

DOCUMENT 00 90 00

ADDENDUM

ADDENDUM NO. [2] Date: February 1, 2017
RE: PRAIRIE DU CHIEN SCHOOL DISTRICT
BA KENNEDY, BLUFF VIEW ELEMENTARY AND HIGH SCHOOL
800 EAST CRAWFORD
PRAIRIE DU CHIEN, WISCONSIN 53821
HSR 16040

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 January 13, 2017. 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 [13] pages, Pre-bid Attendance, [1] Revised Bid Form, [6] specification sections, and [108] 30 x 42 drawings.

CHANGES TO PRIOR ADDENDA:

BLUFFVIEW Addendum 1

1. Sheet M100R HVAC REMODEL SEGMENTS A AND B 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
2. Sheet M101R HVAC REMODEL SEGMENTS C 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
3. Sheet M102R HVAC REMODEL SEGMENTS D 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
4. Sheet M103R HVAC REMODEL ADDITION 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
5. Sheet M500R HVAC SCHEDULES 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
6. Sheet M501R HVAC DETAILS 30 x 42 attached hereto
 - a. Revisions clouded on drawing

CHANGES TO BIDDING REQUIREMENTS AND CONDITIONS OF THE CONTRACT:

7. Pre-bid attendance attached hereto.
8. Bid opening will be held in the "Little Theatre" adjacent to the cafeteria/commons in the high school.
9. Section 00 41 00 BID FORM
 - a. Revised section attached hereto.
10. Section 00 73 00 SUPPLEMENTARY CONDITIONS
 - a. 3.6: Clarification: Do not include sales tax in bids.

GENERAL REQUIREMENTS:

11. Section 01 10 00 SUMMARY OF THE WORK

- a. 1.04, B: Delete "paging system" from sentence. The paging system shall be included in the Contract. Refer to Section 27 51 17 attached to this addendum. Add "expansion of existing" in front of "gymnasium sound system". Paragraph shall read as follows:
"The Owner will secure separate contract with their vendor for building security/access control system and cameras and expansion of existing gymnasium sound system. Rough-ins shall be part of Contract."
- b. Delete Paragraph D. The data cable system shall be included in the Contract. Refer to Section 27 10 05 attached to this addendum.

12. Section 01 21 00 UNIT PRICES

- a. Add Unit Price 4 as follows:
Unit Price UP-4: Ceiling Removal/Reinstallation at HVAC Work
For ceiling tile and grid removal/reinstallation at HVAC remodeling areas state the amount per square foot to remove ceiling tile and required grid to install new HVAC ductwork and reinstall grid and tiles. Tiles and related grid may be stored in the room they are removed from, covered and protected. All ceiling work shall be performed by 09 51 00 contractor.
- b. Add Unit Price 5 as follows:
Unit Price UP-5: New Ceiling Tile
State the amount per 2 x 2 tile as specified in Section 09 51 00, to replace damaged ceiling tile from the HVAC work effort in existing rooms. All ceiling work shall be performed by 09 51 00 contractor.

CHANGES TO SPECIFICATIONS:

13. Section 04 20 00 UNIT MASONRY

- a. 2.02, A: For brick band 5 shown on elevations use lightest brick range from Brick 4 blend.
- b. 3.15: Add Paragraph 'G' as follows; "At brick expansion joints located at side of openings install a horizontal expansion joint off the top corner of the opening the length of the lintel, usually 8 inches."
- c. 3.16, A: Add the following to the end of the sentence; "Coat inside surfaces of hollow metal frames with bituminous paint prior to concealing in masonry."

14. Section 07 53 00 ELASTOMERIC MEMBRANE ROOFING

- a. Most existing membrane roof systems are under warranty. Any patching, tie-in or new equipment penetrations shall be done by a certified Firestone contractor to maintain warranties.
- b. Coordinate installation of piping vaults provided by Division 23 contractor. Refer to B. A. Kennedy M drawings.

15. Section 07 81 00 APPLIED FIREPROOFING

- a. Section attached hereto as part of construction documents.

16. Section 08 11 13 HOLLOW METAL FRAMES AND DOORS

- a. 2.03, B, d: Change “18 gage” to “16 gage”.
- b. 2.03, B, 3: Change “6.0” to “2.6”.
- c. 2.03, D, 3: Change “Mineral Core” to “polystyrene or mineral board as required to meet specified rating.” Honeycomb core not allowed.
- d. 2.04, D: Change “Full profile/continuously welded type” to “Face welded type”.
- e. 2.04: Delete paragraph J.
- f. 2.06, B: The bituminous paint shall be applied to frame at time of installation by Division 4.

17. Section 08 14 16 FLUSH WOOD DOORS

- a. 2.06, 1, b: Stain colors shall be selected from manufacturer’s full line.
- b. 2.06, C: Delete sentence and replace with “Seal edges as required by manufacturer’s standards to meet lifetime warranty.”

18. Section 08 43 13 ALUMINUM FRAMED STOREFRONTS

- a. 2.01: There are 4 1/2“ and 6” frame depths. Provide the corresponding 6” deep high performance thermal break frames for each manufacturer.
- b. 2.04: Interior vestibule framing shall be non-thermally broken.

19. Section 08 71 00 DOOR HARDWARE

- a. 2.02, D, 3: Delete sentence and replace with the following: “Non-ferrous HW BB hinges on all exterior doors and NRP hinges on out swinging exterior doors.”
- b. 2.06, A: Delete LCN numbers listed. Follow model numbers at individual groups.
- c. 3.04 Hardware Schedule:
 - i. It is the responsibility of the Hardware Supplier to confirm door sizes applicable to each hardware set and adjust sets accordingly to match door sizes.
 - ii. In all Groups, change all “S435A” thresholds to “S425A”.
 - iii. Hardware Group 2: Change Rain drip Model Number “R201A144” to R201A100”.
 - iv. Hardware Group 3: Add; 1 EA RIM CYLINDER 12E72 626 BEST
 - v. Hardware Groups 5, 36, 40, 59, 60, 66: Change Exit device “99NL-0P X 110MD 626” TO “99NL-0P X 388MD 626”
 - vi. Hardware Group 9: Add LCN 4010-18 Drop Plate.
 - vii. Hardware Group 67; Delete “omit key...” comment at end of group. 504E doors are installed in a frame with a keyed mullion.

20. Section 08 80 00 GLAZING

a. Add GLT 11 as follows:

GLT 11 - Transparent One-Way Mirror: Mirror quality float glass with pyrolytic (hard coat) type coating located on high light level surface of glass; ASTM C1376.

1. Applications: Locations as indicated on drawings.
2. Thickness: 1/4 inch.
3. Glass Tint: Grey.
4. Glass Type: Annealed.
5. Manufacturers:
 - a. Pilkington North America Inc ; Pilkington Mirropane Transparent Mirror:
www.pilkington.com/na.
 - b. Interpane "MirroVue"
 - c. Substitutions: Refer to Section 01 60 00 - Product Requirements

21. 13 34 13 GREENHOUSE

- a. 2.06: Shade factor for curtain shall be 55%.

22. Section CHINA AND ENAMELED FIXTURES AND TRIM

- a. 2.07, A, 1, b: Delete paragraph b and replace with the following:
"Flush valve: Sloan Model 8111 Sensor Flushometer; PERMEX Synthetic Rubber Diaphragm, ADA-Compliant optima Plus battery powered infrared sensor, latching solenoid operator, Three second flush delay, flush override button, four size AA batteries factory installed, Vandal resistant cap."
- b. 2.07, B, 1, b: Delete paragraph b and replace with the following:
"Flush valve: Sloan Model 8111 Sensor Flushometer; PERMEX Synthetic Rubber Diaphragm, ADA-Compliant optima Plus battery powered infrared sensor, latching solenoid operator, Three second flush delay, flush override button, four size AA batteries factory installed, Vandal resistant cap."

23. HVAC TABLE OF CONTENTS

- a. Remove Section 23 09 93 Controls from the documents. The Owner will be entering a separate contract for controls.

24. Section 26 27 26 WIRING DEVICES

- a. 2.03: Add Paragraph J. USB Charging Station as follows:
- i. 6" wire leads.
 - ii. Tamper resistant.
 - iii. 20 amp, 125 volt.
 - iv. 5V DC, 3.1 Amp USB charging ports.
 - v. NEMA 5-20R.
 - vi. Color: ivory.
 - vii. Manufacturer:
 1. Eaton Arrow Hart #TR7750, or equal.

25. Section 27 10 05 STRUCTURED CABLING FOR VOICE AND DATA

- a. Replace section in Volume B with attached section.

26. Section 27 51 17 PUBLIC ADDRESS SYSTEM

- a. Section attached hereto as part of construction documents.

27. Section 27 53 13 WIRELESS CLOCK SYSTEM

- a. Section attached hereto as part of construction documents.

28. Section 27 56 16 BELL SCHEDULING SYSTEM
 - a. Section attached hereto as part of construction documents.
29. Section 28 31 00 – FIRE DETECTION AND ALARM
 - a. Paragraph 1.01 add the following: **F.** Fire alarm installation company shall pay all fees required for plan submittal for state review. Include all forms and documents required.
30. Section 31 23 23 EPS INSULATION BOARD INFILL
 - a. Section attached hereto as part of construction documents.
 - b. Install under slab locations in auditorium. See structural items in this addendum.

