mounted paging horns
   5. Built-in Web Server for full system programming with Quantum Commander

6. Administrative Web-Browser Application for Programming and Day to Day System Operation

B. System can connect to the PSTN (Public Switched Telephone Network) by connecting it to analog CO trunks.

1. Telephone service with public utilities shall be arranged by the owner, in conjunction with the equipment supplier. Equipment supplier shall generate a one-page document that will provide the Owner with information concerning number of outside lines (minimum of 8, and a maximum of 1,125 per school, maximum of 99 Schools [facilities]).

1.3 SUBMITTALS

A. Specification Sheets shall be submitted on all items including cable types.

B. Submit outline drawing of system control cabinet showing relative position of all major components.

C. Shop drawings, detailing integrated electronic communications network system including, but not limited to, the following:
1. Station wiring arrangement
2. Equipment cabinet detail drawing

D. Submit wiring diagrams showing typical connections for all equipment.

E. Submit a numbered Certificate of Completion for installation, programming, and service training, which identifies the installing technician(s) as having successfully completed the technical training course(s) provided by the system manufacturer.

1.4 QUALITY ASSURANCE

A. All items of equipment shall be designed by the manufacturer to function as a complete system and shall be accompanied by the manufacturer's complete service notes and drawings detailing all interconnections.

B. The contractor shall be an established communications and electronics contractor that has had and currently maintains a locally run and operated business for at least 5 years. The contractor shall be a duly authorized distributor of the equipment supplied with full manufacturer's warranty privileges.

C. The contractor shall show satisfactory evidence, upon request, that he or she maintains a fully equipped service organization capable of furnishing adequate inspection and service to the system. The contractor shall maintain at his or her facility the necessary spare parts in the proper proportion as recommended by the manufacturer to maintain and service the equipment being supplied.

1.5 SINGLE SOURCE RESPONSIBILITY

A. Except where specifically noted otherwise, all equipment supplied shall be the standard product of a single manufacturer of known reputation and minimum of 30 years experience in the industry. The supplying contractor shall have attended the manufacturer's installation and service school. A certificate of this training shall be provided with the contractor's submittal.

1.6 SAFETY / COMPLIANCE TESTING

A. The communications system shall bear the label of a Nationally Recognized Testing Laboratory (NRTL) such as ETL, and be listed by their re-examination service. All work must be completed in strict accordance with all applicable electrical codes, under direction of a qualified and factory approved distributor, to the approval of the owner.

B. The system is to be designed and configured for maximum ease of service and repair. All major components of the system shall be designed as a standard component of one type of card cage. All internal connections of the system shall be with factory-keyed plugs designed for fault-free connection.

C. The printed circuit card of the card cage shall be silk-screened to indicate the location of each connection.

1.7 IN-SERVICE TRAINING

A. The contractor shall provide a minimum of eight hours of in-service training with this system. These sessions shall be broken into segments, which will facilitate the training of individuals in the operation of this system. Operators Manuals and Users Guides shall be provided at the time of this training.

1.8 WIRING

A. System wiring and equipment installation shall be in accordance with good engineering practices as established by the EIA and the NEC. Wiring shall meet all state and local electrical codes. All wiring shall test free from all grounds and shorts.

B. All communication system wiring shall be labeled at both ends of the cable. All labeling shall be based on the room numbers as indicated in the architectural graphics package.

1.9 PROTECTION

A. The contractor shall provide all necessary transient protection on the AC power feed and on all station lines leaving or entering the building.

B. The contractor shall note in his system drawings, the type and location of these protection devices as well as all wiring information. Such devices are not to be installed above the ceiling.

1.10 SERVICE AND MAINTENANCE

A. The contractor shall provide a five year equipment warranty of the installed system against defects in material and workmanship. All materials shall be provided at no expense to the

owner during normal working hours. The warranty period shall begin on the date of acceptance by the owner/engineer.

B. The contractor shall, at the owner's request, make available a service contract offering continuing factory authorized service of this system after the initial warranty period.

C. The system manufacturer shall maintain engineering and service departments capable of rendering advice regarding installation and final adjustment of the system.

PART 2 - EQUIPMENT SPECIFICATION

2.1 MANUFACTURERS

A. Manufactures: Subject to compliance with requirements specifications, provide the following system:
   1. Quantum Multicom IP manufactured by Bogen Communications, Inc., Memphis, TN, Mahwah, NJ, and Orlando, FL and Made in the United States of America

B. The intent is to establish a standard of quality, function and features. It is the responsibility of the bidder to insure that the proposed product meets or exceeds every standard set forth in these specifications.

C. The functions and features specified are vital to the operation of this facility; therefore, inclusion in the list of acceptable manufacturers does not release the contractor from strict compliance with the requirements of this specification.

2.2 EQUIPMENT

A. CONSOLE
   1. Rack-mounted equipment shall be Lowell or Middle Atlantic
      a. 77” Rack
   2. MCRMF
      a. MCRMF Rack mounting mainframe. Includes built-in ventilation fans and the following circuit cards:
         Quantum Processor Card
         Analog Card
         Station Card
         Ribbon Cable Assembly
   3. MCRRP
      a. Relay Module/Card
   4. MCRCA / MCRCA60
      a. Ribbon Cable Assemblies
   5. Program Sources
      a. Desktop Paging Microphone
      b. Local audio input at receptionist desk
   6. 25 Volt Power Amplifiers
      a. 125-Watt Amplifier
   7. Station Equipment
      a. Administrative Desktop Phone

2.3 COMPONENTS AND DESCRIPTIONS

A. The Quantum hybrid IP intercom must be capable of supporting the existing Multicom 2000 hardware and functions as well as the new features across the Quantum Processor's interfaced over the LAN. The VoIP capabilities of the QSPC1 Quantum Processor Card will enable the support of the features across the various processors' nodes. The sections below cover how the system will handle each of the existing and the new features in the QSPC1 product. Systems that do not allow the reuse of existing equipment or are not backwards compatible shall not be deemed acceptable. Systems that don't allow processors/nodes to be seamlessly integrated via the LAN are not considered equal.

B. Quantum Multicom IP

1. The Quantum facility shall have a minimum of one node/processor and a maximum of up to 75 networked nodes/processors. A maximum of up to 99 facilities can be networked into a Quantum IP district.
2. The station numbers, program buses, etc. shall be identified with a QSPC1#, Station card# and port# or QSPC1#, program#.
3. Audio Information will be transmitted between the processors on the LAN using VoIP technology. Quantum will utilize all of the existing Multicom 2000 hardware except the current processor card. Thus making Quantum Multicom IP backwards-compatible with existing Multicom 2000 systems.
4. The processor software shall be upgradeable via Quantum Commander. After rebooting the nodes the software upgrade will be complete. If for some reason the newly installed software will not boot properly, the system shall revert to the previous working software load.
5. It shall be possible for Quantum schools to make 'station-to-station' calls and 'inter-facility All-Call paging' to a single facility or all Quantum facilities in a district using VoIP technology. Systems that require software to be loaded onto an external server or computer to make 'station-to-station' calls and 'inter-facility All-Call paging shall not be considered equivalent.
6. The primary processor shall be configured to act as a VoIP Call Manager for facility point-to-point calls. Using Quantum Commander, every facility shall be configured with the IP addresses of the primary processor systems of all the other known facilities (maximum of 98 additional), and an organizationally private multicast IP address is to use the 239.0.0.0/8 scope. Additionally, multicast best practices recommend avoiding 239.0.0.x, 239.0.1.x, and 239.128.1.x address scopes which shall be used for facility and inter-facility paging.
7. The maximum number of simultaneous inter-facility intercom calls supported is based on the actual performance of the WAN and the CPU load. The voice quality of the inter-facility calls may vary based on the WAN conditions the maximum network intercom call uses 14.4 kbps (uni-cast) maximum for audio distribution (i.e. mp3 player, AM/FM tuner and or CD player) is 308 kbps (multi-cast).
8. The system shall facilitate the playing of audio clips repetitively played until stopped by the Quantum Commander User an administrative display phone MCDS4 or a dry contact closure.
9. A built-in Master Clock, with battery backup, shall be included to automatically control class change or other signals. The Master Program Clock shall have 1024 events that may be programmed into any of the 32 time signaling schedules, and up to 32 flexible holiday schedules. The schedules shall be nameable for easy selection when assigning

schedules to days or in the event of an override. Systems that rely on external master clock shall not be considered equivalent.

10. Network Time Synchronization. The system shall be capable of periodic update/synchronization of the processor's time with a Network Time Server running NTP via the school's LAN network. Systems that do not provide Network Time Synchronization will not be deemed equivalent.
11. Network Failure – in the event of a network failure the multi-node facilities with traditional intercom wiring will continue to work autonomously providing the facility with all scheduled events stored in each of the nodes local non-volatile memory and ability to connect an administrative phone to the local node for paging in the event of network failure. Systems that do not provide autonomous operation shall not be considered equal.
12. Multi-Node Survivability – the system shall provide Multi-Node Survivability in the event of a processor card failure. If either the primary processor or secondary processor fails the remaining processor will take over as primary. Systems that do not provide Multi-Node Survivability shall not be considered equivalent.
13. Station in a Multi-Node system shall support any or all station types specified in section 2.02 A. 8. Systems that don't support all types of station or require different head end equipment are not considered equivalent.

C. Quantum Commander
   1. The processor utilizes a web-based programming tool. The Quantum Commander is built into the QSPC1 processor card and upon boot up, users can login to the Quantum Commander Web Server via compatible web browser. Systems that require software to be loaded onto an external server/pc for web-based programming shall not considered equivalent. Systems that require com port redirector software or serial to Ethernet adapters are not deemed equal
   2. The Quantum Commander shall be divided into three access levels depending on user access credentials. Systems that do not provide at least three (3) Levels of access are not equivalent. The three levels are:
      a. User
      b. Administrator
      c. Technician
   3. Only the Administrator and Technician shall have access to add/delete/modify the database objects.
   4. Users shall have display only access to see the data objects that include configuration, alarms, and performance data and perform certain operations based on the user's CoS (Class of Service).
   5. The following Menu Items must be available on the Multicom IP Quantum Commander:
      a. File - Open Database, New System, Save, Delete, Report and Exit, Upload Database, Download Database, Download Software, Diagnostics, Tones and Announcements, Relay Configuration, Program Distribution, Media Assignment, List Passwords, Add Password, Change Password, and Call Detail Reporting.

D. Administrative Display Phone
   1. Administrative Display Phones shall be Bogen Model MCDS4. The administrative telephone display panel shows the time of day and day of week, the current time signaling schedule, and the station numbers and call-in priority of staff stations that have called that particular station. A 3-key response is used to scroll the display, and answer or erase normal, urgent, and security calls. Depending upon the system programming, an administrative station can use display menus to activate zone pages, alarm signals and

external functions, as well as select program sources and distribute or cancel a program to any or all speakers or zones.

2. Administrative Display Phones shall have the ability to dial and have the option of dialing either the loudspeaker or phone at each station location. The system shall automatically switch from phone-to-intercom communication to phone-to-phone communication when the enhanced staff phone on the receiving end of the call is lifted.
3. The Administrative Display Phone shall display the classroom number of any station that calls 911. This feature will notify the main office when a classroom has dialed 911 emergency centers so that administrators can direct emergency personnel to the correct physical location in the building when they arrive. Systems that do not provide this feature will not be deemed equal.
4. Administrative Display Phones shall have the ability to manually override the active schedule in the facility. Systems that do not have the ability to override the schedule via the administrative phone are not equal.

E. Intercom System Speakers
   1. Classroom/Office/Stairwell Speakers shall be Quam or equal by Bogen or Atlas:
      a. Ceiling Mounted Speakers: System 12 Drop-In Ceiling Speaker
      b. Wall Flush Speakers: 193-8 Backbox w/169-8 Grill and 8C5PAX/TBLUB Speaker
   2. Hallway Speakers shall be Quam or equal by Bogen:
      a. Ceiling Mounted Speakers: System 12 Drop-In Ceiling Speaker
   3. Outdoor / Gym / Locker Room Speakers shall be Atlas or equal by Bogen:
      a. APT15T mounted in 193-8-6 flush mount vandal-resistant enclosure/ with VP161A-APFheavy duty grille

2.4 SYSTEM PARAMETERS

A. The communication system shall be a Bogen Quantum Multicom IP, and shall provide a comprehensive communication network between administrative areas and staff locations throughout the facility. Non-volatile memory shall store permanent memory and field-programmable memory. A system, which uses a battery to maintain system configuration information, shall not be acceptable.

B. The system shall provide no less than the following features and functions:
   1. Telephonic communication (complete with DTMF signaling, dial tone, ringing and busy signals, and data display) on administrative stations shall use two wires. Systems that use more than two wires for communication, tones and data display shall not be acceptable.
   2. Amplified-voice communication with loudspeakers shall use a shielded audio pair (shield can be used as one of the two required conductors for administrative phone or call-in switch).
   3. The system shall be available in the following configurations:
      a. MC2K Wall-mounted in a custom enclosure Quantum. Station capacity shall be from 24 to 120 stations +10 SIP ports per Node. All stations shall have the ability to support displays, with an option to add up to 15 Central Office phone lines.
      b. MC2KR Rack-mounted Quantum. Station capacity shall be from 24 to 240 stations +10 SIP ports per Node. All telephone stations shall have the ability to support displays, with an option to add up to 8 Central Office phone lines.
      c. QRC24 & QRC48 Compact Quantum Rack System. Station capacity shall be from 24 to 48 stations +10 SIP ports per node. All stations shall have the ability to support displays, with an option to add up to 8 Central Office phone lines.

d. 2223/2233 MC2KR Rack-mounted and integrated with Bogen Multi-Graphic Series 2223 or Series 2233 equipment. In this configuration, Quantum Multicom IP system station capacity shall be expandable up to 240 stations in increments of 24 per node. All telephone stations shall have the ability to support displays. The Multi-Graphic system equipment provides the following: backup fail safe intercom and paging functions (Note: the systems operate independently; if one were to fail, the other provides intercom for student safety), plus two additional program channels, and additional Multi-Graphic functions. It shall be possible, by use of a separate call-in switch, to annunciate only to the Multi-Graphic portion of the system without using additional station ports within the Quantum Multicom IP system. For switch banks to work effectively the equipment must be centrally located for switch-bank operation.

e. The above system configurations represent a single processor in the Quantum Multicom IP. Each processor can be combined with up to 74 additional systems (nodes) for a total single facility capacity of up to 18,750 stations.

4. The system shall consist of any combination of the following: Administrative Display Phones, Administrative VoIP Phones, and Administrative Phones.

a. Staff Classroom Stations shall consist of wall- or ceiling-mounted loudspeakers

b. Administrative Display Phones shall be DTMF-dialing digital telephone sets with a 4x16 character LCD display panel. They shall be equipped with a standard 12-key push-button dialing keypad. Phones requiring external LCD displays shall not be accepted as an equal. Optionally, a loudspeaker may be connected at each administrative station location.

c. Administrative Display Phones, Administrative VoIP Phones, and Administrative Phones shall have the option of including a loudspeaker.

d. All types of stations except administrative VoIP phones shall utilize the same type of field wiring. Future station alterations shall only require the station type to be changed and the proper software designation to be selected. Alterations shall not require field wiring or system head-end alterations. All field wiring and system head-end equipment shall support any type of station, at the time of installation. All contractor proposals shall reflect this capacity. Failure to submit and bid this project in this manner will be deemed as being in direct conflict of these specifications and will be rejected.

e. There shall be no limit to the number of administrative display stations within the total capacity of the system including nodes. Systems that require different head-end equipment to make admin phone work shall not be acceptable.

f. It shall be possible at any time to change the type of station at any location without equipment or wiring changes except for administrative VoIP phones that utilize existing LAN connections. Systems that limit the quantity of each station type or require future additional equipment and/or system expansion to provide additional administrative telephones shall not be accepted as an equal.

5. The system shall be a global switching system, providing up to 600 unrestricted simultaneous private telephone paths per facility. The system shall also be capable of providing up to 600 amplified intercom paths per facility. One amplified intercom path shall automatically be provided with each increment of 24 stations of system capacity. All hardware, etc., required to achieve the necessary number of amplified-voice intercom channels for this system shall be included in this submittal. Amplified-voice intercom channels shall provide voice-activated switching. Systems requiring the use of a push-to-talk switch on administrative telephones shall not be acceptable. There shall be an automatic level control for return speech during amplified-voice communications. The

intercom amplifier shall also provide control over the switch sensitivity and delay times of the VOX circuitry.

6. The system shall provide 911 Dial-Through with specific outside line(s) dedicated only for this function to ensure that the line is available all the time for 911 calls. The 911 Dial-Through is available to any station that can dial.
    a. The 911 CO lines can be pre-configured and reserved. If the 911 reserved lines are busy, the normal CO lines will be connected to route the 911 calls. If all the normal CO lines are busy, then one of the ongoing call shall be disconnected and the 911 call shall be placed.
    b. When 911 is dialed from an Administrative VoIP Phone or Administrative Phone its Administrative Display Phone or Wall Display will receive a message that that room dialed 911.
7. It is of highest importance that emergency calls from staff stations receive prompt attention. Therefore, it is important that there be an alternate destination in case the emergency call does not get answered at the primary location. To this end:
    a. Staff-generated Emergency calls shall be treated as the second highest system priority. Therefore, all Emergency calls shall annunciate at the top of the call queue of their respective administrative display phone. Should that emergency call go unanswered for 15 seconds, the call shall be re-routed to an alternate speaker station then a tone prompts the caller to make a verbal call for help. During the transfer, the original administrative telephone shall continue to ring the distinctive Emergency Ring. Should the Emergency Transfer to Station have an associated administrative telephone, it too shall ring the distinctive Emergency ring.
    b. The Emergency Transfer to Station shall be field programmable.
    c. Should the original administrative display phone be engaged in a non-emergency conversation, its conversation shall be automatically terminated, indicated with an alert tone, and then reconnected to the station that generated the Emergency Call.
    d. Should the administrative display phone be engaged in an emergency conversation, successive emergency calls shall log into the call queue as well as transfer to the Emergency Transfer Station for their verbal call for help. Upon termination of the initial emergency conversation, the next one shall immediately ring the administrative telephone.
    e. Systems failing to transfer unanswered Emergency calls or failing to immediately connect to the administrative display phone shall not be deemed as equal.
8. There shall be a System-Wide Facility Emergency All-Call feature. The Emergency All-Call shall be accessed from designated administrative phones or by the activation of an external contact closure which shall give the third audio program input emergency status. The Emergency All-Call function shall have the highest system priority and shall override all other loudspeaker-related functions including Time Tones, Normal All-Call or Zone Pages or Audio Distribution.
    a. Considering that emergencies calls are to be treated with the highest level of concern. Systems which do not regard Emergency-All-Call page from an administrative station with the highest priority shall not be deemed as equal.
    b. Upon picking up the receiver and dialing "9", a menu shall appear on the display prompting the user to enter each subsequent digit. In this way, the user shall not be required to memorize complicated key sequences in order to access emergency functions.
    c. The Emergency All-Call shall capture complete system priority, and shall be transmitted over all speakers in the facility. It shall also activate an external relay, which can be used to automatically override volume controls and other sound systems.

d. Systems without Emergency All-Call, or systems with All-Call that cannot be activated by external means, or which do not capture complete system priority or activate an external relay, shall not be acceptable.

9. There shall be at least four Dedicated Emergency Alarm Tones. Each may be accessed by dialing a three-digit number from designated administrative display phone. These emergency tones should be separate from the time tones. Systems using external alarm generators, or having less than four emergency alarm tones shall not be acceptable.
    a. Upon picking up the receiver and dialing "9", a menu shall appear on the display prompting the user to enter each subsequent digit. In this way, the user shall not be required to memorize complicated key sequences in order to access Emergency Alarm Tones.
10. There shall be four (4) External-Function Relay Driver Outputs, accessible from designated Quantum Commander User or Administrative Display Telephones by dialing a four-digit number. These outputs remain set until accessed and reset at a later time. The user shall have the ability to review the status of each relay driver. A plain English menu, prompting the user through the fields without requiring the user to remember any dialing sequences shall support this feature. Systems that require the user to remember complicated dialing schemes or prompt the user via cryptic commands shall not be deemed equal.
    a. The stations shall be capable of being programmed for security contact relays for use with magnetic locks, motion detectors, cameras or any low-voltage, dry contact creating device. System using security stations for control of external functions shall not be acceptable.
    b. One relay shall connect to the fire alarm system for override (wiring provided by fire alarm contractor).
    c. One relay shall connect to the door monitor system for override (wiring provided by security/door monitor system contractor).
    d. Upon picking up the receiver and dialing "9", a menu shall appear on the display prompting the user to enter each subsequent digit. In this way, the user shall not be required to memorize complicated key sequences in order to access external relay functions.
11. There shall be a program-material interface included with each node, which shall accept up to four (4) program input modules. Systems requiring an external program source interface shall not be acceptable.
12. There shall be an outside line feature. The circuitry shall interface with the station ports of an external telephone system or CO lines, and shall provide facilities for up to 1,125 incoming lines per facility which shall be designated by the user to ring "day" and "night" administrative display stations or administrative stations. Where an administrative display station is designated to receive outside line calls, the phone shall ring with a unique tone and the outside line number shall appear on the display panel. The option shall also provide the ability to make outside line calls from Administrative Display Stations or Administrative Stations. This ability shall be programmable for each phone and there shall be thirty-two Classes of Service available to any station. This feature shall be capable of supporting DID, DISA, and a Security DISA function.
    a. Cellular system access for Security is of the utmost concern. Wireless security page offers a password-protected Security DISA feature that shall be accessible only from authorized Police, Fire, Emergency personal or an off-premise security office, which monitors the facility’s security system. It shall function as follows: upon confirmation of the password DISA number, the system shall allow security personnel to dial access any station and monitor the activity without pre-announce

tone or the privacy tone. This will then allow the security office to determine exactly what the conditions are in the station and the actions need to be taken.

13. The system shall provide for field-programmable three-, four-, five-, or six-digit architectural station numbers.
14. There shall be an automatic level control for return speech during amplified-voice communications.
15. Each station loudspeaker shall be assignable to any one, any combination, or all of 64 Multi-purpose zones or any of the 18,000 hard-wired zones per facility.
    a. Each station loudspeaker shall be assignable to any one, any combination, or all of 64 Multi-purpose zones. Systems with less than 64 Multi-purpose zones shall not be acceptable.
16. There shall be thirty-two (32) Flexible Time-Signaling Schedules with a total of 1024 user-programmed events per facility. Each event shall sound one of user-selected tones or external audio. It shall be possible to assign each schedule to a day of the week, or manually change schedules from an authorized Quantum Commander User via Web browser or MCDS4 phone. Systems, which do not provide a minimum of thirty-two (32) flexible time-signaling schedules or a choice of eight (8) time tones plus external audio, shall not be acceptable.
17. An internal program clock (with battery backup) shall be included, allowing a total of 1024 user-programmed events per facility. It shall be possible to synchronize the internal program clock with an external master clock. Systems, which do not provide an internal program clock and/or cannot synchronize with an external master clock to meet these specifications, are not equal.
    a. There shall be thirty-two (32) flexible time-signaling schedules. It shall be possible to assign each schedule to a day of the week, or manually change schedules from an authorized Quantum Commander User via Web browser on the LAN or WAN. Systems that require external equipment or server to perform these functions are not considered equivalent.
    b. The built-in Master Clock corrects time by accessing the networks Network Time Server.
    c. The Quantum Processor is capable of adjusting the Daylight Savings Time automatically.
    d. Each event shall be able to be directed to any one or more of the sixty-four (64) Multi-purpose time-signaling zones.
    e. Each of the 64 Multi-purpose zones shall have a programmable "tone duration" unique unto itself. For example: the gymnasium can receive a time tone for ten (10) seconds while the rest of the facility receives a tone for five (5) seconds.
    f. Each event shall sound one of eight (8) user-selected tones or external audio. Each event may utilize a different custom tone. It shall be utilized to send the gymnasium, shop classes, and pool (if necessary), a separate time tone to indicate "clean up." Minutes later the entire facility can then receive the same time tone to indicate class change.
    g. Each of the eight (8) Distinct Time Tone Signals may be manually activated by selected Administrative Display Phones or an authorized Quantum Commander User via web-browser. These tone signals shall remain active as long as the telephone remains off-hook, or until canceled from the keypad or Quantum Commander.
        1) Upon picking up the receiver and dialing "9", a menu shall appear on the display prompting the user to enter the next digit. In this way, the user shall not be required to memorize complicated key sequences in order to access manual time-tone functions.

2) Systems that do not provide at least thirty-two (32) flexible time signaling schedules or do not provide automatic activation of schedules shall not be acceptable.

18. There shall be a zone-page/all-page feature that is accessible by selected administrative VoIP phones and administrative phones.
    a. There shall be automatic muting of the loudspeaker in the area where a page is originating.
    b. There shall be a pre-announce tone signal at any loudspeaker selected for voice paging.
19. There shall be a voice-intercom feature that is accessible by selected administrative phones, administrative VoIP phones and all administrative display phones.
    a. There shall be a privacy tone every 16 seconds to signal at any loudspeaker selected for amplified-voice intercom is in progress.
    b. There shall be a pre-announce tone signal at any loudspeaker selected for voice-intercom communication.
    c. Privacy and pre-announce tone signals shall be capable of being disabled during system initialization.
    d. There shall be an automatic switchover to private telephone communication should the person at the loudspeaker pick up his analog phone handset.
    e. By picking up the receiver and dialing the first digit of the number of the station to be called, that number shall appear on the display along with a loudspeaker symbol, prompting the user to enter the next digits. There should be no confusion as to type of conversation, whether speaker/intercom or telephonic to be established.
20. There shall be a telephonic communication feature, which is accessible by all Administrative VoIP Phones, Administrative Phones, and Administrative Display Phones.
    a. There shall be an audible ring signal announcing that a call has been placed to that station.
    b. Upon picking up the receiver and dialing * (star), a telephone symbol shall appear on the display, prompting the user to enter the number of the station to be called. There should be no confusion as to type of conversation, whether speaker/intercom or telephonic to be established.
    c. There shall be an automatic disconnect of enhanced Staff Handsets left off-hook to prevent them from tying up communications channels. The station shall receive a busy signal and shall automatically disconnect after 45 seconds.
    d. There shall be an automatic disconnect of Administrative Display Phones and Administrative Phones to prevent them from tying up communications channels. When a phone goes off-hook and does not initiate a call within ten seconds, the station shall receive a busy signal and shall automatically disconnect after 45 more seconds.
    e. Staff and Administrative Phone Stations may be programmed to ring an Administrative Display Phone during day hours and another Administrative Display Phone during night hours. Day and Night Hours shall be user-programmable. Assignment of Staff Stations shall not be restricted to any particular Administrative Station. Systems that limit the number and assignment of staff call-in to particular Administrative Display Station of Administrative Stations shall not be acceptable.
21. Administrative Display Phones shall be equipped with a 4x16 character alphanumeric display panel.
    a. Administrative Display Phones shall receive dial tone upon going off-hook. Outgoing calls are made by dialing the desired stations. Incoming calls can be

directed to the telephone or to the associated loudspeaker for a hands-free reply. There shall be an automatic switchover from loudspeaker to private telephone communication should the person pick up his handset.

b. The display shall normally show the time of day and day of week, the current time signaling schedule, and the numbers of up to four stations calling in along with the call-in status of each station (normal, urgent, emergency). When dialing from the Administrative Display Phone, the display shall indicate the station number and type of station (loudspeaker or handset) being dialed.

c. The display shall also provide user-friendly menu selections to assist the operator when paging and distributing program material. Displays shall be in English with internationally recognized symbols for maximum ease of use. Systems, which require the operator to memorize long lists of operating symbols or control codes, shall not be acceptable.

d. Administrative Display Phones shall be programmable for one of 3 station types for system access, as follows:

1) Shall permit dialing any station in the system; turn program material on/off at their location; scroll, erase and auto-dial call-waiting queue; make conference calls and transfer calls; call forward to other administrative stations; make all-zone pages and emergency all-zone pages; have access to outside lines and be designated to receive outside line calls.

2) Select and distribute or cancel program material to any combination of stations, paging zones, or all zones; set/reset alarm/external functions and zone paging.

3) Bump or join a conversation in progress, manually initiate time tones.

e. Program selection, and its distribution or cancellation shall be accomplished from a designated administrative display telephone, with the assistance of the menu display system. Distribution and cancellation shall be to any one, or combination of speakers, or any zone(s), or all zones. It shall be possible to provide three program channels at the same time.

f. It shall be possible, via an Administrative Display telephone, to manually initiate any of eight (8) tones or any of the emergency tones. The tones shall be separate and distinctly different from the emergency tones. The tone selected shall continue to sound until it is canceled, or until the administrative display phone is placed back on-hook.

g. Each Administrative Display Phone shall maintain a unique queue of all stations calling that particular phone.

22. System programming shall be from an authorized Quantum Commander User via Web browser. All system programming data shall be stored in nonvolatile memory. A valid username and password shall be required to gain access to the following programmable functions:

a. Station Initialization shall be accomplished from an authorized Quantum Commander User via web browser. All station initialization data shall be stored in nonvolatile memory. A password (separate from the password necessary for system programming) shall be required to gain access to the following station initialization parameters:

1) Programming and diagnostics shall be built into the Quantum Commander Webserver browser and be accessible only by authorized personnel. Diagnostics shall indicate passes and failures of system memory, system clock, all audio busses, tone generators, DTMF generators and decoders and the integrity of the field wiring.

2) Systems not capable of supporting web-based diagnostics and any computer interface for programming and diagnostics or supportive of built-in diagnostics for the end user shall not be deemed as equal.
3) Systems that require a serial to Ethernet converter requiring additional software on pc for programming are not deemed as equal.

23. Rollover EOL (End-Of-Line Device)
    a. This feature shall be supported for all the Stations (Admin Display phone or analog phone) configured with a loudspeaker. Based on the dialed sequence, intercom or telephonic call will be connected to the corresponding telephone or speaker.
    b. If a handset station, configured with this feature, is busy when an Admin User calls the station, the call shall be rolled over to the associated speaker. If the speaker is also busy in this case, then the Admin can bump the conversation if enabled in CoS for the admin calling.
    c. Rollover End-of-Line features is only available for the following station types
       Admin Phone and Speaker
       Analog Phone and Speaker
       Handset and Speaker
    d. For calls initiated by a call switch, rollover to the admin speaker shall not happen.
24. Admin Group
    a. This is an Administrative Display Phone feature. This feature shall be programmed from the Commander software. A maximum of 10 Administrative Display Phones will be supported in an Admin Group and there shall be a maximum of 32 Admin Groups per facility.
    b. Once the Admin Group is set:
       1) For normal calls, if the primary Day/Night Admin Phone is busy/no answer, all the phones in the Admin Group shall ring.
       2) For emergency calls, if the primary day/night phone does not answer, all the phones in the Admin Group shall ring.
       3) On no answer from any of the admin phones and if the emergency announce link is configured, the call shall be transferred to the emergency announce link as per the existing procedures. Administrative VoIP Phones do not have the emergency announce link functionality.
       4) On answer from any of the Admin Group Phones, all the other phones shall stop ringing.
25. Call Details Reporting
    a. The details of every call in a facility can be provided in a report by using this feature. Specify the dates, from and to, of calls that you want to include in your log of call details. Then select Get log to view call details on your screen or select Print log to print the log to your printer or to save to file.
    b. Call Details Log Screen shows an example of a call log. Calls are listed in the order they were placed. Details for each call include source, target, call type, type (local or VoIP), time call started, time call ended, and call duration (in seconds).

2.5 SPEAKERS

A. Classroom speakers and grilles (ceiling-mounted, flush) shall be Quam System 12 Drop-In Ceiling Speakers –Bogen or Quam equivalent.

B. Wiring shall be done per manufacturer's recommendation, West Penn #25292 for classrooms and #25224 for hallways and horns. All terminal connections to be on barrier strips. All cables to be labeled by room.

C. Outdoor horns shall be recessed mounted in block wall horn type speaker, vandal and weather resistant – Quam or Atlas approved equal – surface type horn type speakers are not acceptable except where noted.

D. In all cases, the Contractor and/or its Supplier are responsible for the proper speaker type in all areas shown on the floor plans.

E. All exterior speakers will be on a separate home run to the central control point for complete flexibility in zoning these speakers as the owner requires.

F. The system shall be capable of providing program distribution to the outside speakers while maintaining all intercom PA intercommunication functions. Example - A music source may be distributed to exterior front entrance area and only be heard in this area. While that source is distributed, the office to room office to all call or any other zone type shall not be inhibited by the channel being used for the distributed audio zone.

2.6 VOLUME CONTROLS

A. Provide single gang 10Watt Priority Override Volume Controls with Stainless Plate 10 Volume Selection Knob on wall where shown on the drawings. Quam QC10P or Equivalent. Integrate this volume control with the ceiling speaker(s) in the room. Provide relay and power supplies as needed for priority override function. Priority override shall allow emergency pages to be heard over the speaker, even if the volume control is turned down to the lowest setting.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with the installer present, for compliance with requirements and other conditions affecting the performance of the Integrated Telecommunications System.

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

3.2 INSTALLATION

A. The installation, adjustment, testing and final connection of all conduit, wiring, boxes, cabinets, etc., shall conform to local electrical requirements and shall be sized and installed in accordance with manufacturer’s approved shop drawings.

B. Low-voltage wiring may be run exposed above ceiling areas where they are easily accessible.

C. Contractor shall install new rack console at location shown on plans.
   1. Solder each speaker line splice and tape each individual wire.
   2. Connect remote slave clocks to master clock in console.

D. All Administrative Phones shall be desk- or counter-mounted.
   1. Provide standard wall 120V AC receptacle 16" AFF

2. Verify exact location with Architect

E. Speaker and telephone lines run above ceiling and not in conduit shall be tie-wrapped to ceiling joist with a maximum spacing of 8' between supports. No wires shall be laid on top of ceiling tile.

F. Connect field cable to each speaker transformer using UL butt splices for 20 AWG wire.

G. Rack shall be labeled in numerical order with speaker/phone combinations first, speaker/outside horn combinations last. Labeling and order shall reflect final Architectural room numbers posted outside the rooms. Use three- (3), four- (4), five- (5), or six- (6) digit dialing extensions.

H. Contractor shall provide a minimum of eight (8) hours of operational and programming instruction to school personnel.

I. On the first school day following installation of Multicom System, the Contractor shall provide a technician to standby and assist in system operation via phone support.

J. Mark and label all telephone outlets and/or sets with the graphic room numbers. Label all demarks IDF and MDF points with destination point numbers. Rooms with more than one outlet shall be marked XXX-1, XXX-2, XXX-3, etc. where XXX is the room number.

K. No graphic room number shall exceed the sequence from 000001 through 899999.
1. All outside speakers shall be on a separate page zone and time zone.
2. All zones shall be laid out not to exceed 10 watts maximum per zone.
3. All hallway speakers shall be tapped at 1 watt maximum.
4. All outside horns shall be tapped at 3.75 watts maximum.
5. All classroom speakers shall be tapped at ½ watt maximum.
6. Large rooms, such as cafeterias, shall be tapped at 2 watts maximum.

3.3 GROUNDING

A. Provide equipment grounding connections for Integrated Telecommunications System as indicated. Tighten connections to comply with tightening torques specified in UL Standard 486A to assure permanent and effective grounds.

B. Ground equipment, conductor, and cable shields to eliminate shock hazard and to minimize the greatest extent possible, ground loops, common mode returns, noise pickup, cross talk, and other impairments.

C. The contractor shall provide all necessary transient protection on the AC power feed and on all station lines leaving or entering the building.

D. The contractor shall note in his drawing, the type and locations of these protection devices as well as all wiring information.

E. The contractor shall furnish and install a dedicated, isolated earth ground from the central equipment rack and bond to the incoming electrical service ground buss bar.

PART 4 - EXECUTION

4.1 DIVISION OF WORK

A. While all work included under this specification is the complete responsibility of the contractor, the following division of actual work listed shall occur.

1. The conduit, outlets, terminal cabinets, etc., which form part of the rough-in work shall be furnished and installed completely by the electrical contractor. The balance of the system, including installation of speakers and equipment, making all connections, etc., shall be performed by the manufacturer's authorized representative. The entire responsibility of the system, its operation, function, testing and complete maintenance for one (1) year after final acceptance of the project by the owner, shall also be the responsibility of the manufacturer's authorized representative.

4.2 EQUIPMENT MANUFACTURER'S REPRESENTATIVE

A. All work described herein to be done by the manufacturer's authorized representative shall be provided by a documented factory authorized representative of the basic line of equipment to be utilized.

B. The manufacturer's representative shall have completed at least ten (10) projects of equal scope, giving satisfactory performance and have been in the business of furnishing and installing sound systems of this type for at least five (5) years. The manufacturer's representative shall be capable of being bonded to assure the owner of performance and satisfactory service during the guarantee period.

C. The manufacturer's representative shall provide a letter with submittals from the manufacturer of all major equipment stating that the manufacturer's representative is an authorized distributor. This letter shall also state the manufacturer guarantees service performance for the life of the equipment, and that there will always be an authorized distributor assigned to service the area in which the system has been installed.

D. The contractor shall furnish a letter from the manufacturer of the equipment, which certifies that the equipment has been installed according to factory intended practices, that all the components used in the system are compatible and that all new portions of the systems are operating satisfactorily. Further, the contractor shall furnish a written unconditional guarantee, guaranteeing all parts and all labor for a period of five (5) years after final acceptance of the project by the owner.

4.3 INSTALLATION

A. Plug disconnect: All major equipment components shall be fully pluggable by means of multi-pin receptacles and matching plugs to provide for ease of maintenance and service.

B. Protection of cables: Cables within terminal cabinets, equipment racks, etc., shall be grouped and bundled (harnessed) as to type and laced with No. 12 cord waxed linen lacing twine or T & B "Ty-Rap" cable. Edge protection material shall be installed on edges of holes, lips of ducts or any other point where cables or harnesses cross metallic edge.

C. Cable identification: Cable conductors shall be color-coded and individual cables shall be individually identified. Each cable identification shall have a unique number located approximately 1-1/2" from cable connection at both ends of cable. Numbers shall be approximately 1/4" in height. These unique numbers shall appear on the As-Built Drawings.

D. Shielding: Cable shielding shall be capable of being connected to common ground at point of lowest audio level and shall be free from ground at any other point. Cable shields shall be terminated in same manner as conductors.

E. Provide complete "in service" instructions of system operation to school personnel. Assist in programming of telephone system.

4.4 DOCUMENTATION

A. Provide the following directly to the Supervisor of Technology Service.
   1. Provide a printed copy of all field programming for all components in system.
   2. Provide one copy of all diagnostic software with copy of field program for each unit.
   3. Provide one copy of all service manuals, parts list, and internal wiring diagrams of each component of system.
   4. Provide one copy of all field wiring runs, location and end designation of system.