CHANGES TO DRAWINGS

B. A. KENNEDY

31. Sheet A100R FIRST FLOOR SEGMENT B PLAN 30 x 42 attached hereto.
 - a. Revisions clouded on drawing.
 - b. Rooms SENSORY 212A AND READING ROOM 212B; see Frame Elevation “E” on A600R.
32. Sheet A200R INTERIOR ELEVATIONS 30 x 42 attached hereto.
 - a. Revisions clouded on drawing.
33. Sheet A600R DOOR SCHEDULE AND WALL TYPES 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
34. Sheet S100R FRAMING PLAN AND DETAILS 30 x 42 attached hereto
 - a. Revise 2/S100R to clarify that both new units shown are suspended from new joists (not mounted on roof).
 - b. Revise 3/S100R to show point loads from new joists on bottom chords (see previous item).
 - c. Revise 4/S100R to depict condition with load applied to joist bottom chords
 - d. Delete 6/S100R (no longer applicable).
35. Sheet P100R UNDERFLOOR PLUMBING PLAN 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
36. Sheet P101R FIRST FLOOR PLUMBING PLAN 30 x 42 attached hereto
 - a. Revisions clouded on drawing
37. Sheet E090R ELECTRICAL REMOVAL PLAN SEGMENT B 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
38. Sheet E101R ELECTRICAL POWER PLAN SEGMENT B 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
39. Sheet E110R ELECTRICAL LIGHTING PLAN SEGMENT B 30 x 42 attached hereto
 - a. Revisions clouded on drawing

BLUFFVIEW

40. Sheet A000 COVER SHEET
 - a. At Mechanical Drawings add “M104 HVAC PIPING.

41. Sheet A100 FIRST FLOOR SEGMENT A/B REMODEL PLAN
 - a. Science 323 and Prep 323A: At eastern portion of concrete floor to remain in 323 and in 323A, remove VCT flooring and prepare floor for epoxy flooring. A portion of 323A will be trenched for new floor drain.
 - b. At western end of Corridor A114, adjacent to Classroom 318, remove existing epoxy flooring as required to allow tie in of new epoxy flooring installed over new concrete infill area.
42. Sheet A302R SECTIONS 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
43. Sheet A303R SECTIONS 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
44. Sheet A600 DOOR SCHEDULE AND WALL TYPES
 - a. Door Schedule: At Doors A114A, A114A1 and C2 change door thickness to 1 ¾”.
45. Sheet ID100R FINISH FLOOR PLAN AND MASTER COLOR SCHEDULE 30 x 42 attached hereto
 - a. Finish Legend; Change “RS-1” to “RT-1”.
 - b. Refer to Paragraph above for Bluffview Sheet A100 for additional floor finish information.
46. Sheet S300R SHED PLANS AND DETAILS 30 x 42 attached hereto
 - a. Revise 1/S300R to delete two southernmost garage doors at west side of shed (doors no longer required).
 - b. Revise 2/S300R to delete headers for two southernmost garage doors at west side of shed.
47. Sheet P100R UNDERFLOOR PLUMBING PLAN 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
48. Sheet P101R FIRST FLOOR PLUMBING PLAN 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
49. Sheet M104 HVAC PIPING PLAN 30 x 42 attached hereto
 - a. Drawing attached hereto as part of construction document.
50. Sheet E100R POWER PLAN SEGMENT A 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
51. Sheet E101R LIGHTING PLAN SEGMENTS B AND C 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
52. Sheet E110R LIGHTING PLAN SEGMENT A, B AND E 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
53. Sheet E600R ELECTRICAL DETAILS 30 x 42 attached hereto
 - a. Revisions clouded on drawing

HIGH SCHOOL

54. Sheet A000 COVER SHEET
 - a. At Mechanical Drawings add “M122 SECOND FLOOR DUCTWORK PLAN SEGMENT E”
 - b. At Mechanical Drawings add “M601 HVAC SCHEDULES”

55. Sheet C101 DEMOLITION PLAN

a. Key Notes:

- i. Replace key notes #11 and #12 with the following: Overhead primary power lines and underground primary lines to be relocated by Alliant Energy. The general contractor shall be responsible for coordinating relocation of the primary power. All costs occurred by Alliant Energy to be billed directly to the owner.

56. A001R OVERALL FIRST FLOOR LIFE SAFETY PLAN 30 x 42 attached hereto

- a. Revisions clouded on drawing.
b. Added spray applied fireproofing and 1 hour wall(s).

57. A110-A125 SEGMENT PLANS

- a. Key Notes Plan – Note 28; add the following "...end of ramp / stairs 12".

58. A110R FIRST FLOOR PLAN SEGMENT A 30 x 42 attached hereto

- a. Revisions clouded on drawing.

59. A114R FIRST FLOOR PLAN SEGMENT E 30 x 42 attached hereto

- a. Revisions clouded on drawing.

60. A115R FIRST FLOOR PLAN SEGMENT F 30 x 42 attached hereto

- a. Revisions clouded on drawing.

61. A120R SECOND FLOOR PLAN SEG A 30 x 42 attached hereto

- a. Revisions clouded on drawing.

62. A125R SECOND FLOOR PLAN SEG F 30 x 42 attached hereto

- a. Revisions clouded on drawing.

63. A130R FIRST FLOOR OVERALL REFLECTED CEILING PLAN 30 x 42 attached hereto

- a. Revisions clouded on drawing.

64. A131R SECOND FLOOR OVERALL REFLECTED CEILING PLAN 30 x 42 attached hereto

- a. Revisions clouded on drawing.

65. A140R FIRST FLOOR REFLECTED CEILING PLAN SEG A 30 x 42 attached hereto

- a. Revisions clouded on drawing.

66. A144R FIRST FLOOR REFLECTED CEILING PLAN SEG E 30 x 42 attached hereto

- a. Revisions clouded on drawing.

67. A145R FIRST FLOOR REFLECTED CEILING PLAN SEG F 30 x 42 attached hereto

- a. Revisions clouded on drawing.

68. A150R SECOND FLOOR REFLECTED CEILING PLAN SEG A 30 x 42 attached hereto

- a. Revisions clouded on drawing.

69. A155R FIRST FLOOR REFLECTED CEILING PLAN SEG F 30 x 42 attached hereto

- a. Revisions clouded on drawing.

70. A204R FRAME ELEVATIONS 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
71. Sheet A211 INTERIOR ELEVATIONS
 - a. 5A211: Change DP-1 and DP-4 (4 x 8 sheets) locations to DP-2 and DP-5 (4 x 4 sheets).
72. A303R WALL SECTIONS – AUDITORIUM 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
73. A304 WALL SECTIONS
 - a. DETAIL 3: At left side of detail in notes calling out glazing film change “3A504” to “5A200”.
74. A306 WALL SECTIONS - AUDITORIUM
 - a. Detail 2: Under floor slab change “FILL AT INTERIOR” to “FOAM FILL – SEE STRUCTURAL”. Refer to Section 31 23 23 attached to this addendum.
75. A500R DETAILS 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
76. A600R DOOR SCHEDULE 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
77. Sheet ID101 SECOND FLOOR OVERALL FINISH PLAN
 - a. Penthouse 600 shall receive traffic coating as specified in Section 07 18 00.
78. Sheet ID 120 SECOND FLOOR FINISH PLAN SEGMENT ‘A’
 - a. Science Room 200: Conduct epoxy removal/patching at south end of room as required to create a clean tie-in to new epoxy flooring installed in Storage 204B.
79. Sheet SE100R STAGE EQUIPMENT PLAN AND SCHEDULE 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
80. Sheet S100 GYM FOUNDATION PLAN
 - a. At upper-left corner of sheet revise detail reference on right side of plan “19S800” to “16S800”.
81. Sheet S101R AUDITORIUM FOUNDATION PLAN 30 x 42 attached
 - a. Add notes clarifying slab on grade requirements.
 - b. Revise Plan Note 2 regarding slab on grade requirements.
 - c. Revise slab on grade notes at stage area.
 - d. Add note regarding control joints in seating area.
 - e. Revise foundation in stage/orchestra pit area.
 - f. Revise wall footing near Grid D at north end of auditorium.
 - g. Add foundation wall steps for interior wall at south end.
82. Sheet S101R (ALT) AUDITORIUM FOUNDATION PLAN 30 x 42 attached hereto
 - a. Add notes clarifying slab on grade requirements.
 - b. Revise Plan Note 2 regarding slab on grade requirements.
 - c. Revise slab on grade notes at stage area.
 - d. Add note regarding control joints in seating area.
 - e. Revise foundation in stage/orchestra pit area.
 - f. Add foundation wall steps for interior wall at south end.
83. Sheet S200R GYM ROOF FRAMING PLAN 30 x 42 attached hereto
 - a. Add (2) mechanical openings.
 - b. Revise call-outs at entryways to clarify that there is precast plank below.

84. Sheet S200R (ALT) GYM ROOF FRAMING PLAN 30 x 42 attached hereto
- Add (3) mechanical openings.
 - Revise call-outs at entryways to clarify that there is precast plank below.
85. Sheet S201R AUDITORIUM SECOND FLOOR FRAMING PLAN 30 x 42 attached hereto
- Add (1) mechanical opening.
 - Revise lintel size for exterior mechanical louver.
 - Revise Keyed Note at ticketing/concessions area.
 - Add reference to 13/S901 at ticketing/concessions area.
86. Sheet S201R (ALT) AUDITORIUM SECOND FLOOR FRAMING PLAN 30 x 42 attached hereto
- Add (1) mechanical opening.
 - Revise lintel size for exterior mechanical louver.
 - Delete reference to 13/S901 at ticketing/concessions area.
87. Sheet S500R ROOFTOP UNITS AT EXISTING 30 x 42 attached hereto
- Add (6) mechanical openings ((2) in new precast plank, (3) in existing building roof/floor, (1) for louver in wall between existing and new construction).
 - Revise 5/S500R to clarify precast bearing conditions.
88. Sheet S800 FOUNDATION DETAILS
- 1S800: Over excavation is covered in Section 01 22 00 Unit Prices. This detail gives options for the contractor if soil correction is required. The process chosen should be reflected in the unit price.
 - 16 and 21S800: Delete reference to wire mesh in slab. Slabs are reinforced with fibers.
89. Sheet S801R FOUNDATION DETAILS 30 x 42 attached hereto
- Revise Detail 1/S801R to accommodate change in orchestra pit depth.
 - Revise Detail 5/S801R to accommodate change in orchestra pit depth.
90. Sheet M090 HVAC REMODEL PLAN SEGMENT B 30 x 42 attached
- Drawing attached hereto as part of construction document.
91. Sheet M091 FIRST FLOOR HVAC REMOVAL PLAN SEGMENT B EAST 30 x 42 attached hereto
- Drawing attached hereto as part of construction document.
92. Sheet M092 FIRST FLOOR HVAC REMOVAL PLAN SEGMENT E AND F 30 x 42 attached hereto
- Drawing attached hereto as part of construction document
93. Sheet M093 SECOND FLOOR HVAC REMOVAL PLAN 30 x 42 attached hereto
- Drawing attached hereto as part of construction document
94. Sheet M094 SECOND FLOOR HVAC REMOVAL PLAN SEGMENT E 30 x 42 attached hereto
- Drawing attached hereto as part of construction document
95. Sheet M100 BASEMENT FLOOR CHILLER ROOM PLAN 30 x 42 attached hereto
- Drawing attached hereto as part of construction document
96. Sheet M101 FIRST FLOOR PIPING PLAN SEGMENT A 30 x 42 attached hereto
- Drawing attached hereto as part of construction document
97. Sheet M102 FIRST FLOOR PIPING PLAN SEGMENT B 30 x 42 attached hereto
- Drawing attached hereto as part of construction document
98. Sheet M103 FIRST FLOOR PIPING PLAN SEGMENT C 30 x 42 attached hereto
- Drawing attached hereto as part of construction document