END OF SECTION 27 5116

SECTION 27 53 13

WIRELESS CLOCK SYSTEM

PART 1.0 GENERAL

The system is specified as described.

1.1 GENERAL REQUIREMENTS & SCOPE

A. Furnish and install a complete new Time Synchronization System using the Primex Wireless XR Time Synchronization System.
B. Furnish and install all system equipment, devices, accessories, and material in accordance with these specifications and drawing to provide a complete and operating system.
C. All bids shall be based on the equipment as specified herein. The model designations are that of Primex Wireless, Inc. The specifying authority must approve any alternate system.

1.2 SECTION INCLUDES

A. Transmitter (Master)
B. Satellite Transmitter
C. GPS Receiver
D. System Devices
    - Analog Clocks

1.3 RELATED SECTIONS

A. Division 26 “Electrical” (120 volt grounded outlet required for transmitter)
B. Division 26 Section “Common Work Results for Electrical”

1.4 REFERENCES

A. National Fire Protection Association (NFPA): 1. NFPA 70 - National Electrical Code (NEC).
B. Manufacturer Installation and User Guides.

1.5 DEFINITIONS

This section provides commonly used terms within this specification.

A. **NTP:** Network Time Protocol, used for synchronizing the clocks on computer networks and devices from either a public server or a separate server on a private local area network.
B. **UTC:** Universal Coordinated Time

1.6 SYSTEM DESCRIPTION

This section describes the system as specified.

Wireless Clock System

A. System shall continually wirelessly synchronize clocks and/or timers, and shall be capable of clock readouts in multiple time zones where desired.
B. System shall operate on a 72MHz frequency. The 72MHz frequency transmitter efficiently sends time synchronization signals through commercial building materials to ensure all devices receive important time updates, even for Daylight Saving Time and after a power outage.
C. The system transmitters can be configured with a variety of power output levels to provide coverage for a single building or an entire campus.
D. The system supports an FCC license for operation of a 72MHz transmitter result in safe and interference free operation for users.

E. System shall provide wireless time from a master time source. This time source will either be the atomic clock on the GPS system or the clock from a defined NTP server that the XR transmitter can access via the customer Local Area Network (LAN). The master time will be synchronized to UTC.
F. Hard wiring for data communication will not be required to the clocks installed for the system.
G. Clocks shall automatically adjust for Daylight Saving Time in locations where DST is observed.
H. Each clock and/or timer and every other component in the system shall use both precise time and synchronized time.
I. Digital clocks shall be synchronized to within 10 milliseconds every 10 minutes and the system shall have an internal oscillator that maintains plus or minus four seconds per day between synchronization, so that clock accuracy shall not exceed plus or minus 0.2 seconds.
J. Analog Clocks shall be synchronized to within 10 milliseconds 6 times per day when operating clock strikes 2:01 AM, 6:01 AM, 10:01 AM, 2:01 PM, 6:01 PM, and 10:01 PM, and the system shall have an internal oscillator that maintains plus or minus one second per day between synchronization, so that clock accuracy shall not exceed plus or minus 0.2 seconds.
K. The system shall include an internal clock reference so that failure to detect the master time source shall not result in the clocks failing to indicate time. Additionally, XR transmitters will have an internal battery backup of up to eight hours in the event of a power failure so that settings and the correct master time will be instantly recalled upon restoration of power.
L. System shall incorporate a “fail-safe” design so that failure of any component shall not cause failure of the system. Upon restoration of power or repair of failed component, the system shall resume normal operation without the need to reset the system or any component thereof.
M. If transmitter stops transmitting valid time signals due to power failure, the clocks will continue to function as accurate quartz clocks until a valid time signal is decoded. If signal transmission is not restored after 48 hours, the second hand will “five step” as a visual indicator that the signal has been lost. Should the clocks lose power and signal, the clocks will not function.
N. Clock locations shall be as indicated and clocks shall be fully portable, capable of being relocated at any time.
O. U.S. only: System must operate in accordance with a “Radio Station Authorization”, Form FCC 601 – LM, granted by the Federal Communications Commission (FCC). This license will be issued to and held by the end user.
P. CANADA only: The system must operate in accordance with a “Technical Acceptance Certificate” issued under the authority of Industry Canada and the Ministry of Industry. This license will be granted to and held by the end user.

1.7 REGULATORY REQUIREMENTS

A. Equipment and components furnished shall be of manufacturer latest model.
B. System shall be installed in compliance with local and state authorities having jurisdiction.
C. U.S. only: The end user will hold a license, known as a “Radio Station Authorization” granted by the FCC. This license grants the end user protected use for wireless transmission at the designated frequency. This license will designate a unique “call sign” for each end user.
D. U.S. only: Transmitter and receiver shall comply with Part 90 of FCC rules as follows: This device may not cause harmful interference. This device must accept interference received, including interference that may cause undesired operation. Transmitter frequency shall be governed by FCC Part 90.35. Transmitter output power shall be governed by FCC Part 90 257 (b).
E. CANADA only: The end user will hold a license, known as a “Non Complex Fixed Station” Radio License granted by Industry Canada and the Ministry of Industry. This license grants the end user protected use for wireless transmission at the designated frequency.
F. CANADA only: IC-2365: Application for “License to Install and Operate a Radio Station in Canada” must be completed and signed by end user prior to license issuance. The end user will grant permission for Primex Wireless to apply for the license on their behalf. Primex Wireless will provide all documents and technical information to Industry Canada for approval. This license will designate a unique “call sign” for each end user.
G. CANADA only: Transmitter and receiver shall comply with RSS 119 of Issue 6 of Industry Canada specifications as follows: This device may not cause harmful interference, and this device must accept interference received, including interference that may cause undesired operation. Transmitter frequency shall be governed by IC: RSS119 Issue 6. Transmitter output power shall be governed by IC: RSS119 Issue 6.

1.8 SUBMITTALS

A. Product Data: Submit complete catalog data for each component, describing physical characteristics and method of installation. Submit brochure showing available colors, styles, sizes, and finishes of clocks.
B. Samples: Submit one specified system device model(s) for approval. Approved sample(s) shall be tagged and shall be installed in the work at location directed.
C. Manufacturer Instructions: Submit complete installation, set-up and maintenance instructions.
D. Floor plans indicating the location of system transmitter(s), approved by manufacturer, will be submitted to owner prior to installation.

E. U.S. only: Operating License: Submit evidence of application for FCC Radio Station Authorization prior to installing equipment. Furnish the license or a copy of the application for the license, to the Owner/End User prior to operating the equipment. The original license must be delivered to the Owner/End User.
F. CANADA only: Submit IC Technical Acceptance Certificate prior to installing equipment. Furnish the license or a copy of the application for the license, to the Owner/End User prior to operating the equipment. The original license must be delivered to the Owner/End User.

1.9 SUBSTITUTIONS

A. Proposed substitutions, to be considered, shall be manufactured of equivalent materials that meet or exceed specified requirements of this Section.
B. Proposed substitutions shall be identified not less than 10 days prior to bid date.
C. Other systems requiring wiring and/or conduit between master and clocks and/or timers will not be accepted.
D. Other systems using wireless technology in an unlicensed frequency range will not be accepted.
E. Other systems using wireless technology where the license is held by any party other than the end user will not be accepted.

1.10 QUALITY ASSURANCE

A. U.S. only: Permits: Operating license for the transmitter from the FCC.
B. CANADA only: IC-2365: Application for “License to Install and Operate a Radio Station in Canada” must be completed and signed by end user prior to license issuance.
C. Qualifications: Manufacturer: Company specializing in manufacturing commercial time system products with a minimum of 30 continuous years of documented experience including 10 or more years of experience producing GPS wireless time systems.
D. Installer: Company with documented experience in the installation of commercial time systems.
E. Prior to installation a site survey must be performed to determine proper transmitter placement.

1.11 DELIVERY STORAGE AND HANDLING

A. Deliver all components to the site in the manufacturer original packaging.
B. Packaging shall contain manufacturer name and address, product identification number, and other related information.
C. Store equipment in finished building, unopened containers until ready for installation.

1.12 PROJECT SITE CONDITIONS

This section describes the Project Site Conditions for equipment specified.

A. Clocks and/or Timers shall not be installed until painting and other finish work in each room is complete.
B. Programmable Count Down Timers: a computer having the specified minimum system requirements for the scheduling software installation will be available for use in programming the timer.
C. Transmitter - External Antenna: Coordinate installation of system antenna for access to the roof to comply with GPS Receiver: Coordinate installation of GPS receiver for access to the roof or exterior side wall per manufacturer installation instructions.

1.13 SYSTEM STARTUP

A. At completion of installation and prior to final acceptance, turn on the equipment; ensure that all equipment is operating properly, and that all system devices and components are functioning.

1.14 WARRANTY

A. Manufacturer will provide a one year warranty on GPS receiver, transmitter, and satellite transmitter. All other devices and components will have a 1 year warranty.
B. Manufacturer offers a two, three, or five-year extended transmitter warranty.
C. Manufacturer offers a five-year extended clock warranty.
D. Manufacturer offers an extended warranty on system devices.

PART 2.0 PRODUCTS

The system is specified as described in this section.

2.1 MANUFACTURER

System shall be manufactured by:

A. Primex Wireless, Inc., 965 Wells Street, Lake Geneva, WI 53147

Phone: (800) 537-0464 | Fax: (262) 248-0061 | Email: info@primexwireless.com

B. Or Equal by: American Time and Signal

2.2 SEQUENCE OF OPERATION

The system shall perform in the sequence of operation as described.

A. Configure and install system appliance detailed in manufacturer installation instructions.
B. Configure and install system devices per model specifications detailed in manufacturer installation instructions.

Transmitter Operation

A. When power is first applied to the transmitter, it checks for and displays the software version. It then checks the position of the switches and stores their position in memory. The transmitter looks for the master time source.

Master Time Source Operation

A. **NTP Time Source:** With the transmitter in NTP mode, it connects over the Ethernet to the IP address of the NTP server. This IP address is programmed into the transmitter as part of its configuration. Once the connection to the NTP server is acknowledged, it downloads time data and synchronizes its internal master clock to NTP time. The transmitter then starts to transmit its internal time once every second. The transmitter updates its internal clock in this mode once per hour.

Clock and/or Timer Operation

A. After initial setup, the clock and/or timer will shut off the receiver. Six times each day an Analog Clock microprocessor will activate the receiver and starting with the stored channel it will again look for a valid time signal. Every 10 minutes a Digital Clock/Timer will activate the receiver and starting with the stored channel it will again look for a valid time signal. If necessary, the clocks will resynchronize to the correct time.
B. If an Analog clock has not decoded a valid time signal for a pre-determined number of days, it will go to a step mode. Low battery voltage is a common cause of the clock to not properly decode a time signal. If a clock goes into step mode, replace the batteries first and then determine if the clock synchronizes to master time source before attempting other troubleshooting methods.
C. If a Digital Clock/Timer has not decoded a valid time signal for a pre-determined number of days, the display colon indicator will flash continuously until a valid time signal is received.

2.3 EQUIPMENT

The system shall include all equipment as specified.

Transmitter Equipment

SUPPLY MODELS

Per specifications, supply the following model(s):

Model	Antenna	Time Source
1 Watt Transmitter (16 channel)	External	NTP and GPS

Model	Antenna	Time Source

1 Watt Transmitter

A. The transmitter shall meet all of the below specifications.

Parameter	Specification
Transmission Frequency Ranges	72.020 to 72.980 MHz US: Each range is reserved by the FCC for licensed fixed mobile broadcasts.
Maximum Transmission	1 watt (30dBm) maximum at transmitter
Radio Technology	Narrowband FM
Channel Bandwidth	20 kHz maximum
Transition Mode	One-way communication
Data Rate	2 KBps
Operating Range	32°F - 122°F (0° - 50°C)
Transmitter output power	+26 to +30 dBm
Frequency Deviation	+/- 4 kHz
Power	120 VAC 60 Hz
Internal Power	5 VDC
Carrier Frequency Stability	+/- 20 ppm
Channels	49 selectable channels to assure interference-free reception 16 selectable channels
Housing/Enclosure	Transmitter housing shall be black metal case, 16"W x 1 7/8" H x 12" D (40.64cm W x 4.52cm Hx 30.48cm D)
Power Supply	Power supply (included): • Input: 120 volt AC 50/60 Hz, 0.6 amps • Output: 9 volt DC
Internal Antenna Model	Internal antennal: 46.0" L (116.8cm), Weight: 7lbs

Parameter	Specification

B. Internal Antenna Model only: Transmitter shall transmit time continuously to all clocks in the system.
C. Internal clock: Transmitter shall contain an internal clock such that failure to update time from source will not disable the operation of the clocks.
D. Transmitter shall include a surge suppressor/battery backup and a mounting shelf.
E. Transmitter shall have the following switches

- Time zone adjustment switches for all time zones in the world. Includes: Eastern, Central, Mountain, Pacific, Alaska, and Hawaii.
- Switch to allow the following configuration: Daylight Saving Time bypass option, 12-hour or 24-hour display, GPS or NTP time source, Local or LAN configuration, UTC+ or UTC-, 30 minute UTC offset option CANADA (for Newfoundland).

F. Transmitter housing shall incorporate a display, which shall include the following:

- Time readout
- AM and PM indicator if 12-hour time display is set
- Day and date readout
- Time zone indicator including Standard or Daylight Savings Time
- On screen menu to verify diagnostics, errors, time updates, and switch settings, toggled by sequence of push buttons next to display.
- Status LEDs: The LED signal indicator consists of three visual LEDs that indicate the status of the transmitter. The green LED indicates one of the three statuses, including (1) solid green: transmitter is transmitting, (2) not illuminated: transmitter has not received an initial time signal after power up and/or reset, and (3) flashing: transmitter is not broadcasting due to standby mode or there is a condition that is causing the transmitter not to broadcast properly. The yellow LED indicates one of the two statuses, including (1) not illuminated: no warning conditions, (2) flashing: transmitter has not received a time update for 48 hours or a 1PPS (one pulse per second) has not been detected within the last 48 hours. The red LED indicates one status, (1) solid red: defined error condition exists.

B. Internal clock: Transmitter shall contain an internal clock such that failure to update time from source will not disable the operation of the clocks.
C. Transmitter shall include a surge suppressor/battery backup and a mounting shelf.
D. Transmitter shall have the following switches:

- Time zone adjustment switches for all time zones in the world. Includes: Eastern, Central, Mountain, Pacific, Alaska, and Hawaii.
- DIP Switch to allow the following configuration: Daylight Saving Time bypass option, 12-hour or 24-hour display, GPS or NTP time source, Local or LAN configuration, UTC+ or UTC-, 30 minute UTC offset option.
- The DIP switches and channel switches are disabled during production by the manufacturer as the broadcast channel number and time zone are to be predetermined during the FCC licensing process based on end user location and existing wireless services operating in the area. The end user will be required to contact Primex Wireless if, for any reason, a different broadcast channel is required, since the request would require a modification of the license, requiring approval by the FCC, or if a different time source is desired.

E. Transmitter housing shall incorporate a display, which shall include the following:

- Time readout
- AM and PM indicator if 12-hour time display is set
- Day and date readout
- Time zone indicator including Standard or Daylight Savings Time
- On screen menu to verify diagnostics, errors, time updates, and switch settings, toggled by sequence of push buttons next to display.
- Status LEDs: Green to determine time broadcast, yellow which flashes in the event of lack of time update after 48 hours, red which flashes to indicate connection or internal transmitter problem. The green broadcast mode LED will be solid to indicate the transmitter is broadcasting its signal, and dark to indicate the transmitter is in standby mode and not broadcasting.

NTP or GPS Time Source

A. Transmitter will allow for either NTP time input or GPS satellite time input with use of a GPS Receiver unit.

Event Scheduler Pro Software (Programmable Count Down Timer)

A. Provide scheduling software for installation and programming by owner.
B. Software shall be compatible with the following PC operating systems: Windows NT with Service Pack 6a, Windows NT, Windows XP, Windows Vista, Windows 7. End user/owner will require valid administrator rights to install the software.
C. Software shall be provided from manufacturer in a form of a CD, suitable for operation in standard CD-ROM drives.

Analog Clocks

Analog Clocks shall meet the below specifications.

A. Analog clocks shall be wall mounted.
B. Face shall be white. Hour and minute hands shall be black.
C. Additional colors, finishes, and dial faces are available from manufacturer.
D. Clock faces can be customized by manufacturer to display organization name or logo as specified.
E. Clock frames and lenses are of durable thermoplastic.
F. Clocks shall have a tamper proof/theft resistant clock-lock mounting slots.
G. Analog clocks shall be capable of automatically adjusting for Daylight Saving Time. An on-off switch located on the transmitter shall disable this function if desired.
H. Clock shall have either a battery-power, 120 VAC or 24 VAC power supply built into the clock assembly.
I. If power is interrupted, the clock will stop until power resumes. Upon resumption of power, the clock will self correct to the current time.
J. Electric (AC) models will include a cord with pigtail.
K. Battery-operated analog clocks shall have up to a 5-year battery life. Battery life is based on common operating conditions and may very due to installed site conditions.
L. Installer will furnish clock batteries in accordance with manufacturer instructions.
M. Battery-operated analog clocks shall remember the time during changing of batteries.
N. Time shall be automatically updated from the transmitter 6 times per day.
O. If the transmitter stops transmitting valid time signals due to power failure, the clocks will continue to function as accurate quartz clocks until a valid time signal is decoded. If signal transmission is not restored after 96 hours, the second hand will “five -step” as a visual indicator that the signal has been lost. Should the clocks lose power and signal, the clocks will not function.
P. Analog clock receivers shall be as follows: Receiver sensitivity: >-110 dBm, Receiver power: Dual Alkaline batteries supplied by manufacturer or AC-powered: 24VAC or 120VAC, Antenna type: internal, Antenna gain: -7 dBd

SUPPLY MODELS

Per specifications, supply the following model(s):

Traditional Series Analog Clock Battery Models

Description
12.5" (31.75cm) Black

Wire Guard Accessory

Specifier Note: Where desired for protection of clocks, specify the following Wire Guard(s).

A. Provide Clock Wire Guard(s) to protect against accidental damage or vandalism with a clock wire guard accessory.
B. Cable Connection Sealant: Radio Shack Coaxial Cable Connector Sealant 278-1645, or approved electrical grade silicone sealant.
C. Supply the following models:

SUPPLY MODELS

Per specifications, supply the following model(s):

Description
14" x 14" Analog Wire Guard (for 12.5" clock)

2.4 ADDITIONAL EQUIPMENT

Division 27 "Public Address Systems" (see Primex Wireless XR Bell Scheduling System Specifications)

Battery Pack

A. Dual C-cell Alkaline Battery Pack.
B. Dual D-cell Alkaline Battery Pack.

C. PART 3.0 EXECUTION

3.1 EXAMINATION

A. Examine conditions with the Installer present for compliance with requirements and other conditions affecting the performance of the system and the system devices.
B. Do not proceed until unsatisfactory conditions have been corrected.
C. Verify that construction is complete in spaces to receive equipment and that rooms are clean and dry.
D. Verify that 120 volt electrical outlet is located within 6 feet (1.83m) of location of transmitter and the outlet is operational and properly grounded.
E. Code Blue and Elapsed Timer: Verify single gang electrical box for switch control is mounted and within 15 feet (4.5m) of elapsed timer. Verify pathway for connecting cable is available and compliant to local building codes.
F. AC-powered devices: Verify that electrical power outlet is near location of clock or timer and the outlet is operational and properly grounded.

3.2 INSTALLATION

A. General: Install system in accordance with applicable codes.
B. Install system equipment in accordance with manufacturer written instructions.
C. Provide all system equipment necessary for a complete and operable system.

GPS Unit

GPS Unit (INTERNAL Antenna Transmitter Model only):

1. Install GPS unit on roof in location indicated, in clear view of the sky.
2. Install unit in location free from standing water and above accumulations of leaves or debris.
3. Seal cable connection to GPS with cable connection sealant.
4. Any added cable lengths must be protected from outside elements.

Master Time Source

NTP will be used as master time source:

1. Connect CAT5/CAT5e/CAT6 EIA/TIA standard Ethernet cable from transmitter LAN port to available network drop.
2. Set GPS/LAN DIP switch to NTP.

Transmitter (INTERNAL Antenna only)

1. Locate transmitter where indicated, a minimum of 2 to 3 feet (.6 to 1 meter) above the floor, away from large metal objects such as filing cabinets, lockers or metal framed walls.
2. Transmitter(s) will be placed at locations indicated within specifications and drawings.
3. Connect antenna to transmitter, using care not to strip threads.
4. Connect power supply to the transmitter.
5. Set the channel number on the display to correspond to the FCC license.
6. Plug power supply into electrical outlet.

Analog Clocks

A. Furnish all equipment necessary for a complete and operational system.
B. Perform the following operations with each clock:
    1. Configure and set clock to correct time in accordance with manufacturer instructions.
    2. Observe clock until valid signals are received and clock adjusts itself to correct time.
    3. Install each clock per its model mounting specifications per manufacturer instructions and mounting Wire Guards

A. Secure to wall, using approved theft-resistant fasteners.

3.3 FIELD INSPECTION

A. Inspection: Make observations to verify that system devices and components are properly labeled.
B. Prior to final acceptance, inspect each system device and component, adjust as required, and replace parts which are found defective.

3.4 MANUFACTURER SERVICES

A. If needed, provide technical assistance as demonstrated in the manufacturer guides, on product start-up and system setup, to owners or installers representatives via phone, fax, or email.
B. Installation and user guides shall be provided.

3.5 CLEANING

A. Prior to final acceptance, clean exposed surfaces of devices, using cleaning methods recommended by manufacturer.
B. Remove temporary labels from clock faces. Do not remove labels from backs of clocks.

3.6 DEMONSTRATION

A. Provide training to Owner's representative on setting, adjusting and configuring device and routine maintenance.
B. Provide training to Owner's representative on installing the software, adjusting and programming the transmitter, setting and adjusting system devices and routine maintenance.

3.7 PROTECTION

A. Protect finished installation until final acceptance of the project. 3.8 TESTING

A. All devices must be tested at their operational location under normal operational conditions to assure reception of signal.

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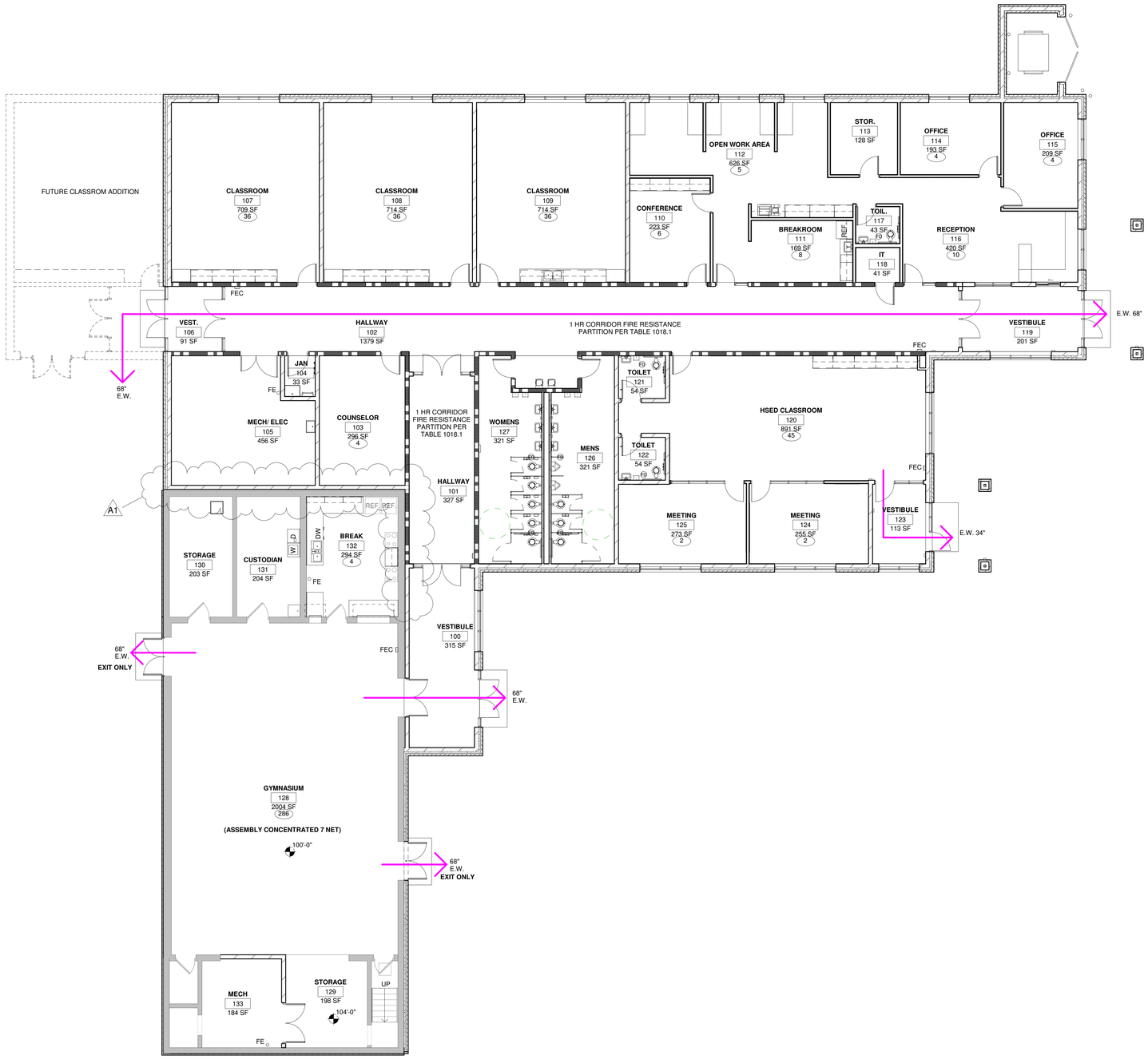

1 CODE PLAN

1/8" = 1'-0"

CODE DATA LEGEND:

1 HOUR RATED WALL
(20 MIN DOORS, 45 MIN FRAMES)

PATH OF TRAVEL

FEC — FIRE EXTINGUISHER CABINET- SURFACE MOUNTED

FE — FIRE EXTINGUISHER- BRACKET MOUNTED

CODE REVIEW:

EAU CLAIRE SCHOOL DISTRICT
McKINLEY CHARTER SCHOOL - CLASSROOM / OFFICE ADDITION

CODE REVIEW: WISCONSIN 2009 IBC

SCOPE: CONSTRUCT A CLASSROOM / OFFICE ADDITION ATTACHED TO AN EXISTING CONCRETE BLOCK GYMNASIUM BUILDING. REMOVE EXISTING CLASSROOM / OFFICE BUILDING AFTER ADDITION IS COMPLETED.

CHAPTER 5 - GENERAL BUILDING HEIGHTS AND AREAS
CLASSROOM / OFFICE ADDITION : 10,752 S.F.
EXISTING GYM / BREAK / CUST / STOR : 3,619 S.F.

TABLE 503 - ALLOWABLE BUILDING HEIGHTS AND AREAS
GROUP E / TYPE IIB - 2 STORIES & 14,500 S.F.

CHAPTER 6 - TYPES OF CONSTRUCTION
ADDITION : TYPE IIB

TABLE 601 - FIRE RESISTANCE RATING REQUIREMENTS
PRIMARY STRUCTURAL FRAME: 0 HR
BEARING WALLS : 0 HR
NON-BEARING WALLS / PARTITIONS EXTERIOR: 0 HR
NON-BEARING WALLS / PARTITIONS INTERIOR: 0 HR
FLOOR CONSTR. & SECONDARY MEMBERS: 0 HR
ROOF CONSTR. & SECONDARY MEMBERS: 0 HR

CHAPTER 9 - FIRE PROTECTION
NON-SPRINKLERED

CHAPTER 10 - MEANS OF EGRESS
TABLE 1004.1.1 MAXIMUM FLOOR AREA PER OCCUPANT
BUSINESS AREAS - 100 S.F. GROSS
EDUCATIONAL - 20 S.F. NET
(SEE PLAN FOR OCCUPANT LOAD)

1005.1 - MINIMUM REQUIRED EGRESS WIDTH:
.2 INCHES PER OCCUPANT FOR OTHER EGRESS COMPONENTS

1014.3 - COMMON PATH OF EGRESS TRAVEL:
75 FEET

TABLE 1016.1 - EXIT ACCESS TRAVEL DISTANCE:
200 FEET w/o SPRINKLER SYSTEM

TABLE 1018.1 CORRIDOR FIRE RESISTANCE RATING
1 HR RATING IN GROUP E OCCUPANCY WITHOUT SPRINKLER SYSTEM - CORRIDORS ONLY.
NOT REQUIRED AT VESTIBULES.

CHAPTER 11 - ACCESSIBILITY: ANSI A117.1

CHAPTER 29 - PLUMBING SYSTEMS

Table 2902.1 Minimum Number of Plumbing Fixtures
Occupant Load (Plan is noted with occupant loads by room).
a. A-3 (Gym) – 286
b. Educational – 202

A-3 (Gym) – 286 Total Occupants (143 Male/ 143 Female)

	M	F
WC	1 per 125	1 per 65
	2 Required	2 Required
	* accessible to public during events	
LAV	1 per 200	1 per 200
	1 Required	1 Required
	* accessible to public during events	

Educational – 202 Total Occupants (101 Male/101 Female)

	M	F
WC	1 per 50	1 per 50
	3 Required	3 Required
LAV	1 per 50	1 per 50
	3 Required	3 Required

INTERNATIONAL EXISTING BUILDING CODE:

LEVEL 2 ALTERATIONS INCLUDE THE RECONFIGURATION OF SPACE, THE ADDITION OR ELIMINATION OF ANY DOOR OR WINDOW, THE RECONFIGURATION OF OR EXTENSION OF ANY SYSTEM, OR THE INSTALLATION OF ANY ADDITIONAL EQUIPMENT.

LEVEL 2 ALTERATION FOR A TOTAL OF 3,619 S.F. OF AFFECTED SPACE.

ARCHITECTURE
ENGINEERING
INTERIOR DESIGN

HSR ASSOCIATES INC.
100 MILWAUKEE STREET
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Consultant:

Project Title: MCKINLEY CHARTER SCHOOL
EAU CLAIRE AREA SCHOOL DISTRICT

Project Location: 1266 MCKINLEY RD
EAU CLAIRE, WI 54703

Sheet Title: CODE PLAN

HSR Project Number: 17057

Project Date: 3-8-18

Drawn By: HSR

Key Plan:

BID DOCUMENTS

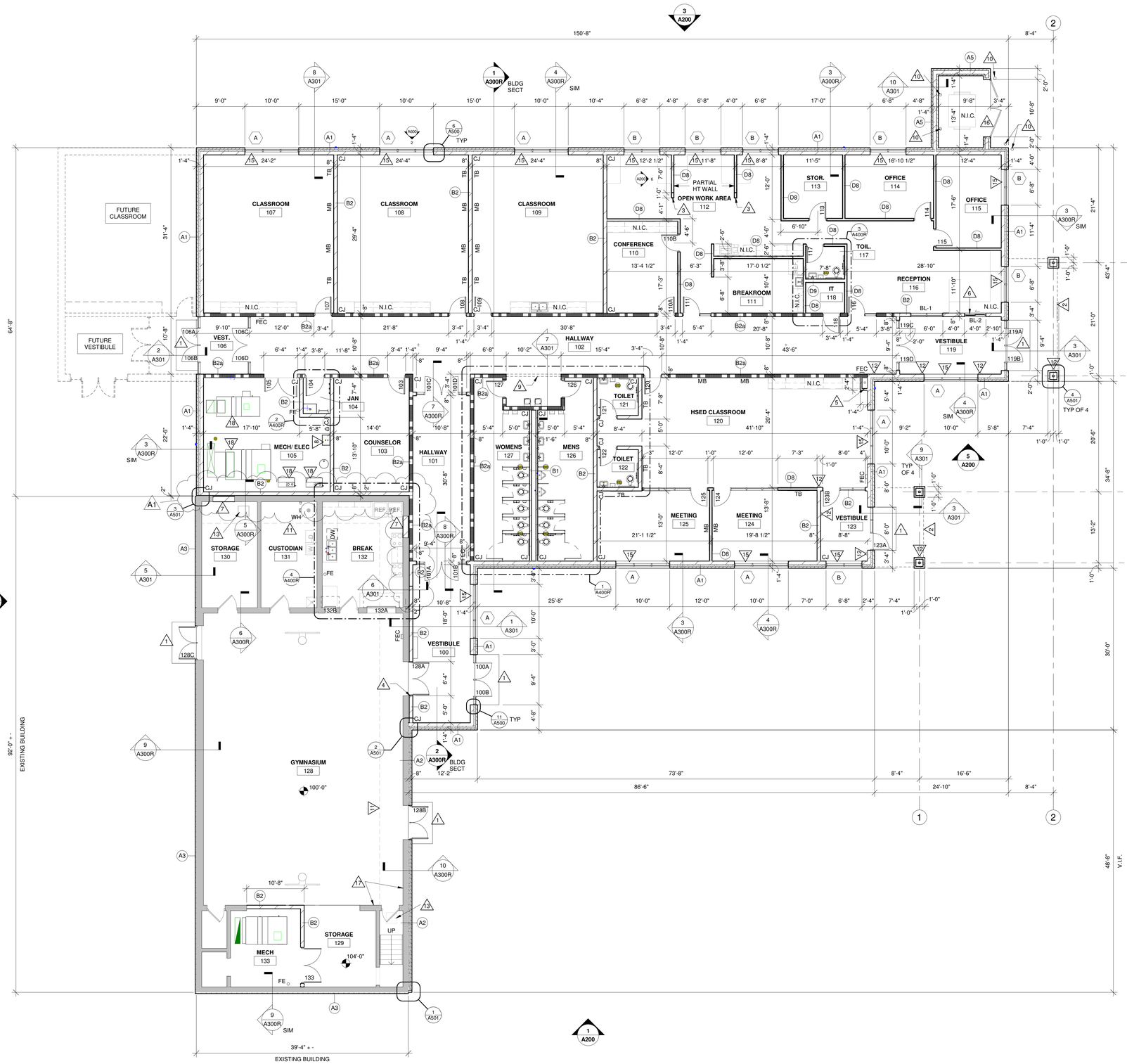
Revisions:

No.	Description	Date
A1	ADDENDUM 1	3-14-18

Graphic Scale: VARIES

Last Update: 3/13/2018 10:31:55 AM

A010R



1 FLOOR PLAN

1/8" = 1'-0"

GENERAL NOTES:

A	SEE ID SHEETS FOR FLOOR AND WALL FINISH LAYOUTS.
B	LOOSE FURNISHINGS EXCEPT AS NOTED SHALL BE PROVIDED AND INSTALLED BY THE OWNER.
C	VERIFY EXACT SIZE AND LOCATION OF ALL MECHANICAL / PLUMB AND ELEC. OPENINGS - GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR FINISH AT ALL VISIBLE AREAS. ALL OPENINGS SHALL BE SEALED AFTER UTILITY INSTALLATION.
D	PAINT ALL EXPOSED STEEL LINTELS.
E	INSTALL BULLNOSE CMU AT ALL OUTSIDE CORNERS W/O TILE AND AT DOOR JAMBS AS DETAILED. NO BULLNOSE AT WINDOW JAMBS.
F	SEE STRUCTURAL FOR SLAB CONTROL JOINTS AND CMU CONTROL JOINTS IN LOAD BEARING CMU WALLS.
G	SEE THIS PLAN FOR CONTROL JOINTS IN NON-LOAD BEARING CMU WALLS. SEE A501 FOR CONTROL JOINT DETAILS. CJ = CONTROL JOINTS
H	REFER TO CODE PLANS FOR FIRE RATING LOCATIONS AND ACCESSIBILITY ROUTES.
J	EXTEND ALL WALLS TO DECK UNLESS NOTED OTHERWISE. SEE 5A400 FOR TOP OF WALL DETAIL.
K	UNLESS NOTED OTHERWISE RESTROOM FLOORS SHALL BE SLOPED A MIN. 1/16" : 12" TO FLOOR DRAINS - TO "CENTER", IF NO FLOOR DRAINS.
L	SEE A500 FOR TYPICAL HEAD FLASHING ISOMETRIC DETAIL.
M	GEN. CONTRACTOR TO PROVIDE CONC. EQUIP. PADS / CURBS AS REQUIRED FOR MECH / ELECTRICAL EQUIP. - VERIFY SIZE / PROFILE / LOCATION WITH MECH / ELECTRICAL.
N	ALL CASEWORK- BY OWNER. GC TO PROVIDE BLOCKING IN STUD WALLS AS REQUIRED.

LEGEND:

- (A) SYMBOL INDICATES WALL TYPE - SEE SHEET A400 FOR WALL TYPE DETAILS.
- A SYMBOL INDICATES WINDOW TYPE. SEE SHEET A600 FOR WINDOW FRAME ELEVATIONS.
- SYMBOL INDICATES CONSTRUCTION NOTE THIS SHEET
- 1 HOUR WALL
- 2 HOUR WALL
- FEC FIRE EXTINGUISHER CABINET- SURFACE MOUNTED
- FE FIRE EXTINGUISHER- BRACKET MOUNTED
- TB 4' X 4' TACKBOARD MOUNTED @ 84" A.F.F. TO TOP CONTRACTOR FURNISHED / INSTALLED
- MB 4' X 8' WHITEBOARD MOUNTED @ 84" A.F.F. TO TOP CONTRACTOR FURNISHED / INSTALLED

KEY NOTES PLAN

1	CONCRETE STOOP- SEE STRUCTURAL.
2	LINE OF CANOPY ABOVE.
3	PROVIDE A 1'- 0" LONG FULL HEIGHT WALL @ END OF PARTIAL HEIGHT WALL FOR POWER / DATA & TO BRACE WALL - SEE 6A200 & 6A501
4	ALIGN NEW OPENING WITH EXISTING DOOR LOCATION.
5	RAINWATER LEADER- SEE PLUMBING. ENCLOSE w/ WALL TYPE 'B1'.
6	SLIDING WINDOW.
7	INFILL EXISTING WINDOWS WITH CMU.
8	UTILITY SINK- SEE PLUMBING.
9	LINE OF BULKHEAD ABOVE - SEE 2A110
10	CONCRETE FILLED PIPE BOLLARD - SEE 5A501
11	EXISTING PIPE TUNNEL BELOW
12	POWER DOOR ACTUATOR PUSH BUTTON
13	EXISTING PIPE TUNNEL ACCESS DOOR
14	NOT USED
15	COMPOSITE WINDOW STOOL - ADHESIVE APPLIED - SEAL PERIMETER
16	STEEL TRASH ENCLOSURE GATES - SEE DETAIL 15A501
17	INFILL EXISTING CMU WALL AT FORMER HVAC OPENINGS (SEE MECH) PAINT TO MATCH ADJACENT WALL SURFACE
18	4" HIGH CONCRETE HOUSEKEEPING PADS AT HVAC EQUIPMENT - COORDINATE SIZE AND LOCATION WITH MECH

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Consultant:

Project Title: **MCKINLEY CHARTER SCHOOL**
EAU CLAIRE AREA SCHOOL DISTRICT

Project Location: 1266 MCKINLEY RD
EAU CLAIRE, WI 54703

Sheet Title: **FIRST FLOOR**

HSR Project Number: **17057**

Project Date: **3-8-18**

Drawn By: **HSR**

Key Plan:

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Graphic Scale: **VARIES**

Last Update: **3/13/2018 10:31:56 AM**

A100R

EXPANSION TANK SYSTEMS (232117)

MARK	SYSTEM	APPROX. SYS. VOL. GAL.	SYSTEM TEMP.		PSIG		MAX. PRESS.		MIN. VOL.		AIR SEPARATOR				PIPE SIZE			REMARKS
			MIN.	MAX.	INITAL TANK	SYS. FILL	RELIEF VALVE	TANK	TANK GAL.	ACCEPT GAL.	SIZE	GPM	Cv	BUILT-IN STRAINER	TO TANK	GLYCOL FILL		
ETS-1	Heating	300	60	140	15.5	12	30	33.5	29.6	12	3"	90		YES	1"	3/4"		1

Based on products by BELL & GOSSETT and CALEFFI #N/A

Equal tanks by WESSELS, ARMSTRONG, TACO or AMTROL are acceptable. 3/2/2018 7:43

Equal air separators by TACO, ARMSTRONG, WESSELS or SPIROVENT are acceptable.