99. Sheet M104 FIRST FLOOR HVAC PIPING PLAN SEGMENT D 30 x 42 attached hereto
 - a. Drawing attached hereto as part of construction document
100. Sheet M105 FIRST FLOOR HVAC PIPING PLAN SEGMENT E 30 x 42 attached hereto
 - a. Drawing attached hereto as part of construction document
101. Sheet M106 FIRST FLOOR HVAC PIPING PLAN SEGMENT E 30 x 42 attached hereto
 - a. Drawing attached hereto as part of construction document
102. Sheet M107 SECOND FLOOR HVAC PIPING PLAN SEGMENT F 30 x 42 attached hereto
 - a. Drawing attached hereto as part of construction document
103. Sheet M108 SECOND FLOOR HVAC PIPING PLAN SEGMENT A 30 x 42 attached hereto
 - a. Drawing attached hereto as part of construction document
104. Sheet M109 SECOND FLOOR HVAC PIPING PLAN SEGMENT D 30 x 42 attached hereto
 - a. Drawing attached hereto as part of construction document
105. Sheet M110 FIRST FLOOR DUCTWORK PLAN SEGMENT A 30 x 42 attached hereto
 - a. Drawing attached hereto as part of construction document
106. Sheet M111 FIRST FLOOR DUCTWORK PLAN SEGMENT B 30 x 42 attached hereto
 - a. Drawing attached hereto as part of construction document
107. Sheet M112 FIRST FLOOR DUCTWORK PLAN SEGMENT C 30 x 42 attached hereto
 - a. Drawing attached hereto as part of construction document
108. Sheet M112A SECOND FLOOR DUCTWORK PLAN SEGMENT C - ALTERNATE 30 x 42 attached hereto
 - a. Drawing attached hereto as part of construction document.
109. Sheet M113 FIRST FLOOR DUCTWORK PLAN SEGMENT D 30 x 42 attached hereto
 - a. Drawing attached hereto as part of construction document
110. Sheet M114 FIRST FLOOR DUCTWORK PLAN SEGMENT E 30 x 42 attached hereto
 - a. Drawing attached hereto as part of construction document.
111. Sheet M115 FIRST FLOOR DUCTWORK PLAN SEGMENT F 30 x 42 attached hereto
 - a. Drawing attached hereto as part of construction document
112. Sheet M120 SECOND FLOOR HVAC DUCTWORK PLAN SEGMENT A 30 x 42 attached hereto
 - a. Drawing attached hereto as part of construction document.
113. Sheet M121 HVAC PENTHOUSE AND ROOF PLAN 30 x 42 attached hereto
 - a. Drawing attached hereto as part of construction document.
114. Sheet M122 SECOND FLOOR DUCTWORK PLAN SEGMENT E 30 x 42 attached hereto
 - a. Drawing attached hereto as part of construction document.
115. Sheet M125 SECOND FLOOR DUCTWORK PLAN SEGMENT F 30 x 42 attached hereto
 - a. Drawing attached hereto as part of construction document

116. Sheet M300 HVAC SECTIONS 30 x 42 attached
 - a. Drawing attached hereto as part of construction document
117. Sheet M301 HVAC SECTIONS 30 x 42 attached
 - a. Drawing attached hereto as part of construction document
118. Sheet M500 HVAC SCHEDULES 30 x 42 attached
 - a. Drawing attached hereto as part of construction document
119. Sheet M501 HVAC SCHEDULES 30 x 42 attached
 - a. Drawing attached hereto as part of construction document
120. Sheet M600 HVAC SCHEDULES 30 x 42 attached
 - a. Drawing attached hereto as part of construction document
121. Sheet M601 HVAC SCHEDULES 30 x 42 attached
 - a. Drawing attached hereto as part of construction document
122. Sheet E090R FIRST FLOOR ELECTRICAL REMOVAL PLANS 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
123. Sheet E091R FIRST FLOOR ELECTRICAL REMOVAL PLANS 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
124. Sheet E092R SECOND FLOOR ELECTRICAL REMOVAL PLANS 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
125. Sheet E093R SECOND FLOOR ELECTRICAL REMOVAL PLANS 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
126. Sheet E100R FIRST FLOOR POWER PLAN SEGMENT A 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
127. Sheet E100AR FIRST FLOOR POWER PLAN SEGMENT A – ALTERNATE 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
128. Sheet E101R FIRST FLOOR POWER PLAN SEGMENT B 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
129. Sheet E102R FIRST FLOOR POWER PLAN SEGMENT C 30 x 42 attached hereto
 - a. Revisions clouded on drawing
130. Sheet E102AR FIRST FLOOR POWER PLAN SEGMENT C – ALTERNATE 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
131. Sheet E103R FIRST FLOOR POWER PLAN SEGMENT D 30 x 42 attached hereto
 - a. Revisions clouded on drawing
132. Sheet E104R FIRST FLOOR POWER PLAN SEGMENT E 30 x 42 attached hereto
 - a. Revisions clouded on drawing
133. Sheet E105R FIRST FLOOR POWER PLAN SEGMENT F 30 x 42 attached hereto
 - a. Revisions clouded on drawing

- 134. Sheet E106AR SECOND FLOOR POWER PLAN SEGMENT A – ALTERNATE 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
- 135. Sheet E107R SECOND FLOOR POWER PLAN SEGMENT C 30 x 42 attached hereto
 - a. Revisions clouded on drawing
- 136. Sheet E107AR SECOND FLOOR POWER PLAN SEGMENT C – ALTERNATE 30 x 42 attached hereto
 - a. Revisions clouded on drawing
- 137. Sheet E108R SECOND FLOOR POWER PLAN SEGMENT D 30 x 42 attached hereto
 - a. Revisions clouded on drawing
- 138. Sheet E109R SECOND FLOOR POWER PLAN SEGMENT E 30 x 42 attached hereto
 - a. Revisions clouded on drawing
- 139. Sheet E110R SECOND FLOOR POWER PLAN SEGMENT E 30 x 42 attached hereto
 - a. Revisions clouded on drawing
- 140. Sheet E105R SECOND FLOOR POWER PLAN SEGMENT F 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
- 141. Sheet E111R BASEMENT FLOOR POWER PLAN SEGMENT E 30 x 42 attached hereto
 - a. Revisions clouded on drawing
- 142. Sheet E120R ELECTRICAL LIGHTING PLAN FIRST LEVEL 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
- 143. Sheet 121AR ELECTRICAL LIGHTING PLAN – ALTERNATE 30 x 42 attached hereto
 - a. Revisions clouded on drawing
- 144. Sheet E500R ELECTRICAL RISER DIAGRAM 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
- 145. Sheet E600R ELECTRICAL DETAILS 30 x 42 attached hereto
 - a. Revisions clouded on drawing.
- 146. Sheet E700R ELECTRICAL SCHEDULES 30 x 42 attached hereto
 - a. Equipment Schedules:
 - ii. Delete Equipment Mark Numbers HD1 and HD2 from schedule and all places shown on drawings. Delete associated circuit breakers and wiring.

PRIOR APPROVALS

- 1. Section 05 12 00 STRUCTURAL STEEL FRAMING
 - a. Armatherm Thermal Break Solutions 800-580-3984
- 2. Section 08 71 00 DOOR HARDWARE
 - a. Ives approved for hinges, protective plates and wall/floor stops.
- 3. Section 09 67 00 FLUID APPLIED FLOORING
 - a. Crossfield Products Corp., Dex-O-Tex
- 4. Section 11 61 63 THEATRICAL RIGGING SYSTEM
 - a. LVH Entertainment Systems (1.05 and 2.01 approval)

5. Section 13 34 13 GREENHOUSE
 - a. Winandy Greenhouse Co., Inc., (765) 935-2111
 - b. Wisconsin Solar Design
 - c. Albert J. Lauer Inc. (651) 423-1651
6. Section 22 10 83 COMPRESSED AIR PIPING
 - a. Transair or Airpipe Systems

END OF DOCUMENT 00 90 00

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"SIGN-IN" SHEET



HSR Associates

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100 Aldenoke St • La Crosse, WI 54601 • 608.781.1830

PROJECT: Prairie du Chien School District Renovations/Additions

HSR NO.: 16040 DATE: January 25, 2017

PLEASE PRINT ALL INFORMATION CLEARLY

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DOCUMENT 00 41 00 (REVISED)

BID FORM

BIDDER: _____

BID FOR SINGLE PRIME CONTRACT

PROJECT: PRAIRIE DU CHIEN SCHOOL DISTRICT
BA KENNEDY, BLUFF VIEW ELEMENTARY AND HIGH SCHOOL
800 EAST CRAWFORD
PRAIRIE DU CHIEN, WISCONSIN 53821
HSR 16040

TO: PRAIRIE DU CHIEN SCHOOL DISTRICT
800 EAST CRAWFORD
PRAIRIE DU CHIEN, WISCONSIN 53821

BASE BID

The undersigned, having examined the site where the Work is to be executed and become familiar with local conditions affecting the cost of the Work and carefully examined the Project Manual, the Project Drawings, all other Bidding Documents and Addenda thereto prepared by the AE, HSR Associates, Inc., hereby agrees to provide all labor, materials, equipment and services necessary for the complete and satisfactory execution of the ENTIRE WORK, including General Construction, Plumbing, Heating, Ventilating, Air Conditioning and Electrical Work for the Base Bid stipulated sum of:

_____ Dollars (\$_____ .00)

The Base Bid stipulated sum, stated above, includes work by the following major subcontractors intended for Work on this Project: ***(This information will not be used to determine low bidders)***

[NOTE: Separate prices for Plumbing and HVAC Work are required below even if Plumbing and HVAC Work is to be performed by the same subcontractor.]