REMARKS:

1. Bladder Type Expansion Tank B&G model # B-130LA. Tank to include: charging valve and drain. ASME with replaceable bladder. Caleffi 549 HydroCAL combination hydraulic, air and dirt separator. Automatic air release valve, drain valve and insulation.

GLYCOL SYSTEM FEEDERS (232123)

MARK	MODEL No.	SYSTEM	CIRC FLUID	GPM @ FREE FLOW	GPM @ 50 PSI	MAX TEMP	TANK SIZE	ELECTRICAL WATTS	ELECTRICAL VOLT/PH	OPTIONS/ ACCESSORIES	REMARKS
GFS-1	MF300	Heating Water	30% P.G.	0.7			17 Gallon	50	115/1	1 thru 6	A, B

Based on products by AXIOM. #N/A

Equal products by Wessels, J.L. Wingert and Neptune are acceptable. 2/28/2018 12:56

OPTIONS/ACCESSORIES:

1. Pump suction hose with strainer.
2. Pressure pump with thermal cut-out.
3. Integral pressure switch and check valve.
4. Adjustabe pressure regulating valve.
5. Pre-charged accumulator tank with EPDM diaphragm
6. Pressure gauge and pressure switch with dry contact.

REMARKS:

A. High impact polystyrene mixing and storage tank and lid.
B. 3-prong plug and cord.

HVAC PUMPS (232123)

MARK	MODEL No.	SYSTEM	TYPE	CIRCULATING FLUID FLUID	GPM	FT HD	cP	MAX. HD. **	NPSH	% EFF	IMP. DIA.	MOTOR BHP	HP	RPM	VOLT/PH	ACCESS.	REMARKS
HWP-1 & 2	B&G E-90 2AB	Heating Water	Inline	30% PG	90	45	---	49	8.22	71.2	6 3/4		3	1725	208/3	1, 2 3, 4	A, B, C
BP-1 & 2	B&G PL-130	Boiler Circ	Perm. Lub. Circ	30% PG	31	15	---	---	---	---	---	---	1/6	3200	115/1		A

Based on products by BELL & GOSSETT. ** Maximum head in feet @ shutoff. #N/A

Equal products by GRUNDFOS, ARMSTRONG and TACO are acceptable. 3/15/2018 16:11

ACCESSORIES:

1. Differential pressure gauge.
2. Balance for Variable Frequency Drive.
3. Pump discharge check valve and balancing valves.
4. Venturi with measurement ports.

REMARKS:

A. Motor selected as non-overloading.
B. Standby (alternating) operation.
C. VFD control pressure, ___ PSI.

FANS - CABINET/CEILING EXHAUST (233416)

MARK	MANUFACTURER'S MODEL NO.	SERVING/ LOCATION	CFM	TOT. S.P.	TYPE	SONES	CONTROL/ INTERLOCK	FAN RPM	FAN DRIVE	ELECT. WATTS	ELECT. VOLT/PH	ACCESSORIES/ OPTIONS	REMARKS
CE-1	SP-B110	Toilet 117	95	0.25	Ceiling	2	AHU-1	950	Direct	80.2	115/1	1,2,4	
CE-2	SP-B110	Toilet 121	95	0.25	Ceiling	2	AHU-2	950	Direct	80.2	115/1	1,2,4	
CE-3	SP-B110	Toilet 122	95	0.25	Ceiling	2	AHU-2	950	Direct	80.2	115/1	1,2,4	
CE-4	SP-B150	IT 118	150	0.25	Ceiling	3	Reverse T-stat	1050	Direct	128	115/1	1,2,4	
CE-5	SP-B110	Jan 104	95	0.25	Ceiling	2	AHU-2	950	Direct	80.2	115/1	1,2,5	

Based on products by GREENHECK #N/A

Equal products by Penn and Cook are acceptable. 3/2/18 7:43

ACCESSORIES/OPTIONS:

1. Integral Plug-In Disconnect & Backdraft Damper.
2. Rubber Isolators.
3. Control Switch
4. Wall Cap.
5. Roof Jack.

REMARKS:

A.

FANS - POWER ROOF VENTILATORS (233423)

MARK	MANUFACTURER'S MODEL NO.	SERVING/ LOCATION	CFM	TOT. S.P.	TYPE	OPENING SIZE	FAN RPM	FAN DIA.	FAN DRIVE	ELECT. H.P.	ELECT. VOLT/PH	ACCESSORIES/ OPTIONS	REMARKS
PRV-1	G-103-VG	Tlt 126 & 127	750	0.375	Cent. Roof	14.5" Sq	Variable	10"	Direct	VG-1/4	115/1	1,2,3,4	A
PRV-2	G-123-VG	130, 131, 132	1050	0.375	Cent. Roof	14.5" Sq	Variable	12"	Direct	VG-1/4	115/1	1,2,3,4	B
PRV-3	G-103-VG	Mech/Elect 105	850	0.25	Cent. Roof	14.5" Sq	Variable	10"	Direct	VG-1/4	115/1	1,2,3,4	C

Based on products by GREENHECK. #N/A

Equal products by Penn and Cook are acceptable. 3/6/18 7:39

ACCESSORIES/OPTIONS:

1. Pitched roof curb.
2. Disconnect switch.
3. Vari-Green speed control for balancing.
4. Gravity backdraft damper.

REMARKS:

A. Fan speed 1189 RPM, Interlock with AHU-2. Aproximately 55 lbs.
B. Fan speed 1108 RPM, Interlock with existing AHU-3. Approximately 60 lbs.
C. Fan speed 1190 RPM Interlock with reverse acting thermostat and MOD in IL-2. Aproximately 55 lbs.

VAV AIR TERMINAL UNITS (233600)

MARK VAV-	AREA SERVED	PLAN CFM ***	DUCT RUNOUT SIZE	TERMINAL UNIT INLET SIZE	INLET S.P.	COOLING CFM * MAX	COOLING CFM * MIN	MAX. PD** **	COIL DATA (based on PLAN CFM) MBH	ROWS	30% PG / WATER GPM	30% PG / WATER PD'	30% PG / WATER E.W.T.	E.A.T.	L.A.T. REQ.	PIPING RUNOUT SIZE	PIPING CONTROL VALVE	ACCESS./ REMARKS
1-1	Office 115	170	7	5	0.25	185	70	0.05	9.1	2-10	3	1.04	160	60	110	3/4"	2-Way	1, A
1-2	Reception 116	400	8	8	0.31	440	160	0.11	10.7	1-12	1	0.89	160	60	85	1/2"	2-Way	1, A
1-3	Office 114	185	6	5	0.26	205	75	0.06	10.3	2-10	3	1.04	160	60	112	3/4"	3-Way	1, A
1-4	Open Area 112	850	10	10	0.45	935	340	0.25	22.6	2-10	2	0.52	160	60	85	3/4"	2-Way	1, A
1-5	Break Room 111	265	8	6	0.24	290	105	0.04	6.5	1-10	1	0.64	160	60	83	1/2"	2-Way	1, A
1-6	Conference 110	255	8	6	0.24	280	100	0.04	6.4	1-10	1	0.64	160	60	83	1/2"	2-Way	1, A
1-7	Vestibule 119	450	10	8	0.55	495	180	0.35	24.0	3-10	3	1.52	160	60	109	3/4"	2-Way	1, A
2-1	Classroom 109	800	12	10	0.43	880	320	0.23	23.2	2-10	2	0.52	160	60	87	3/4"	2-Way	1, B
2-2	Classroom 108	800	12	10	0.43	880	320	0.23	23.2	2-10	2	0.52	160	60	87	3/4"	2-Way	1, B
2-3	Classroom 107	800	12	10	0.57	880	320	0.37	27.0	2-12	2	0.64	160	60	91	3/4"	2-Way	1, B
2-4	Future Classroom	850	12	10	0.61	935	340	0.41	29.0	2-12	2.3	0.85	160	60	92	3/4"	2-Way	1, B,C
2-5	Vestible 123	300	8	6	0.42	330	120	0.22	16.6	2-12	3.1	1.54	160	60	111	3/4"	3-Way	1, B,D
2-6	Meeting 124	400	9	8	0.33	440	160	0.13	11.9	2-10	1	0.33	160	60	88	1/2"	2-Way	1, B
2-7	Meeting 125	400	9	8	0.33	440	160	0.13	12.2	2-10	1	0.33	160	60	88	1/2"	2-Way	1, B
2-8	HSED Class 120	900	12	12	0.36	990	360	0.16	25.6	2-10	2	0.58	160	60	86	3/4"	2-Way	1, B
2-9	Mens & Womens	140	6	4	0.27	155	55	0.07	8.8	2-12	1	0.17	160	60	118	1/2"	2-Way	1, B,D
2-10	Hallway 101 & 102	465	10	9	0.35	510	185	0.15	21.6	2-12	2	0.64	160	60	103	3/4"	2-Way	1, B
2-11	Counselor 103	120	6	4	0.23	130	50	0.03	6.6	2-10	1	0.23	160	60	111	1/2"	2-Way	1, B
2-12	Break Room 132	275	8	6	0.25	305	110	0.05	6.8	1-10	1	0.64	160	60	83	1/2"	2-Way	1, B
AHU-1 System Totals =		2575			0.55	2830	1030		302.1		34.4	1.54						#N/A
AHU-2 System Totals =		6250			0.61	6875	2500					MAX.		17.6 deg. Aver. delta T.				3/15/18 16:03

Based on TITUS Model DESV

ACCESSORIES:

1. Access panel in bottom or side of box.

REMARKS:

A. Served by AHU-1
B. Served by AHU-2
C. Future
D. Axillary Heat in zone.

* 110% Max. and 40% Min.of plan CFM = cooling CFM.
** Press. Diff. Between inlet and discharge including coil.
*** Use PLAN CFM for heating CFM.

ROOF HOODS (233723)

MARK	MANUFACTURER'S MODEL NO.	SERVING	THROAT WID.	THROAT LEN.	HOOD WID.	HOOD LEN.	HOOD SF	APPL.	CFM	VELOCITY (FPM) HOOD	VELOCITY (FPM) THROAT	MAX P.D. "	CONSTR.	ACCESSORIES/ OPTIONS	REMARKS
RH-1	Fabra Hood - Gavity	AHU-1	22	26	32	36	4.03	RELIEF	2575	639	648	0.06	Aluminum	2, 3, 4, 5	A, B
RH-2	Fabra Hood - Gavity	AHU-2	30	44	44	60	9.17	RELIEF	6250	682	682	0.06	Aluminum	2, 3, 4, 5	A, C

Based on products by GREENHECK. #N/A

Equal products by Penn and Cesco are acceptable. 3/6/18 7:39

ACCESSORIES/OPTIONS:

1. Insect Screen.
2. Bird Screen and 0.5" internal insulation.
3. 12" Roof Curb.
4. Motorized damper in throat.
5. 5" base.

REMARKS:

A. Ducted.
B. Approximately 105 lbs.
C. Approximately 155 lbs.

WALL LOUVERS (233101)

MARK	MANUFACTURER'S MODEL NO.	SERVING	DIMENSIONS IN INCHES WIDTH	DIMENSIONS IN INCHES HGT.	DIMENSIONS IN INCHES DEPTH	F. A. SQ FT	APPL.	CFM	MAX P.D. "	CONSTR.	ACCESSORIES/ OPTIONS	REMARKS
IL-1	ESD-635	AHU-1 & PRV-3	36	48	6	6.91	Intake	3425	0.04	Aluminum	1, 3, 4, 5	A, B
IL-2	ESD-635	AHU-2	66	48	6	12.84	Intake	6250	0.04	Aluminum	1, 3, 4, 5	A
IL-3	ESD-435	AHU-3	38	40	4	5.60	Intake	5000	0.04	Aluminum	1, 3, 4, 5	A
RL-3	ESD-635	AHU-3	72	36	6	10.14	Relief	5000	0.03	Aluminum	1, 3, 4, 5	A

Based on products by GREENHECK. #N/A

Equal products by American Warning and Ventilating, Arrow and Cesco are acceptable. 3/2/18 7:43

ACCESSORIES/OPTIONS:

1. Bird Screen
2. Flange Frame
3. Channel Frame
4. Baked enamel finish
5. Weather proof with downspouts and gutters.

REMARKS:

A. Color selected by owner.
B. 30x48 serves AHU-1, 6x48 serves PRV-3.

KITCHEN RANGE HOODS - RESIDENTIAL (233813)

MARK	MANUFACTURER'S MODEL NO.	CFM	SONES	TYPE	LOCATION	DIST. ABOVE SURFACE	DIMENSIONS LEN.	DIMENSIONS HGT.	DIMENSIONS DEPTH	DIMENSIONS EXHAUST	ACCESSORIES/ OPTIONS	REMARKS
KRH-1	Broan EVOLUTION QP130SS	110 / 300	0.8 / 5	Under Cab.	Break Room 132		30"	6-3/4"	20-1/8"	7" Dia.	1 thru 5	A
KRH-2	Broan EVOLUTION QP130SS	110 / 300	0.8 / 5	Under Cab.	Break Room 132		30"	6-3/4"	20-1/8"	7" Dia.	1 thru 5	A

Based on products by BROAN. #N/A

2/28/18 12:56

ACCESSORIES/OPTIONS:

1. Stainless Steel Construction.
2. Four 35W Halogen lamps, two-level control.
3. Aluminum mirco-mesh filters filters.
4. Two speed fan.
5. Ducted / non-ducted convertible..

REMARKS:

A. Single fan, 120V/1 2.3 amps.

BOILERS - HIGH EFFICIENCY (235233)

MARK	MANUFACTURER MODEL NO.	TOTAL MBH INPUT	TOTAL MBH OUTPUT	MINIMUM GPM *	MINIMUM RET. TEMP.	% EFF	PIPE CONN. SIZE SUP.	PIPE CONN. SIZE RET.	VENT SIZE Intake	VENT SIZE Exhaust	GAS PRESSURE Min.	GAS PRESSURE Max.	TYPE	ACCESS./ OPTIONS	REMARKS
BLR-1	CM-500	500.0	460.0	31		92	1-1/2"	1-1/2"	5"	4"	6"	14"	Aluminum	1,2,3	A,B,C
BLR-2	CM-500	500.0	460.0	31		92	1-1/2"	1-1/2"	5"	4"	6"	14"	Aluminum	1,2,3	A,B,C

Based on products by PK MACH. * at 30 delta T. #N/A

Equal products by other manufacturers are acceptable. 2/28/18 12:56

ACCESSORIES/OPTIONS:

1. ASME Boiler Certification..
2. Flow Switch
3. Temperature/Pressure gauge.

REMARKS:

A. Burner gas train and control wiring shall be the responsibility of the Mechanical Cont'r.
B. 120/1, 15 amp electrical power required.
C. Operating weight 313 Lbs, 1.58 gallon water content.

AIR COOLED CONDENSING UNITS (236213)

MARK	MODEL No.	SERVING SYSTEM	TOTAL MBH *	MAX. SST	O.A.T. TEMP.	STEPS/ SPEEDS	NO. COMP	REFRIG TYPE	MIN. EER	ELECT. KW	ELECT. MCA	ELECT. VOLT/PH	ACCESSORIES/ OPTIONS	REMARKS
ACU-1	TTA-073	AHU-1	77	45	95	2	2	R-410a	12.5		24	208/3	1 thru 8	A, B, C, F
ACU-2	TTA-240	AHU-2	256	45	95	2	2	R-410a	12.1		98	208/3	1 thru 8	A, B, D, F
ACU-3	TTA-240	AHU-3	256	42	95	2	2	R-410a	12.1		98	208/3	1 thru 8	A, B, E, G

Based on products by TRANE. * AT 95 deg. F O.A.T. #N/A

Equal products by Aaon, Daikin and Carrier are acceptable. 3/15/2018 16:01

ACCESSORIES/OPTIONS:

1. Unit stand.
2. Compressor heater.
3. Time delay timer on compressor start.
4. Low ambeint kit to allow operation down to 45 deg.
5. Refrigerant line set.
6. Refrigerant service valves, high and low pressure switches.
7. Condenser coil hail guard.
8. Separate insulated compressor compartment.

REMARKS:

A. Unit mounted on 16" steel frame.
B. Unit mounted on equipment rails on roof.
C. System IEER 10.1 , MOP 125 A. weight 762 lb.
D. System IEER 11.1 , MOP 125 A. weight 762 lb.
E. System IEER 11.1 , MOP 125 A. weight 762 lb.
F. Route refrigerant circuit piping up through roof through RPH-1.
G. Route refrigerant circuit piping up through roof through RPH-2.

CENTRAL STATION AIR HANDLING UNITS (237323)

MARK	MANUFACTURER'S MODEL NO.	SERVING/ LOCATION	CFM	EXT S.P.	% O.A.	FAN RPM	FAN SIZE	FAN TYPE	FAN DRIVE	COILS HEAT	COILS COOL	MOTOR HP	MOTOR VOLT/PH	ACCESSORIES/ OPTIONS	REMARKS
AHU-1	CSAA-06	Office Area	2575	2	14	1761	10"	FC	Belt	HC-1	DX-1	3	208/3	1, 2, 3, 4, 5	A
AHU-2	CSAA-12	Classrooms	6250	2	28	2399	15"	AF	Belt	HC-2	DX-2	7 1/2	208/3	1, 2, 3, 4, 5	B
AHU-3	CSAA-10	Gym	5000	1.5	46	1362	15"	FC	Belt	HC-3	DX-3	7 1/2	208/3	1, 2, 3, 5	C

Based on products by TRANE. #N/A

Equal products from other manufacturers are acceptable. 3/5/2018 7:43

ACCESSORIES/OPTIONS

1. Angled filter section with 2" pleated 35% filters.
2. Mixing box section, opposed blade dampers less actuator.
3. Coil and access section.
4. VAV fan with VFD shipped loose for field mounting.
5. Disconnect.