PLUMBING WORK: _____
_____ Dollars (\$_____ .00)

(Name): _____

HVAC WORK: _____
_____ Dollars (\$_____ .00)

(Name): _____

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ELECTRICAL WORK: _____

_____ Dollars (\$_____ .00)

(Name): _____

ALTERNATE BIDS

The undersigned further agrees to perform the alternative portions of the Work as described in the Project Manual, Section 01 23 00 Alternates, for the following additions to or deductions from the Base Bid sum stipulated above:

Alternate No. 1: One Bay Gym Addition

Add _____ Dollars (\$_____ .00)

Alternate No. 2: Auditorium Balcony Addition with 250 Additional Seats

Add _____ Dollars (\$_____ .00)

Alternate No. 3: Bluffview Maintenance Storage Building

Add _____ Dollars (\$_____ .00)

Alternate No. 4: Orchestra Pit Floor Lift

Add _____ Dollars (\$_____ .00)

UNIT PRICES

The undersigned agrees to add or deduct portions of the Work from the Contract as described in the Project Manual, Section 01 22 00 Unit Prices, for the following Unit Price amounts:

A. Unit Price UP-1: (Excess Excavation)

Per cubic yard _____ Dollars (\$_____ .00)

B. Unit Price UP-2: (Compacted Fill)

Per cubic yard _____ Dollars (\$_____ .00)

C. Unit Price UP-3: (Floor Topping/Leveler Compound)

Per cubic foot _____ Dollars (\$_____ .00)

D. Unit Price UP-4: (Suspended Ceiling Removal/Reinstallation at HVAC Work)

Per square foot _____ Dollars (\$_____ .00)

E. Unit Price UP-5: (New Ceiling Tile)

Per 2 x 2 Tile _____ Dollars (\$_____ .00)

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BIDDER'S CHOICE SUBSTITUTIONS

The following Bidder's Choice Substitution is proposed for your consideration subject to the requirements set forth in Document 00 22 13 Supplementary Instructions to Bidders, Subparagraph 3.3.4:

Substitution No. S1:

For substituting _____

Type, Brand, Catalog No. _____

Manufacturer _____

Deduct from BASE BID _____ Dollars (\$ _____ .00)

In submitting this Bid, the undersigned agrees to:

1. Hold this Bid open for **60** days.
2. Accept the provisions of Instructions to Bidders regarding disposition of Bid Security.
3. Enter into and execute an Agreement, if awarded on the basis of this Bid, and to furnish Performance and Labor and Material Payment Bonds according to the Supplementary Conditions.
4. Accomplish work according to the Contract Documents.
5. Complete the work by the time stated in Section 01 10 00 Summary of the Work.

Receipt of the following Addenda and inclusion of their provisions in this Bid is hereby acknowledged:

Addendum No. _____ Dated _____

Addendum No. _____ Dated _____

Addendum No. _____ Dated _____

Addendum No. _____ Dated _____

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Attached hereto are the required:

- a. Bid Security
- b. Certificate of Organization and Authority
- c. Non-Collusive Affidavit: An affidavit in proof that the undersigned has not entered into any collusion with any person in respect to this Bid or any other bid or the submitting of bids for the contract for which this bid is submitted.
- d. An executed Document 00 45 15 Disclosure of Ownership is:
 - Attached hereto
 - Not applicable to the undersigned Bidder

FIRM NAME: _____

(Affix seal if
Corporation)

By: _____

Title: _____

By: _____

Title: _____

Date: _____

Official Address: _____

Telephone: _____

END OF DOCUMENT 00 41 00

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SECTION 07 81 00
APPLIED FIREPROOFING

PART 1 GENERAL

1.01 SECTION INCLUDES

- A. Fireproofing of interior structural steel not exposed to damage or moisture.

1.02 RELATED REQUIREMENTS

- A. Section 01 40 00 - Quality Requirements: Additional requirements relating to testing agencies and testing.
- B. Section 05 12 00 - Structural Steel Framing.
- C. Section 07 84 00 - Firestopping.

1.03 REFERENCE STANDARDS

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- B. ASTM E605/E605M - Standard Test Methods for Thickness and Density of Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members; 1993 (2015)e1.
- C. ASTM E736/E736M - Standard Test Method for Cohesion/Adhesion of Sprayed Fire-Resistive Materials Applied to Structural Members; 2000 (2015)e1.
- D. ASTM E760/E760M - Standard Test Method for Effect of Impact on Bonding of Sprayed Fire-Resistive Material Applied to Structural Members; 1992 (Reapproved 2015)e1.
- E. ASTM E761/E761M - Standard Test Method for Compressive Strength of Sprayed Fire-Resistive Material Applied to Structural Members; 1992 (Reapproved 2015).
- F. ASTM E937/E937M - Standard Test Method for Corrosion of Steel by Sprayed Fire-Resistive Material (SFRM) Applied to Structural Members; 1993 (Reapproved 2015).
- G. UL (FRD) - Fire Resistance Directory; current edition.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordinate with placement of ceiling hanger tabs, mechanical component hangers, and electrical components.
- B. Preinstallation Meeting: Convene one week before starting work of this section.

1.05 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittals procedures.
- B. Product Data: Provide data indicating product characteristics, performance criteria, and limitations of use.
- C. Test Reports: Reports from reputable independent testing agencies for proposed products, indicating compliance with specified criteria, conducted under conditions similar to those on project, for:
 - 1. Bond Strength.
 - 2. Bond Impact.
 - 3. Compressive Strength.
 - 4. Fire tests using substrate materials similar to those on project.
 - a. Applicator shall provide calculations of adjustments made to members that differ in size from testing agency test sizes. Calculations shall be made by use of the W/D formula.
- D. Manufacturer's Installation Instructions: Indicate special procedures.
- E. Manufacturer's Certificate: Certify that sprayed-on fireproofing products meet or exceed requirements of contract documents.
- F. Manufacturer's Field Reports: Indicate environmental conditions under which fireproofing materials were installed.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.

1.07 FIELD CONDITIONS

- A. Do not apply spray fireproofing when temperature of substrate material and surrounding air is below 40 degrees F or when temperature is predicted to be below said temperature for 24 hours after application.
- B. Provide ventilation in areas to receive fireproofing during application and 24 hours afterward, to dry applied material.
- C. Provide temporary enclosure to prevent spray from contaminating air.
- D. Do not allow roof traffic during installation of roof fireproofing and drying period.

1.08 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a one year period after Date of Substantial Completion.
 - 1. Include coverage for fireproofing to remain free from cracking, checking, dusting, flaking, spalling, separation, and blistering.
 - 2. Reinstall or repair failures that occur within warranty period.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Sprayed-On Fireproofing:
 - 1. Carboline Company : www.carboline.com.
 - 2. GCP Applied Technologies : www.gcpat.com/sle.
 - 3. Isolatek International Inc : www.isolatek.com.
 - 4. Southwest Fireproofing Products Company : www.sfrm.com.
 - 5. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 FIREPROOFING ASSEMBLIES

- A. Spray Applications: Any material meeting requirements.
 - 1. Fire Ratings: Use any system listed by UL that meets the required hourly rating indicated on the drawing.

2.03 MATERIALS

- A. Sprayed Fire-Resistive Material for Interior Applications, Concealed: Manufacturer's standard factory mixed material, which when combined with water is capable of providing the indicated fire resistance, and conforming to the following requirements:
 - 1. Bond Strength: 150 pounds per square foot, minimum, when tested in accordance with ASTM E736/E736M when set and dry.
 - 2. Dry Density: As required by fire resistance design.
 - 3. Compressive Strength: 8.33 pounds per square inch, minimum.
 - 4. Effect of Impact on Bonding: No cracking, spalling or delamination, when tested in accordance with ASTM E760/E760M.
 - 5. Corrosivity: No evidence of corrosion, when tested in accordance with ASTM E937/E937M.
 - 6. Surface Burning Characteristics: Maximum flame spread index of 0 (zero) and maximum smoke developed index of 0 (zero), when tested in accordance with ASTM E84.

2.04 ACCESSORIES

- A. Primer Adhesive: Of type recommended by fireproofing manufacturer.
- B. Water: Clean, potable.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that surfaces are ready to receive fireproofing.
- B. Verify that clips, hangers, supports, sleeves, and other items required to penetrate fireproofing are in place.
- C. Verify that ducts, piping, equipment, or other items that would interfere with application of fireproofing have not been installed.
- D. Verify that voids and cracks in substrate have been filled. Verify that projections have been removed where fireproofing will be exposed to view as a finish material.

3.02 PREPARATION

- A. Review cold weather protection methods and temporary heat requirements of work areas and incorporate as required.
- B. Perform tests as recommended by fireproofing manufacturer in situations where adhesion of fireproofing to substrate is in question.
- C. Remove incompatible materials that could affect bond by scraping, brushing, scrubbing, or sandblasting.
- D. Prepare substrates to receive fireproofing in strict accordance with instructions of fireproofing manufacturer.
- E. Apply fireproofing manufacturer's recommended bonding agent on primed steel.
- F. Protect surfaces not scheduled for fireproofing and equipment from damage by overspray, fall-out, and dusting.
- G. Close off and seal duct work in areas where fireproofing is being applied.

3.03 APPLICATION

- A. Apply primer adhesive in accordance with manufacturer's instructions.
- B. Apply fireproofing in thickness and density necessary to achieve required ratings, with uniform density and texture.
- C. Completely fill metal deck flutes above beams.

3.04 FIELD QUALITY CONTROL

- A. An independent testing agency will perform field quality control tests as specified in Section 01 40 00 - Quality Requirements.
- B. Inspect the installed fireproofing after application and curing for integrity, prior to its concealment. Ensure that actual thicknesses, densities, and bond strengths meet requirements for specified ratings and requirements of the Authority Having Jurisdiction.
- C. Remove and replace installed fireproofing that does not comply with specified requirements, as directed by Architect.
- D. Re-inspect the installed fireproofing for integrity of fire protection, after installation of subsequent Work.

3.05 CLEANING

- A. Remove excess material, overspray, droppings, and debris.
- B. Remove fireproofing from materials and surfaces not required to be fireproofed.

END OF SECTION

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SECTION 27 10 05

STRUCTURED CABLING FOR VOICE AND DATA

PART 1: GENERAL

1.01 SCOPE

- A. The applicable provisions of Division 1 shall govern work specified in this section.

1.02 WORK INCLUDED

- . Furnish and install a complete communications cabling system: horizontal data cables, and Fiber Optic Cables. Install in conduit in building riser pathways, in cable tray and/or free-air in as identified on the Drawings.
- A. At each Communications/Hub Room, Fiber Optic cable terminations and Horizontal data cables shall be mounted on wall mounted equipment racks.
- C. Provide various equipment for pulling, racking, terminating, testing documentation and labeling. Also provide other equipment as specified below.
- D. All cables and splice equipment shall be furnished, installed, tested, and wired including proper grounding/bonding by the Contractor.

1.03 WORK SEQUENCE

- A. During the construction period coordinate telecommunications schedule and operations with the Owner
- B. For additional information pertaining to the sequencing of the work refer to Division 1.

1.04 UTILITY ALLOWANCE

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

1.05 SUBMITTALS

- A. Submit six (6) sets, of which two (2) will be returned to the contractor, of Shop Drawings for all materials proposed, in accordance with provisions of Division 1.
- B. Submit product data indicating cable and accessory construction, materials, ratings and all other parameters identified in Part 2 - Products below.
- C. A complete description of the material which the contractor proposes to substitute and reason for substitution.
- D. Submit manufacturer's installation instructions.
- E. Work shall not proceed without the approved submittals.

1.06 SYSTEM DESCRIPTION

- A. The system shall include the provision of horizontal data/ voice cable and video cabling installed as indicated on the drawings and routed to each telecommunications station or TV outlet box. **There shall be a minimum of one voice and one data cable run to each voice/data outlet, one data cable run to each data outlet, and one voice cable run to each voice outlet unless indicated otherwise on the floor plans.**

1.07 PROJECT RECORD DOCUMENTS

- A. Submit record documents under provisions.
- B. Accurately record exact sizes, locations and quantities of cables.

1.08 QUALITY ASSURANCE

- A. The manufacturer shall be a company specializing in communication cable and/or accessories with a minimum of five years documented experience in producing cable and/or accessories similar to those specified below.

1.09 CODE REQUIREMENTS

- A. ANSI/IEEE C2 - National Electrical Safety Code
- B. NFPA 70-1999 - National Electrical Code.
- C. Wisconsin Department of Commerce Chapter Comm 16 - Wisconsin Electrical Code
- D. EIA/TIA Standards

1.10 DELIVERY, STORAGE AND HANDLING

- A. Deliver products to and receive products at the site under provisions of Division 1.
- B. Cable shall be stored according to manufacturer's recommendations as minimum. In addition, cable must be stored in a location protected from vandalism and weather. If cable is stored outside, it must be covered with opaque plastic or canvas with provision for ventilation to prevent condensation and for protection from weather. If air temperature at cable storage location will be below 40 degrees F., the cable shall be moved to a heated (50 degrees F. minimum) location. If necessary, cable shall be stored off site at the contractors expense.

PART 2: PRODUCTS

2.01 OPTICAL FIBER SPECIFICATIONS - BACKBONE CABLE

- A. This cable shall be suitable for installation free-air, in building Risers, in Conduit, in Cable Tray and/or in Innerduct and shall be plenum rated.
- B. Cabling shall carry an OFNR rating (Optical Fiber Non-Conductive Riser) and shall be listed as being suitable for use in a vertical run in a shaft or from floor to floor and shall be listed as having fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.
- C. General
 - 1. The fiber count in each cross-section shall be (6) multi-mode.

2. All optical fibers shall be sufficiently free of surface imperfections and inclusions to meet the optical, mechanical, and environmental requirements of this specification. Factory optical fiber splices are not allowed.
3. All fibers shall have been subjected to a minimum tensile proof test by the fiber manufacturer equivalent to 100-kpsi.
4. All fibers in each cable shall be guaranteed to meet the stated specifications.

D. Multi-mode Optical Fibers

1. Multi-mode Optical Fibers in each cable shall meet the following specifications:

Fiber Type	Multi-mode; doped silica core surrounded by a concentric glass cladding.
Index Profile	Graded Index
Transmission Windows	850-nm and 1300-nm
Core Diameter (nom)	62.5- μ m (microns) \pm 3
Cladding Diameter	125- μ m \pm 2
Core-clad Concentricity	\leq 3- μ m
Cladding Non-circularity	\leq 2.0%

Fiber Coating Diameter 250- μ m \pm 15 (primary coating)
 All coatings shall be mechanically strippable without damaging the optical fiber.

Attenuation (max. @ 23 \pm 5 °C; Backbone)

@ 850-nm	3.75-dB/km
@ 1300-nm	1.5 “

2.02 HORIZONTAL COPPER VOICE AND DATA WIRE

- A. All cables and equipment shall be furnished, tested, installed and wired by the Contractor. The following should be used for the horizontal cabling:

- (1) Plenum Rated:
- (2) Color: Blue for Data and White for Voice Cabling.

- B. Transmission characteristics of the cable shall meet full Category 6 performance as specified by the EIA/TIA. Bidders must specify the methods by which the cables are tested to verify conformance to the specifications, the identity of the testing body and the quality control mechanisms employed by the manufacturer to insure product compliance.

- C. Transmission characteristics of the Cables shall meet full Category 6 performance criteria as defined by the referenced TIA/EIA documents. Refer to the Execution Section which details the required performance criteria of the completed Link of which the Cable is a part.

IMPORTANT: Cable and Termination Components (Jack, Patch Panel, Wiring Blocks) are specified to function as a System. The compatibility of the Cable to be installed with the proposed termination components shall be recognized and

documented by the Termination Component Manufacturer.

- D. The cable shall be restricted to four-pair size to support a broad range of applications. The pair twists of any pair shall not be exactly the same as any other pair. The pair twist lengths shall be selected by the manufacturer to ensure compliance with the near-end crosstalk requirements of EIA/TIA 568 and NEMA.
- E. Cable shall meet specifications of NEMA (low loss), EIA/TIA 568, UL 444, and ICEA.

2.03 MODULAR JACKS AND FACE PLATES

- A. Station cables shall each be terminated at their designated Workstation area and Data Rooms. The color of the USOC RJ-45 8 pin nonkeyed voice jack is to be white. The Category 6, 568B keyed data jacks are to be blue in color.
- B. Data termination hardware shall meet full Category 6 performance specifications for connecting hardware. All pair combinations must be considered with the worst case measurement being the basis for compliance. Bidders must specify the methods by which the Jacks are tested to verify conformance to the specification, the identity of the testing body and the quality control mechanisms employed by the manufacturer to insure product compliance.
- C. Face plates shall be furnished by the Contractor. Color of the face plates shall be white. Face plates shall consist of a mounting frame designed for use with modular jacks as identified on the floor plan. All modular jacks and outlet face plates will be made of high impact resistant nylon.
- D. It is the contractor's responsibility to insure that the manufacturer's face plates align flush with the metal surface mounted outlet box selected to prevent the face plates from "over-hanging" the outlet, where it could be pulled off or damaged.
- E. Each face plate shall be secured to the metal outlet box utilizing center pin reject security screws. The contractor shall provide a minimum of two (2) center pin reject tools per building.
- F. Where a modular jack is not used in the faceplate a dust cover or blank shall be inserted into the jack opening.
- G. This contractor where necessary, shall provide a modular mounting frame so that all face plates can be adjusted to level.

2.04 DATA PATCH PANEL

- A. In the Data rooms, these modular jacks shall be positioned on rack mounted patch panels. Jacks shall be positioned in sequence of the station I.D. starting with the lowest identification number.
- B. Data Patch Panels shall be sized to accommodate the total workstation count defined in the Drawings. No "High Density" data patch panels will be allowed. The largest single patch panel configuration shall not exceed 48 ports. A horizontal 'Wire' or 'Slack Manager' is to be installed between each patch panel to accommodate the data patch cords.
- C. Panels shall be designed and installed in a fashion as to allow future station cabling to be terminated on the panel without disruption to existing connections.

- D. Data patch panels will be mounted in data rack.
- E. At all rack locations, wire management hardware in the form of vertical and horizontal slack managers shall be installed by the contractor. This hardware shall be sufficient for routing of jumper cables from the patch panel to the area on the backboard or rack at which network electronics shall be positioned.
- F. The modular patch panel shall be equipped with 8 pin RJ-45 type keyed jacks configured the same as Faceplate Jacks (EIA/TIA 568B), with 110 type style termination's for horizontal data wiring, capable of terminating all four cable pairs.
- G. All Patch Panels, data jacks and other data related termination hardware shall support and be rated for 250 Megahertz data speeds per EIA/TIA 568B specifications. The terminating blocks shall be designed to maintain the cable's pair twists to the point of mechanical termination. The installer shall insure that the twists are preserved. All panels shall have port identification capabilities. Panels shall be labeled by mechanical means identifying jacks in sequence of station

2.05 DATA RACK

- A. 36" high, wall mounted, 19" relay racks. Racks should be drilled and tapped to accept 12-24 screws using the industry standard 5/8, 5/8, 1/2" hole pattern.