REMARKS:

A. Vertical Unit, fan discharge - Top Back, 19.0 MCA, Fuse size 30 A.
B. Vertical Unit, fan discharge - Top Back, 35 MCA, Fuse size 60 A.
C. Vertical Unit, fan discharge - Top Back, 28 MCA, Fuse size 50 A.

AHU DX COOLING COILS (237500)

MARK	COIL SIZE	AIR UNIT	COND. UNIT	CFM	MAX. PD "	MAX. FV	EAT DB	EAT WB	LAT DB	LAT WB	MBH CAPACITY TOTAL	MBH CAPACITY SENS.	REFRIGERANT TYPE	REFRIGERANT SST	REFRIGERANT LIQ. T	COIL TYPE	COIL FPF	COIL ROWS	ACCESSORIES REMARKS
DX-1	26" x 34"	AHU-1	ACU-1	2575	0.412	426	77.0	64.7	56.2	54.9	76.2	58.68	R-410a	45	115	3F	113	4	
DX-2	32" x 55"	AHU-2	ACU-2	6250	0.488	516	78.9	66.4	56.5	54.8	223.3	153.57	R-410a	45	115	3F	99	4	
DX-3	28" x 50"	AHU-3	ACU-3	5000	0.648	514	79.3	66.7	53.8	52.8	210.7	140.06	R-410a	45	115	3F	88	6	

Based on products by TRANE. #N/A

Equal products from other manufacturers are acceptable. 2/28/18 12:56

ACCESSORIES/OPTIONS:

1.
2.
3.

REMARKS:

A.
B.

Entering Air Temps. are based on	DB	WB
RAT	**75**	**63**
OAT	**89**	**75**

AHU WATER HEATING COILS (237500)

MARK	COIL SIZE	UNIT	CFM	MAX. PD "	MAX. FV	EAT	LAT	TOT. MBH	30% PG / WATER GPM	30% PG / WATER ENT	30% PG / WATER LVG	30% PG / WATER PD. FT	COIL TYPE	COIL FPF	COIL ROWS	ACCESSORIES/ OPTIONS	REMARKS
HC-1	24" x 32"	AHU-1	2,575	0.128	483	57.5	91.1	93.7	9.9	160	140	0.93	SW	146	1		
HC-2	30" x 55"	AHU-2	6,250	0.179	508	44.8	91.9	319.5	33.7	160	140	1.63	UW	111	2		
HC-3	27" x 49"	AHU-3	5,000	0.33	544	32.1	94	335.7	25.36	160	132	0.75	W	144	3		

Based on products by TRANE. #N/A

Products by other manufactures are acceptable. 2/28/18 12:57

ACCESSORIES/OPTIONS:

1.
2.
3.

REMARKS:

A.
B.
C.

Enteri... are...	DB	WB
RAT	**70**	56
OAT	**-20**	-19

RADIANT CEILING PANELS (238101)

MARK	MANUFACTURER'S MODEL NO.	QUANTITY	PANEL SIZE	PANEL TYPE	ROOM TEMP	BTUH EACH	MIN. WATER GPM	WATER EWT	WATER LWT	WATER PD. FT	ACCESSORIES/ OPTIONS	REMARKS
RCP-1	HPH	3	24"x24"	Tegular	70	615	0.5	160	152	0.36	1, 2, 3, 4	A, B
RCP-2	HPH	3	24"x24"	Tegular	70	615	0.5	160	152	0.36	1, 2, 3, 4	A, B
RCP-3	HPH	1	24"x24"	Tegular	70	615	0.5	160	157	0.12	1, 2, 3, 4	A, B

Based on products by AIRTEX. #N/A

Equal products by Aero-Tech and Sterling are acceptable. 3/6/18 7:39

ACCESSORIES/OPTIONS:

1. Provide Isolation valves, P/T plugs on each circuit.
2. Provide control valve and calibrated balancing valve on each circuit.
3. Backs of all panels shall be covered with 1" of 3/4 lbs density fiberglass insulation.
4. Silkscreen panel to match adjacent acoustic tile.

REMARKS:

A. Capacity based on perimeter location and 155 deg. F mean water temperature.
B. See piping detail on plans.

CABINET HEATER - HOT WATER (238101)

MARK	MANUFACTURER'S MODEL NO.	LOCATION	STYLE	CFM	MBH	EAT	LAT.	HEATING COIL EWT	HEATING COIL LWT	HEATING COIL GPM	HEATING COIL PD.FT.	ELECT. AMPS	ELECT. VOLT/PH	ACCESSORIES/ OPTIONS	REMARKS
CUH-1	FFEB-040	Vest 119	Horiz. Recessed	338	19.4	70	123	160	134	1.5	5.6	3.1	115/1	1, 3, 4, 5	A, B
CUH-2	FFEB-030	Vest 106	Horiz. Recessed	193	15.8	70	146	160	144	2	3.3	3.1	115/1	2, 3, 4, 5	A, B
CUH-3	FFBB-060	Vest 100	Vert. Cabinet	403	28.8	70	136	160	146	4	3.2	3.1	115/1	1, 3, 4, 5	A, B
										7.5	GPM				

Based on products by TRANE. #N/A

Equal products by Airtherm and Vulcan are acceptable. 3/6/18 7:39

ACCESSORIES/OPTIONS:

1. 3-row Hot Water coil.
2. 4-row Hot Water coil.
3. Piping Package.
4. Free Discharge ECM Motor.
5....

REMARKS:

A. Sized at high fan speed.
B. Color selected by Owner.

UNIT HEATERS - HOT WATER (238101)

MARK	MANUFACTURER'S MODEL NO.	LOCATION	TYPE	CFM	MBH	EAT	LAT	WATER GPM	WATER EWT	WATER LWT	ELECT. PD.FT.	ELECT. Watts	ELECT. VOLT/PH	ACCESSORIES/ OPTIONS	REMARKS
UH-1	S-A18	Mech/Elec 105	Horizontal	500	11.0	60	81	1.5	160	145	2	16	115/1		

Based on products by TRANE. #N/A

Equal products by Sterling and Airtherm are acceptable. 3/6/18 7:39

ACCESSORIES/OPTIONS:

1.
2.
3.

REMARKS:

A.
B.

AIR DISTRIBUTION DEVICES (233713)

MARK	MANUFACTURER'S MODEL NO.	APPL'N	SIZE (W x H) DUCT	SIZE (W x H) FACE	MAXIMUM CFM	MAXIMUM PD" *	MAXIMUM NC*	THROW * FT **	THROW * DIRECT.	TYPE	CONSTR.	DAMPER	ACCESSORIES/ OPTIONS	REMARKS
S-1	PLQ	Supply	8"	24x24	280	0.07	17	6	4-Way	Arch. Ceiling Diff.	Steel	No	1	B
S-2	PLQ	Supply	6"	24x24	170	0.06	17	4	4-Way	Arch. Ceiling Diff.	Steel	No	1	B
S-3	PLQ	Supply	10"	24x24	420	0.1	19	8	4-Way	Arch. Ceiling Diff.	Steel	No	1	B
S-4	PLQ	Supply	12"	24x24	550	0.12	19	10	4-Way	Arch. Ceiling Diff.	Steel	No	1	B
S-5	(not used)													
S-6	DMGDU	Supply	36x8	39x9	1020	0.084	29	32	22.5 Deg	Univ. Spiral Duct	Aluminum	Extractor	1	A, D
R-1	EGC-15	Return	22x22	24x24	1600	0.04	21	---	---	Eggcrate	Aluminum	No	1, 3	B, C
R-2	EGC-15	Return	22x10	24x12	800	0.05	22	---	---	Eggcrate	Aluminum	No	1, 3	B, C
R-3	EGC-15	Return	22x6	24x8	350	0.03	14	---	---	Eggcrate	Aluminum	No	1, 3	B, C
R-4	S80	Return	56x24	58x26	5000	0.024	24	---	0 deg. Def.	3/4" single deflect.	Steel	No	1	A
E-1	EGC-15	Exhaust	12x12	14x14	530	0.05	18	---	---	Eggcrate	Aluminum	Yes	1, 3	A

Based on products by KRUEGER. *at Maximum... ** Distance in FT at 100 FPM with direction pattern indicated. #N/A

Equal products by TITUS and PRICE are acceptable. *** Horizontal distance/Vertical distance @ 15 deg. Delta T. 3/2/18 7:43

ACCESSORIES/OPTIONS:

1. Standard White Finish.
2. Aluminum Finish.
3. 1/2" openings x 1" deep.

REMARKS:

A. Surface Mounted.
B. T-bar lay-in.
C. Plenum with bellmouth takeoff, see detail.
D. Universal edncaps with foam seals.

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Consultant:

Project Title: MCKINLEY CHARTER SCHOOL
EAU CLAIRE AREA SCHOOL DISTRICT

Project Location: 1266 MCKINLEY RD
EAU CLAIRE, WI 54703

Sheet Title: MECHANICAL SCHEDULES

HSR Project Number: 17057

Project Date: 3-08-18

Drawn By: S Kelly

Key Plan:

BID DOCUMENTS

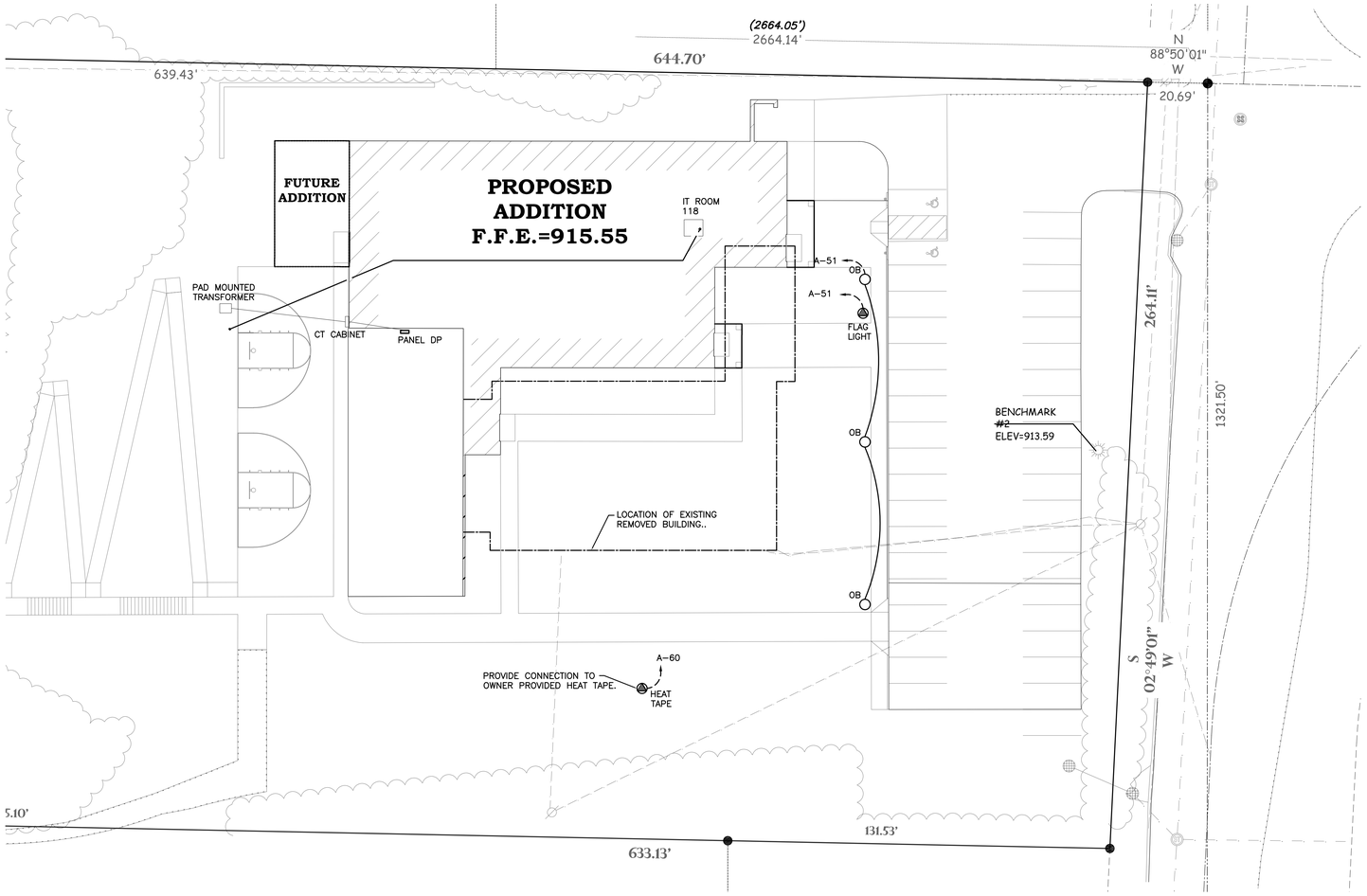
Revisions:

No.	Description	Date
A1	Revision 1	3-15-2018

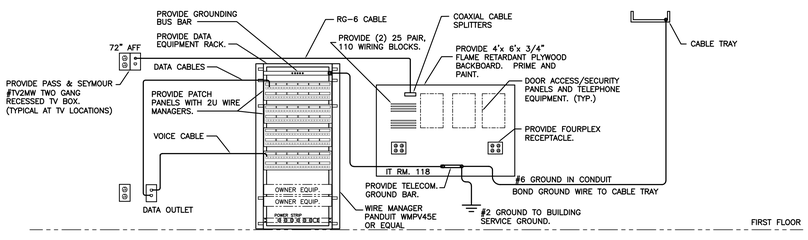
Graphic Scale: VARIES

Last Update: 3/15/2018 4:18:12 PM

M600R



1 ELECTRICAL SITE PLAN
1"= 20'



3 COMMUNICATIONS RISER DIAGRAM
N.T.S.

CONSTRUCTION NOTES: REMODEL

GENERAL NOTES:

a. ALL ELECTRICAL DEVICES SHOWN TO BE NEW, UNLESS INDICATED OTHERWISE.

b. MAINTAIN OPERATION OF ALL EXISTING DEVICES; EXTEND WIRING/CONDUITS TO LIGHTS, RECEPTACLES, CLOCKS, INTERCOM, SPEAKERS, ETC.

c. PROVIDE GROUND CONDUCTOR IN ALL NEW CONDUITS.

d. REINSTALL EXISTING LIGHTS, SMOKE DETECTORS, SPEAKERS, AND FIRE ALARM HORN/STROBES WHERE INDICATED. PROVIDE NEW CONDUIT AND WIRING AS REQUIRED.

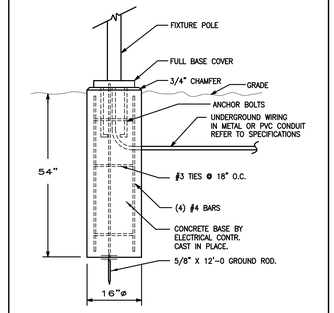
e. PROVIDE FIRE STOPPING AND SMOKE DRAFT STOPPING AT ALL CONDUIT PENETRATIONS. REFER TO SPECIFICATION SECTION 07840 FOR FIRE RESISTIVE AND NON-FIRE RESISTIVE ASSEMBLIES.

f. ELECTRICAL CONTRACTOR TO USE JOHNSON CONTROLS AS THE SUB CONTRACTOR FOR THE DOOR ACCESS SYSTEM: INCLUDE ALL COSTS TO PROVIDE ADDITIONAL EQUIPMENT, DEVICES, CONDUITS/ WIRING AND LABOR.

g. ELECTRICAL CONTRACTOR TO USE NETGUARD AS THE SUB CONTRACTOR FOR THE SECURITY SYSTEM: INCLUDE ALL COSTS TO PROVIDE ADDITIONAL EQUIPMENT, DEVICES, CONDUITS/ WIRING AND LABOR.

h. ELECTRICAL CONTRACTOR TO USE JOHNSON CONTROLS AS THE SUB CONTRACTOR FOR THE VIDEO SURVEILLANCE SYSTEM: INCLUDE ALL COSTS TO PROVIDE ADDITIONAL EQUIPMENT, DEVICES, CONDUITS/ WIRING AND LABOR.

i. DOOR INTERCOM SYSTEM: AIPHONE SYSTEM IS REINSTALLED BY THE ELECTRICAL CONTRACTOR. PROVIDE NEW CABLE TO MATCH EXISTING.



2 POLE BASE DETAIL "OB"

ELECTRICAL SYMBOLS

- LIGHTING FIXTURE – WALL BRACKET *
- LIGHTING FIXTURE DOWNLIGHT – SURFACE TYPE *
- LIGHTING FIXTURE DOWNLIGHT– RECESSED *
- LIGHTING FIXTURE(S) – EMERGENCY CIRCUIT/BATTERY BODINE #B74CST*
- LIGHTING FIXTURE (2'x2') – SURFACE TYPE *
- LIGHTING FIXTURE (2'x2') – RECESSED *
- LIGHTING FIXTURE (2'x2') – EMERGENCY CIRCUIT/BATTERY, BODINE #B50ST*
- LIGHTING FIXTURE (2'x4') – SURFACE TYPE *
- LIGHTING FIXTURE (2'x4') – RECESSED *
- LIGHTING FIXTURE (2'x4') – EMERGENCY CIRCUIT/BATTERY, BODINE #B50ST *
- LIGHTING FIXTURE – OPEN STRIP *
- EXIT SIGN
- EMERGENCY LIGHTING UNIT *
- OCCUPANCY SENSOR *
- LIGHTING CONTACTOR
- PHOTOCELL CONTROLLER
- SWITCH – SINGLE POLE
  3 – 3–WAY SWITCH
  4 – 4–WAY SWITCH
  K – KEY SWITCH
- STANDARD SINGLE RECEPTACLE *
- STANDARD DUPLEX RECEPTACLE *
  "GFI" GROUND FAULT INTERRUPTING
  "WP" WEATHERPROOF COVER
  "TR" TAMPER RESISTANT
  "WR" WEATHER RESISTANT
  "USB" COMBINATION RECEPTACLE AND USB CHARGING PORTS
- DOUBLE DUPLEX RECEPTACLE *
- SURFACE RACEWAY/ PLUG–IN STRIP
- WIRE CABLE TRAY (SEE DRAWINGS FOR LENGTHS & RUNS)
- DISCONNECT SWITCH
- MOTOR STARTER
- MOTOR CONNECTION (NUMBER REFERS TO SCHEDULE)
- EQUIPMENT CONNECTION OR PROVISION (NUMBER REFERS TO SCHEDULE)
- PANELBOARD, TERMINAL CABINET
- GROUND CONNECTION
- 2 TELEPHONE **
- 2 (VOICE) 2 (DATA) COMBINATION VOICE/DATA OUTLET **
- 4 COMPUTER DATA OUTLET **
- P PROJECTOR CONTROL OUTLET
- F FIRE ALARM MANUAL STATION
- F FIRE ALARM HORN/STROBE
- S FIRE ALARM STROBE UNIT ONLY
- RTS REMOTE STATION FOR DUCT MOUNTED SMOKE DETECTORS
- FAA FIRE ALARM ANNUNCIATOR PANEL
- FACP FIRE ALARM CONTROL PANEL
- S SMOKE DETECTOR
- S_D DUCT SMOKE DETECTOR WITH TWO AUXILLIARY CONTACTS
- S_E ELEVATOR RECALL WITH AUXILLIARY CONTACTS
- H AUTOMATIC HEAT DETECTOR (135° F RATE OF RISE).
- H_F AUTOMATIC HEAT DETECTOR. "F" – INDICATES FIXED TEMPERATURE 190° F.
- RT REMOTE TEST STATION FOR DUCT SMOKE DETECTOR
- DC SECURITY DOOR CONTACT
- SM SECURITY MOTION DETECTOR
- KC KEYCARD ACCESS STATION
- J JUNCTION BOX OR PULL BOX
- T TRANSFORMER
- C1 LIGHTING CONTACTOR
- PUSHBUTTON STATION
- BELL
- BUZZER
- TV TELEVISION OUTLET
- CLOCK
- S SPEAKER *
- V VOLUME CONTROL
- GROUND CONNECTION
- LEG TO PANEL
- NOTE NUMBER (REMOVAL)
- NOTE NUMBER (REMODEL)

* TYPE AS INDICATED WITH LETTER/NUMBER, REFER TO SPECIFICATIONS OR SCHEDULES.
** QUANTITIES OF CABLE DROPS AS INDICATED WITH NUMBER, REFER TO DRAWINGS. HEIGHTS AND LOCATIONS AS INDICATED ON DRAWINGS.
*** NUMBER REFERS TO LOW VOLTAGE LIGHTING RELAY, REFER TO SCHEDULE.