2.06 FIBER OPTIC PATCH PANELS

- A. Fiber termination enclosures shall consist of enclosures pre-assembled with SC connectors for rack mounting.

2.07 FLEXIBLE NONMETALLIC INNERDUCT AND FITTINGS

- A. Flexible Non-metallic Innerduct (e.g. "Innerduct") shall be used as follows:
 - 1. As protection to backbone fiber optic cables when installed in cable tray.
 - 2. As protection to fiber optic cable(s) within equipment rooms and Data Closets.
- B. Where not installed in a continuous length, innerduct segments should be spliced using couplings designed for that purpose.
- C. Nominal duct size shall be 1-inch (minimum).
- D. Innerduct shall be rated Riser or Plenum as required by the installation environment. Riser and Plenum innerduct shall be of a color contrasting to that of the "Standard" and Flame-retardant innerduct. The preferred colors are Orange ("Standard & Flame-retardant) and White (Riser and Plenum).

PART 3: EXECUTION

3.01 GENERAL WIRE AND INSTALLATION REQUIREMENTS

- A. Furnish and install all conduit, cables, connectors and equipment as shown on drawings and as specified above.
- B. All cable termination's shall be completed by qualified personnel utilizing state-of-the-art equipment and techniques.

- C. Four cable pairs are to be terminated on each modular jack at each station.
- D. Data pairs shall terminate on the Data Patch Panels and mounted in an equipment rack located. All cabling for this project shall be terminated in the following manner, unless otherwise identified:
- E. Data: All Category 6 rated horizontal cable shall be terminated on Category 6 rack mounted patch panels. All termination equipment shall meet full Category 5e performance criteria, as specified by the EIA / TIA Technical System Bulletin (TSB) #40. Bidders must specify the methods by which the cables are tested to verify conformance to the specifications, the identity of the testing body and the quality control mechanisms employed by the manufacturer to insure product compliance. Data wiring shall be sequenced by using the TIA-568B wiring standard.
- F. Voice pairs shall terminate on wall mounted 110 type blocks that shall be located in the Data room in each area. Voice wiring shall be sequenced by using the USOC wiring standard. Installation, testing and conversion shall be coordinated with the owner.
- G. All distribution cable shall be concealed, in conduit or a secured metal raceway system (wireway or equivalent) in all public areas, or as designated on the floor plans. All other routing, such as that found with typical MDF/IDF closets and wall fields, shall be kept clear of other trades work and supported according to code utilizing "D-type" mounting ring, cable trays and louver-head adder racks.
- H. The contractor shall provide to the Engineer, prior to installation, drawings showing the proposed installation for his approval.
- I. All cables shall be installed splice-free unless otherwise specified.

3.02 WORK BY OWNER

- A. All network electronic equipment and patch cables not specified herein.
- B. Voice cross connection wiring at telephone service equipment.

3.03 TESTING

- A. System testing, procedures and Contractor Responsibilities are as follows:
 1. Test Equipment - Contractor is responsible for supplying all test equipment and personnel to conduct acceptance test.
 2. Contractor Responsibility - Contractor shall conduct acceptance testing according to a schedule coordinated with the Owner. Representatives of the Owner may be in attendance to witness the test procedures. The contractor shall offer adequate advance notice to the Owner as to allow for such participation.
 3. Procedures - Contractor shall describe how they will conduct the tests and provide copies of all test results to the Architect/Engineer.
- B. Tests to be conducted:
 1. Category 6 tests (all cables, voice or data): Each installed station cable shall be tested to 250-MHZ for compliance with the specified Attenuation and NEXT performance characteristics as defined by TIA TSB-36 and -40. Measurements, which shall consider installed cable length, shall include cabling, patch panel and RJ45 faceplate. All pair combinations shall be tested with compliance being

based upon the worst case pair combination.

2. Changes to multi-mode fiber performance at extreme operational temperatures (-40 to +70 C) shall not exceed 0.2 dB/km at 1300 nm (per FOTP-3 procedures)

Bandwidth (min.)

@ 850-nm 160-MHz*km

@1300-nm 500-MHz*km

No multi-mode optical fiber shall show a point discontinuity greater than 0.2 dB at the specified wavelengths. Such discontinuity or any discontinuity showing a reflection at that point shall be the cause for rejection of that fiber by the Owner.

- C.** The Contractor shall make the following tests during the course of construction and at completion of the work. The necessary instruments, meters, etc., for making these tests shall be supplied by the Contractor, this shall include a competent person for making these tests.
- D.** Each pair of each horizontal cable shall test free of shorts within the pairs, open or miswired pairs, shorts between pairs and transposed pairs when tested with an appropriate measuring instrument based on NEC requirements of insulation value of the particular wire. This same test shall be performed for all cross connects from the voice jacks to the Main Distribution Frame (MDF) in the case of Voice circuit paths and from the data jacks to the intermediate Distribution Frame (IDF) in the case of Data circuit paths.
- E.** In addition to the above tests, all data cable from the data jack to the MDF shall be tested using a Microtest Pentascanner or equivalent to provide verification of the horizontal telecommunications link. The test for this link shall be include (1) the jack at the work area, (2) the horizontal "station" cable, and (3) the jack at the DF on which station cabling is terminated. Note that the maximum length of station cable shall not exceed 90 meters which allows 10 meters for equipment and patch cables. Worst case performance, based on a maximum length of 100 meters, shall be as follows:

<u>Frequency (MHz)</u>	<u>PS-NEXT Loss (dB; Worst Case)</u>	<u>Attenuation (maximum dB)</u>
1.0	62.0	1.9
4.0	61.8	3.5
8.0	57.0	5.0
10.0	55.5	5.5
16.0	52.2	7.0
20.0	50.7	7.9
25.0	49.1	8.9
31.3	47.5	10.0
62.5	42.7	14.4
100.0	39.3	18.6
200.0	34.3	27.4
250.0	32.7	31.1

- F.** The tests that shall be made and documentation provided shall consist of wire map, near-end crosstalk, attenuation, cable length, resistance and noise using TDR technology and be provided in hard copy.
- G.** Alternately the contractor may furnish the above information on a 3.5" disc. This disc

shall contain the electronic equivalent of the bid specification requirements along with the software required to view such data. If this information can be provided in a standard format such as TIFF, PCX, etc. or a standard format readable from general purpose office automation type of software package, identification of such format is all that is required. The contractor shall furnish two disks to the Owner for distribution prior to final payment.

- H. The results of the above tests shall be placed in a binder with three sets provided to the A/E.
- I. In the event results of the tests are not satisfactory, the Contractor shall make such adjustments, replacement and changes as are necessary and shall then repeat the test or tests which disclosed faulty or defective material, equipment or installation method, and shall make additional tests as the Engineer deems necessary at no additional expense to the project or owner.
- J. Tests related to connected equipment of others shall only be done with permission and presence of Contractor involved. The Contractor shall ascertain that testing only as required to prove the wiring connections are correct.
- K. Three (3) record copies of all test readings shall be submitted to the Engineer for approval. The Contractor shall notify the Engineer at least one week in advance of the test date so that the Engineer may choose to be present.

3.04 CABLE PULLING

- A. Beginning installation means contractor accepts existing conditions.
- B. Where unacceptable conditions are found, the Contractor shall bring this to the attention of the construction supervisor immediately. A written resolution will follow to determine the appropriate action to be taken.
- C. Contractor shall furnish all required installation tools to facilitate cable pulling without damage to the cable jacket. Such equipment is to include, but not limited to, sheaves, winches, cable reels, cable reel jacks, duct entrance tunnels, pulling tension gauge and similar devices. All equipment shall be of substantial construction to allow steady progress once pulling has begun. Makeshift devices which may move or wear in a manner to pose a hazard to the cable shall not be used.
- D. Cable pulling shall be done in accordance with cable manufacturer's recommendations and ANSVIEEE C2 standards. Manufacturers recommendations shall be a part of the cable submittal. Recommended pulling tensions and pulling bending radius shall not be exceeded. Any cable bent or kinked to radius less than recommended dimension shall not be installed.
- E. During pulling operation an adequate number of workers shall be present to allow cable observation at all points of duct entry and exit as well as the feed cable and operate pulling machinery.
- F. Avoid abrasion and other damage to cables during installation.

3.05 CABLE ROUTING

- A. All wiring shall be run in conduit, a secured metal raceway, or as designated on the floorplan, and mounted from the building structure. All cable shall be free of tension

at both ends.

- B. To reduce or eliminate EMI, the following minimum distances shall be adhered to: Five (5) inches from power lines of 2kVa. Eighteen (18) inches from high voltage lighting (including fluorescent). Thirty-nine (39) inches from power lines of 5kVa or greater. Thirty-nine (39) inches from transformers and motors.

3.06 VOICE CROSS CONNECTS

- A. All four pairs, terminating on each voice modular jack shall appear on the MDF 110 blocks. The 25th position of each horizontal voice block shall remain vacant.
- B. All four pairs, terminating on each data modular jack shall appear in the MDF closet and terminated on the data patch panels. All cabling shall be neatly laced, dressed and supported.
- C. Fastening cables directly to support brackets with wire or plastic ties will not be accepted.
- D. See Drawings for the location of outlets per floor.
- E. The contractor shall work with the owner to resolve any installation related issue, problems and activities pertaining to the final conversion from the existing wiring system to the new wiring system. These activities could include, but are not limited to cross connect documentation, general wiring installation and conversion procedures, cable pair identification, etc.

3.07 FILL RATIOS

- A. Contractor is responsible for maintaining a maximum fill ratio of 40% for horizontal conduit and raceway systems, and a 60% fill ratio for vertical pathways.

3.08 LABEL IDENTIFICATION

- A. Each "Faceplate" and each cable entering the outlet shall be labeled with the unique identifying code to be submitted at a later date. Cable shall be labeled with a tag which is wrapped around the cable sheath (not a "flag"). Faceplate labels shall be placed on the outside of the cover and on the base. All Labeling shall be by mechanical means in black ink on non-removable tags. Hand lettered designations are not acceptable. (See Label Identification).

3.09 WARRANTY

- A. Contractor shall provide a manufacturer's warranty of at least two years for all cable, connectors, termination equipment and labor.

END OF SECTION

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SECTION 27 51 17

PUBLIC ADDRESS SYSTEM

PART 1: GENERAL

1.01 SECTION INCLUDES

- A. Zone paging modules.
- B. Amplifiers.
- C. Speakers.
- D. Communications cable.
- E. Volume control attenuators.
- F. Tone generator

1.02 SYSTEM DESCRIPTION

- A. The system shall have the capability to selectively page zones indicated on the drawings, or all-call the entire system. Paging shall be accomplished through the telephone system.
- B. System shall be capable of selective distribution of background music.
- C. Provide wall mounting paging amplifier.

1.03 SUBMITTALS

- A. Submit under provisions of Section 013000.
- B. Indicate layout of equipment mounted in racks and cabinets, component interconnecting wiring, and wiring diagrams of field wiring to speakers and remote input devices.

1.04 REGULATORY REQUIREMENTS

- A. Conform to requirements of ANSI/NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories, Inc.
- C. Conform to requirements of Federal Communications Commission.

PART 2: PRODUCTS

2.01 ZONE PAGING MODULES

- A. Zone Paging Module. One module shall be provided for each three (3) paging zones in the system. The module shall provide built-in DIP switches to set talk-back on/off for each zone. It shall include a power-on LED, low-power background music volume

control, background music out/in jumper field, local BGM selection jumpers, and high-power/low-power operation selector switch. A connector block, using screw terminal connections, shall be included to connect local background music, zone wiring, and relay driver outputs.

- B. Manufacturer: Bogen:
 - 1. Model # PCMZPM, zone paging module.
 - 2. Model # PCMCPU, central processing modules
 - 3. Model # PCMTIM, telephone interface module

2.02 AMPLIFIERS

- A. The telephone paging amplifier shall be a, with a full power rating of 100 watts. The amplifier shall provide a frequency response of ± 1 dB from 70Hz to 15kHz, and shall deliver rated power at less than 1% distortion.
- B. The amplifier shall permit paging from telephone and/or microphone. The signal-activated paging channel shall automatically mute background music during a telephone page, eliminating the need for manual activation of switches and the use of external relays. Provision shall be included to set to mute the level of background music during a page. Music level shall be returned to its normal level after a page. The telephone paging channel shall have a VOX sensitivity adjustment to eliminate transmission of background noise, and automatic output leveling (ALC) to compensate for varying voice levels and paging techniques of persons using the system. An Aphex® Aural Exciter circuit shall be included to regenerate the harmonics lost during the amplification process. A control shall be provided to set the level of the Aphex effect.
- C. Input terminals shall be furnished for a telephone line and LO-Z balanced microphone. A choice of RCA jack or screw terminals shall be provided for the music source. Terminals shall also be provided to control music muting during a mic page, and for contact closure. Balanced or unbalanced outputs shall be provided for 16-ohm, 25V, 25VCT, and 70V speaker lines. Provision shall be included to feed a 600-ohm telephone line, LO-Z input or balanced microphone input of another amplifier, using an accessory line-matching transformer (Model WMT1A). Individual controls shall be provided to set the telephone and mic page volume, music volume, and music mute level. Bass and treble controls shall permit tonal adjustments. An automatic level control (ALC) and VOX sensitivity controls shall be included. A peak level indicator shall illuminate when the amplifier is driven into clipping. A power indicator shall also be provided.
- D. The amplifier shall operate from a 120V AC, 60Hz source, and shall be equipped with a resettable circuit breaker and thermal and electronic overload protection. Installation shall be facilitated by flanges with keyhole slots for mounting on a suitable backboard.
- E. Mount amplifiers in wall mounted rack.
- F. Manufacturer: Bogen Model #TPU100B

2.03 SPEAKERS

- A. 2' x 2' Systems are supported by the T-Bar grid and include an integral T-Bar fast installation when replacing of a 2' x 2' tile. Ready-to-install systems include a wide selection of factory wired speaker/transformer assemblies mounted to a 2' x 2' sub-plate with a fine-perforated grille, integral T-Bar, and with acoustic lining, or protective backbox.

- B. For installation convenience, assemblies with mounted back-box have speaker leads exiting through a metal clamp. Provide flush masonry backboxes where speakers are indicated to be wall mounted flush on drawings.
- C. 8" diameter speaker, 12W power rating, Dual cone type with 5 oz. Ceramic magnet. Frequency response, 55Hz - 12.5 kHz, 120° dispersion, 8 Ohms voice coil impedance.
- D. Manufacturer: Lowell #LT805-72BB.
- E. Wall mounted Speaker: Manufacturer, Bogen AMBSL1 or approved equal.

2.04 SPEAKER HORNS

- A. Flange-mounted reentrant horn loudspeaker, highly intelligibility. Sturdy, weatherproof, vandal-resistant, all metal-construction. Built in rotary impedance selector switch for matching the speaker power requirements to a 70V or 25V constant-voltage line. 15W power rating.
- B. Screw terminals for fast easy installation. Self-aligning, field replaceable diaphragm for easy field maintenance.
- C. Flush mount enclosure for installation.
- D. Heavy-duty cast aluminum grille and adapter ring for installation.
- E. Manufacturer: Bogen
 - 1. Model # FMH15T, horn loudspeaker.
 - 2. Model # BBFM6, flush-mount enclosure.
 - 3. Model # SGHD8, grille.
 - 4. Model # FMHAR8, adapter ring.

2.05 COMMUNICATION CABLE

- A. 18 GA., Two conductor shielded.
- B. Cables shall be plenum rated.
- C. Manufacturer : Belden or West Penn.

2.06 VOLUME CONTROL ATTENUATORS

- A. Volume Control Attenuators. Compact controls that provide precise level adjustment of single or multiple speaker lines. Required that emergency and paging signals to bypass/override the attenuator.
- B. Manufacturer: Lowell.
 - 1. Volume control attenuator #100LVC-PA includes priority relay (24VDC @ 5mA). Rotary switch type.
 - (a). Power rating: 100W
 - (b). Attenuation per step: 3dB
 - (c). Plate style: Standard one-piece stainless steel
 - (d). Color: White

2.07 TONE GENERATOR

- A. 4 types of tones, steady, pulsed alarm, slow whoop and chime.
- B. Tones generated by external contact closure.
- C. Adjustable tone and pitch.
- D. Operates on 12-48 V DC, positive or negative ground.
- E. 600 Ohm output.
- F. Line-matching transformer for standard 600 ohm telephone line connections.
- G. Screw terminal connection.
- H. Manufacturer: Bogen Model TG4C with WMT1A.

PART 2: EXECUTION

3.01 INSTALLATION

- A. Install equipment in accordance with manufacturer's instructions.
- B. Splice cable only in accessible junction boxes or at terminal block units.
- C. Make cable shields continuous at splices and connect speaker circuit shield to equipment ground only at amplifier.
- D. Leave 12 inches excess cable at each termination at microphone, speaker, and other system outlet.
- E. Support cables above accessible ceilings to keep them from resting on ceiling tiles. Use spring metal clips or plastic cable ties to support cables from structure or cable tray. Include bridle rings or drive rings.
- F. Use suitable cable fittings and connectors.
- G. Install system cabinets in locations shown.

3.02 ADJUSTING

- A. Adjust transformer taps for appropriate sound level.

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. **GPS:** Global Positioning System, a worldwide system that employs a constellation of satellites in an integrated network to determine geographic location anywhere in the world, and which employs and transmits Universal Coordinated Time, the world's most accurate and reliable time.
- B. **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.
- C. **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 safety standards detailed in manufacturer instructions and per local codes.
- D. 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:

U.S.:

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

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

CANADA:

Primex Wireless, Inc., 1310 Kerrisdale Blvd. Unit #4, Newmarket, ON L3Y 8V6

Phone: (800) 330-1459 | Fax (905) 952-0134 | Email: info@primexwireless.ca | www.primexwireless.ca

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. **GPS Time Source:** With the transmitter in GPS mode, it powers to a connected GPS engine mounted with a clear view of the sky. Upon power, the GPS module seeks the GPS satellites in orbit to determine position and UTC time. Once the transmitter acknowledges receivable GPS data, it downloads time data and synchronizes its internal master clock to GPS time. The transmitter then starts to transmit its internal time once every second. The transmitter updates its internal clock every time it receives valid time data from the GPS.
- B. **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

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	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)

Parameter	Specification
Power Supply	Power supply (included): <ul style="list-style-type: none"> • Input: 120 volt AC 50/60 Hz, 0.6 amps • Output: 9 volt DC
Internal Antenna Model	Internal antenna: 46.0" L (116.8cm), Weight: 7lbs
External Antenna Model	Cabling 100' (30.48m) between transmitter and antenna FCC Part 90 Accepted IC RSS-119 Accepted Weight: 8.25lbs (3.75kg)

- 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).
 - External Antenna Transmitter Model only: 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 US: FCC, or if a different time source is desired. CANADA: by Industry Canada, or if a different time source is desired.
- 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.
 - 1. 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. Internal clock: Transmitter shall contain an internal clock such that failure to update time from source will not disable the operation of the clocks.
- B. Transmitter shall include a surge suppressor/battery backup and a mounting shelf.
- C. 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.

External Antenna

- A. The antenna connects to the transmitter via a 100 foot (30.5m) 50-ohm coaxial cable.
- B. Transmitter shall include an external antenna that meets the below specifications.