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Consultant:

Project Title: McKINLEY CHARTER SCHOOL
EAU CLAIRE AREA SCHOOL DISTRICT

Project Location: 1266 McKINLEY RD
EAU CLAIRE, WI 54703

Sheet Title: ELECTRICAL SITE PLAN

HSR Project Number: 17057

Project Date: 3-8-18

Drawn By: scott gerzsik

Key Plan:

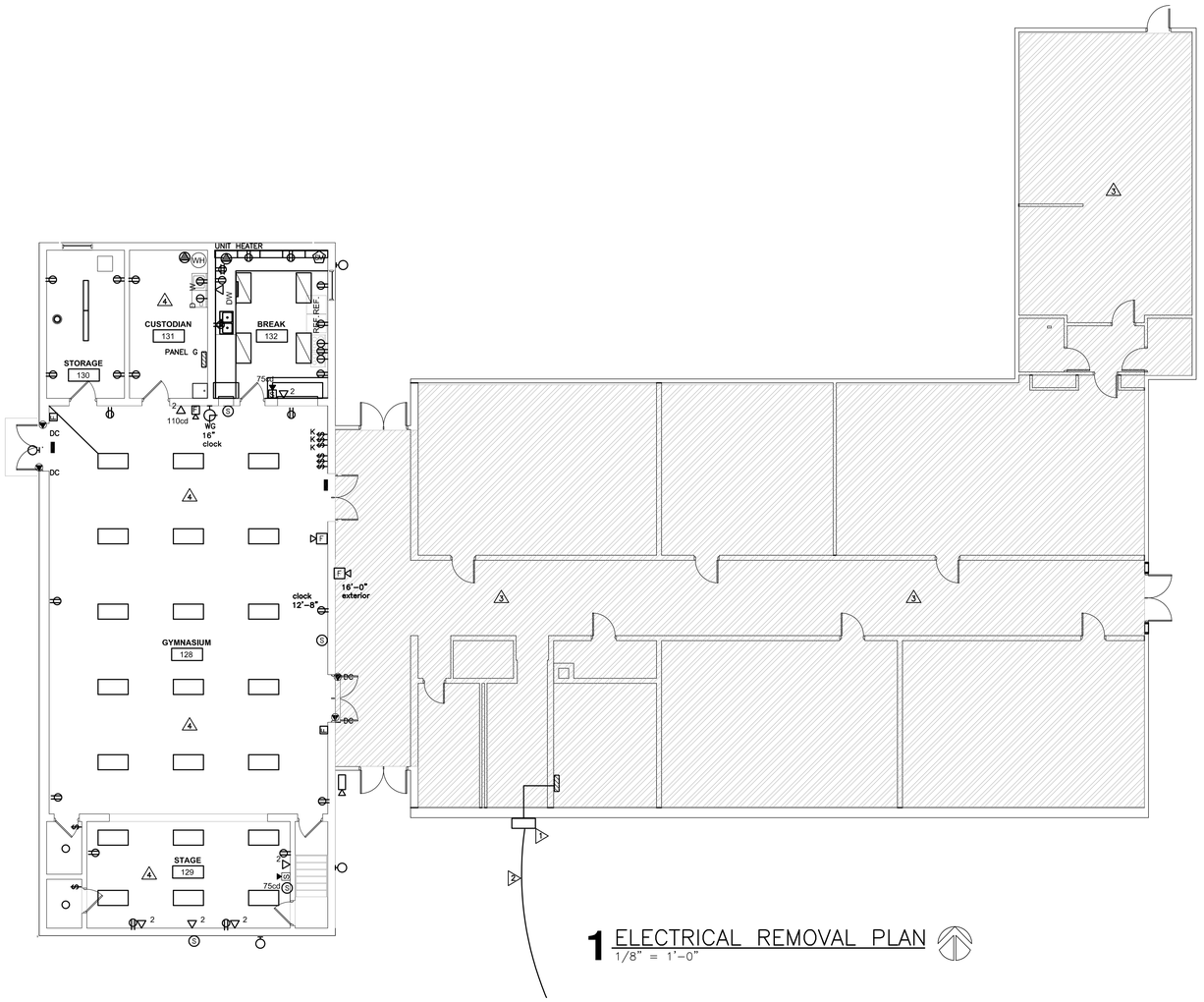
Revisions:

No.	Description	Date
A1	ADDENDUM #1	03/15/2018

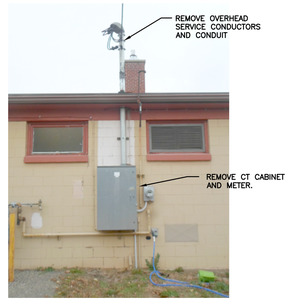
Graphic Scale: VARIES

Last Update: 03/15/18

E001R

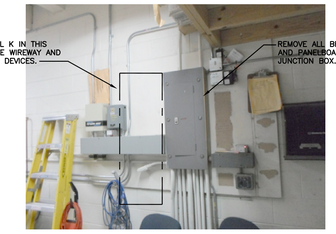


1 ELECTRICAL REMOVAL PLAN
1/8" = 1'-0"



2 CURRENT TRANSFORMER CABINET
NTS

3 MAIN SERVICE ELECTRICAL PANEL
NTS



4 EXISTING PANEL G
NTS

5 BUILDING EXTERIOR
NTS

6 EXISTING GYMNASIUM
NTS

CONSTRUCTION NOTES: REMOVAL

GENERAL NOTES:

a. REMOVE ALL ELECTRICAL DEVICES SHOWN AND ABANDON WIRING/CONDUIT BACK TO ELECTRICAL PANEL, CABINET, OR TERMINATION BOARD.

b. REMOVE ALL ELECTRICAL DEVICES WITHIN HATCHED AREA OF FLOOR PLAN.

c. ELECTRICAL CONTRACTOR TO INCLUDE ALL DEVICES REQUIRED FOR REMOVAL. MAINTAIN OPERATION OF ALL EXISTING RECEPTACLES AND DEVICES TO REMAIN. PROVIDE NEW HOMERUNS OF CONDUIT/WIRING WHERE REQUIRED..

d. SALVAGE ALL DATA AND COMPUTER EQUIPMENT, SECURITY CAMERAS, CLOCKS, DOOR INTERCOM SYSTEM, CARD READERS WITH RELATED DEVICES AND MOTION SENSORS, AND ALL OTHER ITEMS REQUESTED BY THE OWNER TO THE OWNER.

e. MAINTAIN OPERATION OF EXISTING SCHOOL SYSTEMS: ELECTRICAL POWER, DOOR ACCESS SYSTEM, SECURITY SYSTEM, FIRE ALARM, ETC., UNTIL OCCUPATION OF NEW SCHOOL ADDITION.

f. PROVIDE COVERPLATES AT ALL OPEN DEVICE AND JUNCTION BOXES.

SPECIFIC NOTES:

1. REMOVE 240 VOLT, 1 PHASE ELECTRICAL SERVICE TO BUILDING AND ASSOCIATED ELECTRICAL EQUIPMENT.

2. REMOVE OVERHEAD ELECTRICAL SERVICE CONDUCTORS.

3. ENTIRE BUILDING WITHIN HATCHED AREA IS REMOVED. ELECTRICAL TO REMOVE ALL ELECTRICAL ITEM IN THIS AREA.

4. EXISTING GYMNASIUM AND ADJACENT ROOMS TO REMAIN. REMOVE ALL ELECTRICAL ITEMS AND ALL WIRING. ALL ELECTRICAL ITEMS AND WIRING TO BE NEW IN THE REMODEL PHASE.

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Consultant:

Project Title: **McKINLEY CHARTER SCHOOL**
EAU CLAIRE AREA SCHOOL DISTRICT

Project Location: **1266 McKINLEY RD**
EAU CLAIRE, WI 54703

Sheet Title: **ELECTRICAL REMOVAL PLAN**

HSR Project Number: **17057**

Project Date: **3-8-18**

Drawn By: **scott gerzsik**

Key Plan:

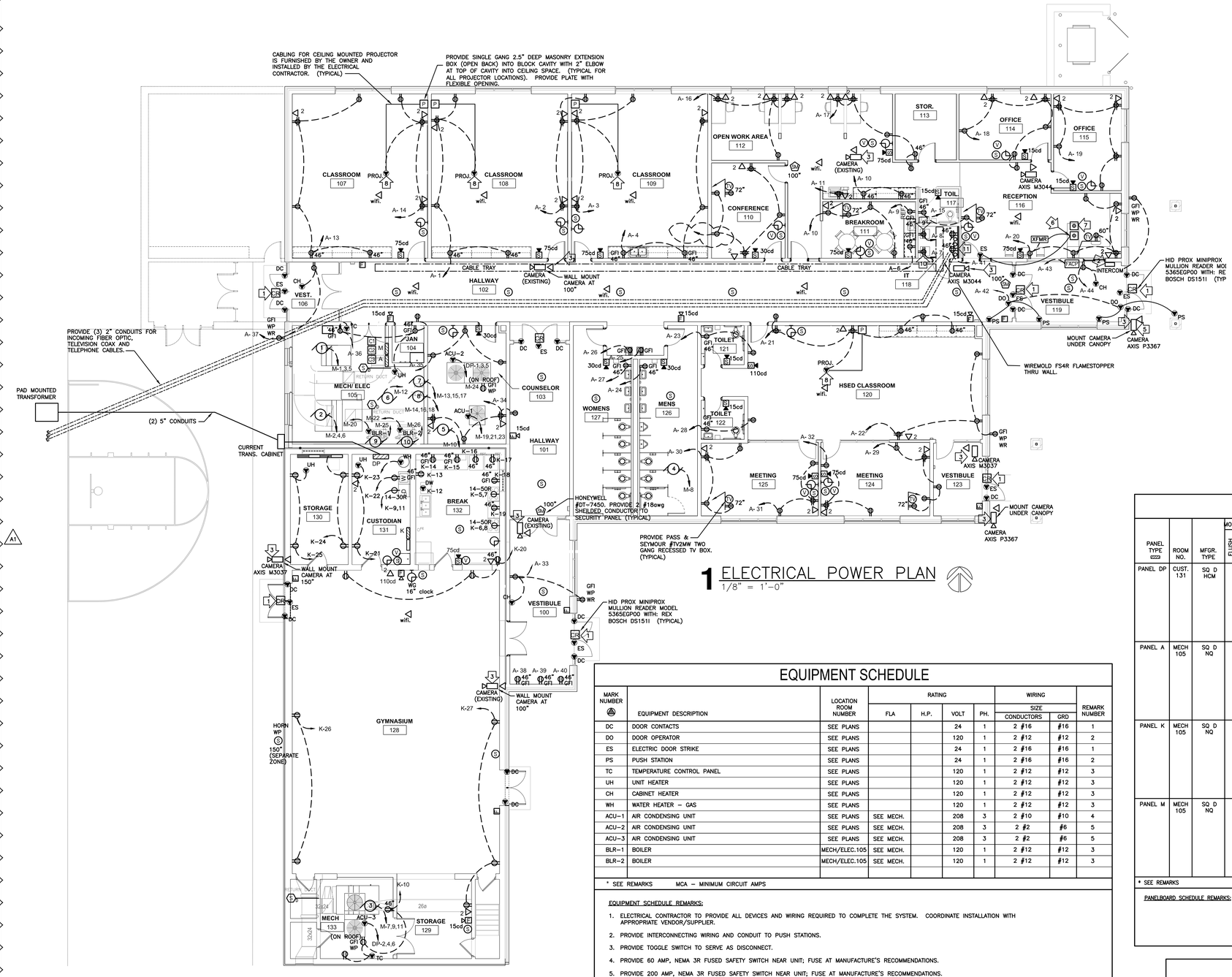
Revisions:

No.	Description	Date
A1	ADDENDUM #1	03/15/2018

Graphic Scale: **VARIES**

Last Update: 03/15/18

E090R



1 ELECTRICAL POWER PLAN
1/8" = 1'-0"

CONSTRUCTION NOTES: REMODEL

GENERAL NOTES:

a. ALL ELECTRICAL DEVICES SHOWN TO BE NEW, UNLESS INDICATED OTHERWISE.
b. MAINTAIN OPERATION OF ALL EXISTING DEVICES; EXTEND WIRING/CONDUITS TO LIGHTS, RECEPTACLES, CLOCKS, INTERCOM, SPEAKERS, ETC.
c. PROVIDE GROUND CONDUCTOR IN ALL NEW CONDUITS.
d. REINSTALL EXISTING LIGHTS, SMOKE DETECTORS, SPEAKERS, AND FIRE ALARM HORN/STROBES WHERE INDICATED. PROVIDE NEW CONDUIT AND WIRING AS REQUIRED.
e. PROVIDE FIRE STOPPING AND SMOKE DRAFT STOPPING AT ALL CONDUIT PENETRATIONS. REFER TO SPECIFICATION SECTION 07840 FOR FIRE RESISTIVE AND NON-FIRE RESISTIVE ASSEMBLIES.
f. ELECTRICAL CONTRACTOR TO USE JOHNSON CONTROLS AS THE SUB CONTRACTOR FOR THE DOOR ACCESS SYSTEM: INCLUDE ALL COSTS TO PROVIDE ADDITIONAL EQUIPMENT, DEVICES, CONDUITS/ WIRING AND LABOR.
g. ELECTRICAL CONTRACTOR TO USE NETGUARD AS THE SUB CONTRACTOR FOR THE SECURITY SYSTEM: INCLUDE ALL COSTS TO PROVIDE ADDITIONAL EQUIPMENT, DEVICES, CONDUITS/ WIRING AND LABOR.
h. ELECTRICAL CONTRACTOR TO USE JOHNSON CONTROLS AS THE SUB CONTRACTOR FOR THE VIDEO SURVEILLANCE SYSTEM: INCLUDE ALL COSTS TO PROVIDE ADDITIONAL EQUIPMENT, DEVICES, CONDUITS/ WIRING AND LABOR.
i. DOOR INTERCOM SYSTEM: AIPHONE SYSTEM IS REINSTALLED BY THE ELECTRICAL CONTRACTOR. PROVIDE NEW CABLE TO MATCH EXISTING.

SPECIFIC NOTES:

1. PROVIDE CARD READER AT NEW DOOR LOCATION, PROVIDE NEW (6) CONDUCTOR SHIELDED CABLE #18AWG TO IT ROOM 118 DOOR ACCESS CONTROL CABINET.
2. REINSTALL EXISTING INTERCOM STATION. PROVIDE CAT. #6 CABLE TO OFFICE TELEPHONE.
3. PROVIDE SECURITY CAMERA, PROVIDE NEW CAT. #6 CABLE TO IT ROOM 118 DATA RACK.
4. (NOT USED)
5. PROVIDE COAXIAL CABLE FROM EXTERIOR CAMERA TO TELEVISION/MONITOR AT RECEPTION 116.
6. PROVIDE PUSHBUTTON STATION FOR RELEASE OF ELECTRIC DOOR STRIKE. PROVIDE 24 VOLT TRANSFORMER AND WIRING.
7. PROVIDE INTRUDER SWITCH (911 CALL) WITH CAT. #6 CABLE TO EQUIPMENT IN IT ROOM 118.
8. REINSTALL CEILING PROJECTOR; PROVIDE AND INSTALL ALL ASSOCIATED CABLES AND BOXES REQUIRED. INSTALL SIMILAR TO PREVIOUS LOCATION.
9. PROVIDE DATA RACK.
10. PROVIDE RACK AND EQUIPMENT FOR PA SYSTEM.
11. PROVIDE PLYWOOD BACKBOARD, REFER TO SHEET E001R FOR DETAIL.

PANELBOARD SCHEDULE

PANEL TYPE	ROOM NO.	MFGR. TYPE	MOUNT'G FLUSH	MOUNT'G SURFACE	SIZE WIDTH	SIZE DEPTH	MAINS ELECTRICAL SERVICE	MAINS AMP.	MAINS LUGS	MAINS BREAKER	MAINS SWITCH	MAINS FEED THRU LUGS	BRANCHES NO.	BRANCHES AMP.	BRANCHES POLE	BRANCHES CIRCUIT NUMBERS	SPACE	REMARK NUMBER
PANEL DP	CUST. 131	SQ D HCM		X			120/208 VOLT 3 PH, 4 WIRE	800		X				800	3	MAIN CIRCUIT BREAKER		
													1	225	3	PANEL A		
													1	225	3	PANEL K		
													1	225	3	PANEL M		
													2	125	3	CONDENSING UNITS CU-2 AND CU-3		
PANEL A	MECH 105	SQ D NQ		X			120/208 VOLT 3 PH, 4 WIRE	225	X				44	20	1	A-1, 2-44	72 SP	
													5	20	1	A-45,46,47,48,49. (SPARES)		
													11	20	1	A-50, 51-50 LIGHTING CIRCUITS		
													1	20	1	A-60, GFI CIRCUIT BREAKER		
													1	60	3	TVSS		
													8	20	1	SPARES		
PANEL K	MECH 105	SQ D NQ		X			120/208 VOLT 3 PH, 4 WIRE	225	X				4	20	1	K-1,2-4 LIGHTING CIRCUITS	42 SP	
													17	20	1	K-10, 12-27		
													2	50	2	K-5,7 K-6,8 (RANGES)		
													1	30	2	K-9,11 DRYER		
													8	20	1	SPARES		
PANEL M	MECH 105	SQ D NQ		X			120/208 VOLT 3 PH, 4 WIRE	225	X				2	50	3	MOTORS #2;#3: M-2,4,6: M-7,9,11	42 SP	
													3	20	3	MOTOR #3,7,8; M-1,3,5 M-13,15,17 M-14,16,18		
													–	–	–			
													1	30	3	ACU-1, M-19,21,23		
													7	20	1	M-8,10,12,20,22,23,24		
													8	20	1	SPARES		

* SEE REMARKS

PANELBOARD SCHEDULE REMARKS:

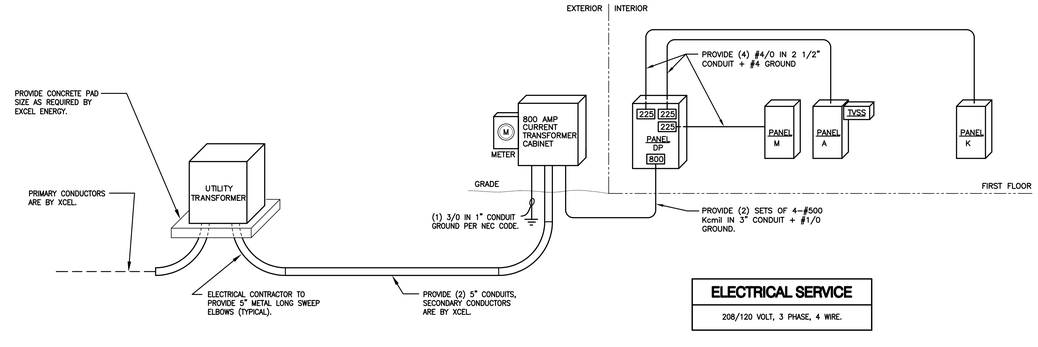
EQUIPMENT SCHEDULE

MARK NUMBER	EQUIPMENT DESCRIPTION	LOCATION ROOM NUMBER	RATING FLA	RATING H.P.	RATING VOLT	RATING PH.	WIRING SIZE CONDUCTORS	WIRING SIZE GRD	REMARK NUMBER
DC	DOOR CONTACTS	SEE PLANS			24	1	2 #16	#16	1
DO	DOOR OPERATOR	SEE PLANS			120	1	2 #12	#12	2
ES	ELECTRIC DOOR STRIKE	SEE PLANS			24	1	2 #16	#16	1
PS	PUSH STATION	SEE PLANS			24	1	2 #16	#16	2
TC	TEMPERATURE CONTROL PANEL	SEE PLANS			120	1	2 #12	#12	3
UH	UNIT HEATER	SEE PLANS			120	1	2 #12	#12	3
CH	CABINET HEATER	SEE PLANS			120	1	2 #12	#12	3
WH	WATER HEATER – GAS	SEE PLANS			120	1	2 #12	#12	3
ACU-1	AIR CONDENSING UNIT	SEE PLANS	SEE MECH.		208	3	2 #10	#10	4
ACU-2	AIR CONDENSING UNIT	SEE PLANS	SEE MECH.		208	3	2 #2	#6	5
ACU-3	AIR CONDENSING UNIT	SEE PLANS	SEE MECH.		208	3	2 #2	#6	5
BLR-1	BOILER	MECH/ELEC.105	SEE MECH.		120	1	2 #12	#12	3
BLR-2	BOILER	MECH/ELEC.105	SEE MECH.		120	1	2 #12	#12	3

* SEE REMARKS MCA – MINIMUM CIRCUIT AMPS

EQUIPMENT SCHEDULE REMARKS:

1. ELECTRICAL CONTRACTOR TO PROVIDE ALL DEVICES AND WIRING REQUIRED TO COMPLETE THE SYSTEM. COORDINATE INSTALLATION WITH APPROPRIATE VENDOR/SUPPLIER.
2. PROVIDE INTERCONNECTING WIRING AND CONDUIT TO PUSH STATIONS.
3. PROVIDE TOGGLE SWITCH TO SERVE AS DISCONNECT.
4. PROVIDE 60 AMP, NEMA 3R FUSED SAFETY SWITCH NEAR UNIT; FUSE AT MANUFACTURE'S RECOMMENDATIONS.
5. PROVIDE 200 AMP, NEMA 3R FUSED SAFETY SWITCH NEAR UNIT; FUSE AT MANUFACTURE'S RECOMMENDATIONS.



ELECTRICAL SERVICE
208/120 VOLT, 3 PHASE, 4 WIRE.

2 ELECTRIC RISER DIAGRAM
NTS

MOTOR SCHEDULE

MOTOR NO.	EQUIPMENT	PLBG/ HVAC EQUIP. NO.	LOC. ROOM NO.	MOTOR RATING HP	MOTOR RATING VOLT	MOTOR RATING PH	DISCONNECT BY MECH.	DISCONNECT BY ELEC.	DISCONNECT BY ** TYPE	STARTER BY MECH.	STARTER BY ELEC.	STARTER BY *** TYPE	CONTROL WIRING BY MECH.	CONTROL WIRING BY ELEC.	MOTOR WIRING SIZE CONDUCTORS	MOTOR WIRING SIZE GRD.	REMARK NUMBER
1	AIR HANDLER	AHU-1	MECH 105	3	208	3	X		VFD	X		VFD	X		3 #12	#12	1
2	AIR HANDLER	AHU-2	MECH 105	7 1/2	208	3	X		VFD	X		VFD	X		3 #10	#10	1
3	AIR HANDLER	AHU-3	MECH 133	7 1/2	208	3		X	NF		X	FVNR	X		3 #10	#10	4
4	POWER ROOF VENTILATOR	PV-1	MEN'S 128	1/4	120	1	X		TS	X			X		2 #12	#12	2
5	POWER ROOF VENTILATOR	PV-2	CONS. 106	1/4	120	1	X		TS	X			X		2 #12	#12	2
6	POWER ROOF VENTILATOR	PV-3	MECH 105	1/4	120	1	X		TS	X			X		2 #12	#12	2
7	HOT WATER PUMP	HWP-1	MECH 105	3	208	3	X		VFD	X		VFD	X		3 #12	#12	1
8	HOT WATER PUMP	HWP-2	MECH 105	3	208	3	X		VFD	X		VFD	X		3 #12	#12	1
9	BOILER PUMP	BP-1	MECH 105	1/6	120	1		X	TS	X			X		2 #12	#12	3
10	BOILER PUMP	BP-2	MECH 105	1/6	120	1		X	TS	X			X		2 #12	#12	3

SEE REMARKS
(CB) CIRCUIT BREAKER; (CS) COMBINATION STARTER/DISCONNECT; (F) FUSED SAFETY SWITCH; (NF) NOT FUSED SAFETY SWITCH; (TS) TOGGLE SWITCH
*** (FVNR) FULL VOLTAGE NON-REVERSING MAGNETIC STARTER; (FVR) FULL VOLTAGE REVERSING MAGNETIC STARTER; (MS) MANUAL STARTER-WITH OVERLOAD PROTECTION; (MSW) MANUAL SWITCH-WITHOUT OVERLOAD PROTECTION; (MCC) MOTOR CONTROL CENTER; (RV) REDUCED VOLTAGE STARTER; (VFD) VARIABLE FREQUENCY DRIVE

MOTOR SCHEDULE REMARKS:

1. ELECTRICAL CONTRACTOR TO INSTALL VARIABLE FREQUENCY DRIVE UNIT FURNISHED BY THE MECHANICAL CONTRACTOR.
2. ROOF EXHAUSTER IS FURNISHED WITH INTEGRAL DISCONNECT SWITCH.
3. PROVIDE TOGGLE DISCONNECT NEAR UNIT.
4. ELECTRICAL TO PROVIDE MOTOR STARTER AND DISCONNECT.

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Project Title: **McKINLEY CHARTER SCHOOL**
EAU CLAIRE AREA SCHOOL DISTRICT

Project Location: **1266 McKINLEY RD**
EAU CLAIRE, WI 54703

Sheet Title: **ELECTRICAL POWER PLAN**

HSR Project Number: **17057**

Project Date: **3-8-18**

Drawn By: **scott gerzsik**

Key Plan:

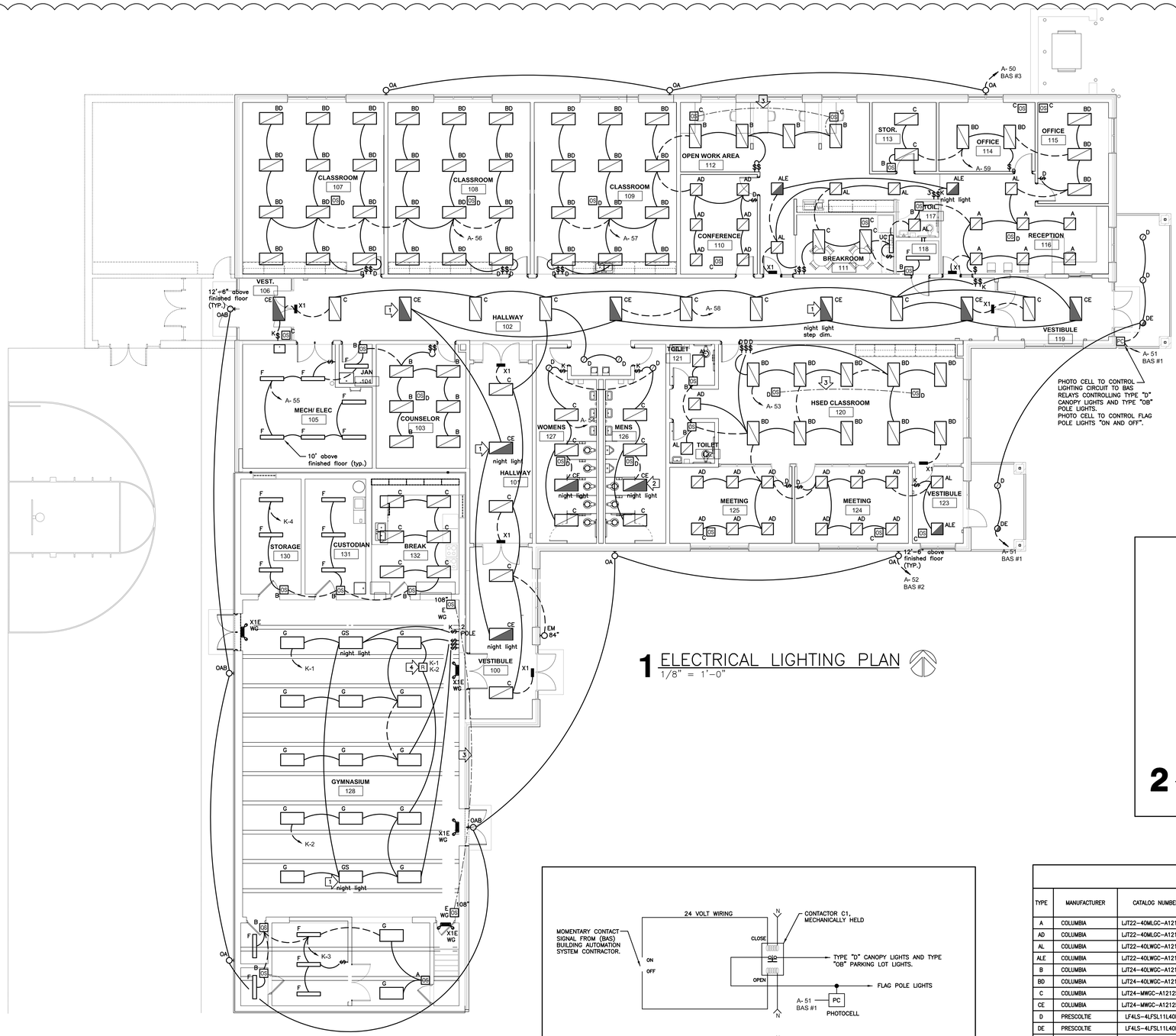
Revisions:

No.	Description	Date
A1	ADDENDUM #1	03/15/2018

Graphic Scale: **VARIES**

Last Update: **03/15/18**

E100R



1 ELECTRICAL LIGHTING PLAN

1/8" = 1'-0"

CONSTRUCTION NOTES: REMODEL

GENERAL NOTES:

a. ALL ELECTRICAL DEVICES SHOWN TO BE NEW, UNLESS INDICATED OTHERWISE.

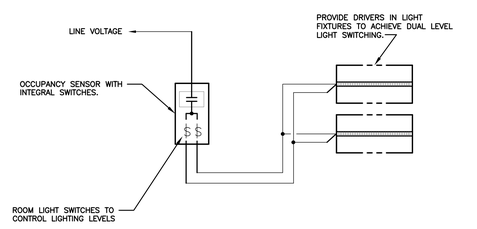
b. PROVIDE FIRE STOPPING AND SMOKE DRAFT STOPPING AT ALL CONDUIT PENETRATIONS. REFER TO SPECIFICATION SECTION 07840 FOR FIRE RESISTIVE AND NON-FIRE RESISTIVE ASSEMBLIES.

c. PROVIDE SEPARATE NEUTRAL CONDUCTORS FOR EACH BRANCH CIRCUIT. (NO COMMON NEUTRALS)

d. PROVIDE GROUND CONDUCTOR IN ALL NEW CONDUITS.

SPECIFIC NOTES:

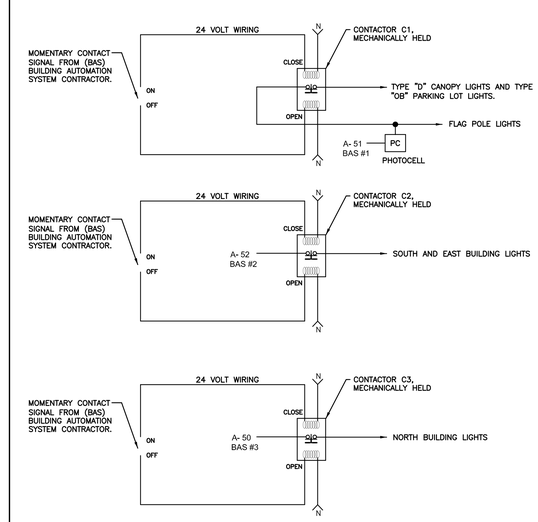
1. STEP DIMMING LIGHT FIXTURE TO BE ACTIVATED BY KEY SWITCH TO 40% OUTPUT. TOGGLE SWITCH TO ACTIVATE LIGHT FIXTURE TO 100% LIGHT OUTPUT (TYPICAL).
2. ROOM OCCUPANCY SENSOR TO CONTROL ROOM LIGHTING: TYPE "C" FIXTURES TO TURN ON AND OFF AT 100%; TYPE "CE" FIXTURE TO REMAIN AT 40% DURING UNOCCUPIED TIMES.
3. INTERLOCK ROOM OCCUPANCY SENSORS SO THAT EITHER ONE MAINTAIN BRANCH CIRCUIT TO LIGHT SWITCHES.
4. PROVIDE 2 POLE RELAY TO CONTROL BOTH LIGHTS CIRCUITS IN ROOM VIA LIGHTING OCCUPANCY SENSORS.



2 TYPE 'A' OCCUPANCY SENSOR

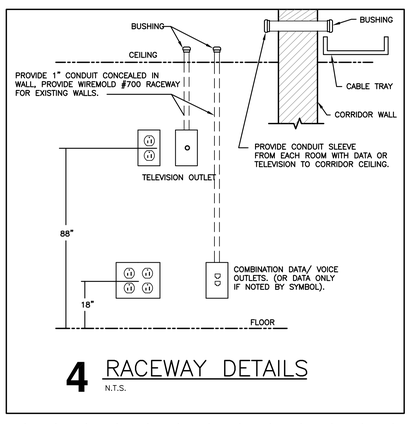
NTS

(DUAL LEVEL SWITCHING)



3 EXTERIOR LIGHTING CONTROL

NTS



4 RACEWAY DETAILS

N.T.S.

LIGHTING FIXTURE SCHEDULE

TYPE	MANUFACTURER	CATALOG NUMBER	DESCRIPTION	VOLT	MOUNTING ** F	S	P	O	LAMPS NO.	WATT	TYPE	REMARK NUMBER
A	COLUMBIA	LJT22-40MLGC-A12125-E	2' X 2' LAY IN TROFFER,	MVOLT	*				–	31	LED 4000K	1
AD	COLUMBIA	LJT22-40MLGC-A12125-ED1	2' X 2' LAY IN TROFFER, DIMMING TO 1%	MVOLT	*				–	31	LED 4000K	1,4
AL	COLUMBIA	LJT22-40LWGC-A12125-E	2' X 2' LAY IN TROFFER,	MVOLT	*				–	24	LED 4000K	1
ALE	COLUMBIA	LJT22-40LWGC-A12125-E-ELL14	2' X 2' LAY IN TROFFER, EMERGENCY BATTERY	MVOLT	*				–	24	LED 4000K	1
B	COLUMBIA	LJT24-40LWGC-A12125-ESD	2' X 4' LAY IN TROFFER, STEP DIMMING	MVOLT	*				–	34	LED 4000K	2,3
BD	COLUMBIA	LJT24-40LWGC-A12125-ES1	2' X 4' LAY IN TROFFER, DIMMING TO 1%	MVOLT	*				–	34	LED 4000K	2,4
C	COLUMBIA	LJT24-MWGC-A12125-E	2' X 4' LAY IN TROFFER	MVOLT	*				–	31	LED 4000K	2
CE	COLUMBIA	LJT24-MWGC-A12125-ESD-ELL14	2' X 4' LAY IN TROFFER, EMERGENCY BATTERY	MVOLT	*				–	31	LED 4000K	2,3
D	PRESCOLITE	LF4LS-4LFSL11L40K	4" LED DOWNLIGHT	MVOLT	*				–	15.5	4000K	6
DE	PRESCOLITE	LF4LS-4LFSL11L40K-EMG	4" LED DOWNLIGHT, WITH EMERGENCY BATTERY	MVOLT	*				–	15.5	4000K	6
F	COLUMBIA	LCL4-40ML-E	LED STRIP LIGHT	MVOLT		*				48	4000K	
G	COLUMBIA	LJT24-40VLSM-A12125-E	2' X 4' SURFACE FIXTURE	MVOLT		*			–	59	LED 4000K	5
GS	COLUMBIA	LJT24-40VLSM-A12125-ESD	2' X 4' SURFACE FIXTURE, STEP DIMMING	MVOLT		*			–	59	LED 4000K	5
EM	DUAL-LITE	PGZ-HTR	EXTERIOR EMERGENCY LIGHT	MVOLT		*			–	15.2	LED 4000K	8
X1	COMPASS	CER	EXIT LIGHT, RED LETTERS AND BATTERY	120		*			–	2.6	LED	7
X1E	COMPASS	CCR-WGEL	EXIT LIGHT, RED LETTERS, LIGHTING HEADS	120		*			–	2.6	LED	7
OA	DUAL-LITE	RDI14KUDB	EXTERIOR BUILDING LIGHT	MVOLT		*			–	32	LED 4000K	9
OAB	DUAL-LITE	RDI14KUDB-EH	EXTERIOR BUILDING AND EMERGENCY LIGHT	MVOLT		*			–	50	LED 4000K	10
OB	SPAULDING	CL1-A-60L1-4K-3-DB	PARKING LOT LIGHTS, WITH 20' 4" SQUARE POLES	120		*			–	135	LED 4000K	11

* SEE REMARKS
** (F) FLUSH MOUNT; (S) SURFACE MOUNT; (P) PENDANT HUNG; (O) OTHER-SEE REMARKS IN REGARDS TO FIXTURE MOUNTING.

LIGHTING FIXTURE SCHEDULE REMARKS:

1. 2' X 2' LENSED LED LAY-IN TROFFER.
2. 2' X 4' LENSED LED LAY-IN TROFFER.
3. PROVIDE WITH STEP DIMMING DRIVER.
4. PROVIDE WITH DIMMING DRIVER DOWN TO 1%.
5. SURFACE 2'X 4' LED LIGHT WITH AMERICAN TIME #G2081 WIRE GUARD.
6. 4" LED DOWNLIGHT.
7. EXIT LIGHT, WITH EMERGENCY BATTERY, RED LETTERS, WHITE FINISH.
8. EXTERIOR EGRESS LIGHT.
9. EXTERIOR BUILDING MOUNTED LIGHT.
10. EXTERIOR BUILDING MOUNTED LIGHT WITH BATTERY.
11. PARKING LOT LIGHT WITH 20' POLE 4" SQUARE STEEL POLE PAINTED TO MATCH LUMINARIE. PROVIDE CONCRETE BASE.

EQUAL FIXTURES BY COOPER LIGHTING, HUBBELL LIGHTING AND DAY-BRITE ARE ACCEPTABLE.

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E101R