Parameter	Specification
Antenna Dimension	Radiating element 29.4 inches (747mm)
Ground Radials	41.5 inches (1063 mm)
Equivalent Flat Plate Area	0.68ft ² (0.063m ²)
Polarization	Vertical
H-plane Beamwidth	Omni
E-plane Beamwidth	78 degrees (half power)
Max. Input power	75 watts @ 50 degrees
Gain	0 dBd. VSWR (max) <: 1.5
Frequency Range	68-78MHz (broadband)
Impedance	50 ohms
Lightning Protection	Direct Ground
Connector	N female
Mount	Pole or Wall Mountable. Mounting hardware supplied.
Certification	FCC Part 90 Accepted IC RSS-119 Accepted
Mask	Options: Penetrating Antenna Mast Kit.
Mask Wind Survival Rating	120mph (200kph)

GPS Receiver

- A. External Antenna model: GPS roof mounted with 16 foot cable (5m) attached. The GPS Receiver shall be a complete GPS receiver including antenna in a waterproof case, designed for roof or outdoor mounting. Provide mounting bracket for attachment to roof structure. An extension cable is available from the manufacturer, including either a 50ft (15.25m), 100 ft (30.5m), or 200ft (61m).
- B. The GPS Receiver cable must be plenum rated where required by local code.

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.
- B. Unit shall obtain current time from either satellite via GPS or via NTP through an Ethernet port.

Transmitter Rack

- A. Transmitter rack, 3" (76.2mm) x 16.5" (419mm) x 18" gauge metal, epoxy covered, will be supplied.

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 vary 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 Electric Models

Description
12.5" (31.75cm) 120VAC, Black
16" (40.64cm) 120VAC, Black
12.5" (31.75cm) 120VAC, Black, Wall, Dual-Sided
12.5" (31.75cm) 120VAC, Black, Ceiling, Dual-Sided

2.4 ADDITIONAL EQUIPMENT

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

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 (EXTERNAL Antenna Transmitter Model only):

1. Locate transmitter in a penthouse, electrical closet or telecommunications room in a central location in the building.
2. Clearance around all side of the transmitter to comply with local building codes.

Master Time Source

If GPS Unit will be used as master time source:

1. Attach GPS receiver to transmitter using cable.
2. Set GPS/LAN DIP switch to GPS.

If 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 (EXTERNAL Antenna only)

1. Transmitter is connected to external antenna via a 50 ohm coaxial cable. Typical length – 100 feet (30.5m)
2. Cable routing should comply with ANSI EIA/TIA-569 and local building codes.
3. If cable is routed through conduit, the conduit should be a minimum of 2 inch (50.8mm) diameter.
4. Transmitter enclosure must be bonded to an earth ground per ANSI EIA/TIA 607, NEC Article 250, and local building codes.
5. Antenna should be mounted to a mast on the roof of the building connecting to the transmitter via a 50-ohm coaxial cable.
6. Consult manufacturer instruction manual for specific clearances and mounting instructions.

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 instructions at the indicated location.

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.

PART 1.0 GENERAL

SECTION 23 56 16

The system is specified as described.

Bell Scheduling System

1.1 GENERAL REQUIREMENTS & SCOPE

- A. Furnish and install a complete new Bell Scheduling System using the Primex Wireless, Inc. XR 72MHz Bell Scheduling System.
- B. Furnish and install all equipment, accessories, and material in accordance with these specifications and drawing to provide a complete and operating Bell Scheduling System.
- C. All bids shall be based on the equipment as specified herein. The part numbers and model designations are that of Primex Wireless, Inc. The specifying authority must approve any alternate system.

1.2 SECTION INCLUDES

- A. Wireless Tone Generator (WTG)
- B. Scheduling Software
- C. Wireless Transceiver(s)

1.3 RELATED SECTIONS

- A. Division 26 "Electrical" (120 volt grounded outlet required for transmitter)
- B. Division 26 Section "Common Work Results for Electrical"
- C. Division 27 "Wireless Clock System" (see Primex Wireless XR Time Synchronization System Specifications)

1.4 REFERENCES

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

1.5 DEFINITIONS

This section provides commonly used terms within this specification.

- A. **GPS:** Global Positioning System, a worldwide system that employs a constellation of satellites in an integrated network to determine geographic location anywhere in the world, and which employs and transmits Universal Coordinated Time, the world's most accurate and reliable time.
- B. **UTC:** Universal Coordinated Time
- C. **WTG:** Wireless Tone Generator

1.6 SYSTEM DESCRIPTION

This section describes the system as specified.

Bell Scheduling System

- A. The Bell Scheduling System shall receive 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 Ethernet. The master time will be synchronized to UTC. Each WTG and every other component in the system shall use both precise time and synchronized time.
- B. The Bell Scheduling System shall provide a tone at pre-defined times to an Owner-furnished public address system, or relay closure to Owner furnished bell system. The tone and relay shall actuate all devices programmed to operate on receipt of the tone.
- C. Timing and operation of the Bell Scheduling System shall be controlled by software provided by system manufacturer, where schedules are housed in the transmitter and programmed by an Owner-furnished PC.
- D. The Bell Scheduling System shall not require wiring from the transmitter to the WTG. Initially and at scheduled intervals, the WTG receives the time data and command packets from the transmitter. Using that information, the WTG can send an audio tone to and an existing PA-type announcement system and/or an existing bell system.
- E. The transmitter shall continuously broadcast (transmit) a time data packet and command packets to the WTG.

-
- F. U.S. only: The transmitter shall operate on FCC licensed frequencies that have optimal building penetration and that are regulated by the FCC to minimize interference on the selected channel.
 - G. The GPS unit shall receive the precise time via satellite from its vantage point with a view of the sky and continuously provide this precise time to the transmitter.
 - H. The Bell Scheduling System shall incorporate 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.
 - I. 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.
 - J. 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's 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.
- 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's Instructions: Submit complete installation, set-up and maintenance instructions.
- D. 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.
- E. 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 tone generator 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 experience producing GPS wireless time systems. Installer: Company with documented experience in the installation of commercial time systems.
- D. 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's original packaging. Packaging shall contain manufacturer's name and address, product identification number, and other related information.
- B. 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.

Scheduling Software

Verify that a PC having the specified minimum system requirements for the scheduling software installation will be available for use in programming the timer.

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 limited warranty on bell scheduling hardware.

PART 2.0 PRODUCTS

The Bell Scheduling System is specified as described.

2.1 MANUFACTURER

Bell Scheduling System shall be manufactured by:

U.S.:

Primex Wireless, Inc.
965 Wells Street
Lake Geneva, WI 53147
Phone: 800-537-0464
Email: info@primexwireless.com
www.primexwireless.com

2.2 SEQUENCE OF OPERATION

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

Wireless Tone Generator

- A. When the WTG receives a signal from the transmitter, it shall generate a tone and relay closure to actuate the devices that have been predetermined to operate upon receipt of that tone and closure.

2.3 EQUIPMENT

The Bell Scheduling System shall include all equipment as specified.

XR Bell Scheduling System

System and devices shall meet the below specifications

- A. Bell Scheduling System complete with scheduling software, cables, transceivers, and antenna required for complete installation.
- B. Size: Approximately 7-1/4 inches (184mm) wide by 5 inches (140mm) long by 1-1/2 inches (32mm) high, not including antenna.
- C. WTG shall be housed in a black plastic case.
- D. 9 volt switching power supply (fed from 120 volt line)
- E. Switching contacts "Form D", two sets: one normally open, one normally closed.
- F. Switch ratings: Contact ratings: 4.4 amp, 1/6 hp, 125v, 250v, AC 4.4 amps, 20 volts DC
- G. DC Break ratings: 30 watt maximum. One amp, 30 volts, DC; 2.4 amps, 125 volts DC
- H. Audio Output: Isolation transformer with center tap, 600/150 ohms output impedance
- I. Variable output and line level
- J. Relay output: Test and reset buttons
- K. Signal indicator: 25 switch identification codes.
- L. Selectable channels: 49
- M. 96 programmable events with 7 day selectable operations.
- N. 12 Selectable tone/closure length for each event
- O. Selectable daylight saving time bypass.
- P. Selectable automatic channel scanning.
- Q. Computer programmable through transmitter, with automatic backup, and schedule changes which easy to make.
- R. Switching information stored in non-volatile memory in the transmitter and broadcast at regular intervals. Each switch retains its instructions in non-volatile memory.
- S. Capacitor to maintain internal clock memory for up to 8 hours in the event of loss of power
- T. On Screen Display/Menu • Press buttons allowing user to toggle through commands/displays • Displays date/time received from primary transmitter • Allows displaying last time update for diagnostic checks • Confirms that software schedule has been received and processed.
- U. Provide connecting cables for a completely operational system.

Network Bell Relay Specifications

Product Features:

- Schedules may be coordinated across multiple district buildings
- Manages up to 25 different zones with up to 96 events per zone
- Event Scheduler Pro software is compatible with Windows Operating Systems

Wireless Tone Generator and Scheduler Transceiver Specifications:

Tone Generator:

- Dimensions: 7.25"L x 5.5"W x 1.25"D (18.41cm x 13.97cm x 3.18cm)
- Antenna: 11.5"L (29cm)
- Power supply:
 - Input: 120 VAC 60 Hz 10 Watt
 - Output: 9 VDC 1.6 Amp (6' (1.83m) cord)
- 8 hour memory battery backup
- Dry Contact Output
 - Normally Opened/Normally Closed Relay
 - 240Vac, 4.4A Maximum
- Audio Output
 - Balanced or unbalanced depending on cable utilized
 - Line level with variable output

Scheduler Data Transceivers:

- Dimensions: 4.75"L x 1.25"H x 2.75"D (12.1cm x 3.18cm x 6.99cm)
- Antenna: 7.75"L (19.69cm)
- 700 MHz frequency
- Power supply: 7.5V, 1.5AMP (6' (1.83m) cord)

Bell:

- Dimensions: 6"L x 6"W x 4.75"D (15.24cm x 15.24cm x 12.07cm)
- 6" (15.24cm) gong
- Weight: 4 lbs. (1.81kg)
- Power Supply: Input: 120 VAC pig tail
- Current Requirement: 0.09 Amps
- Decibels at 10' (3.05m): 92-94
- Universal backplate included
- Event Scheduled Pro Software Operating System

Compatibility:

- Windows 95, 98, NT, 2000, XP, Vista, Windows 7

SUPPLY MODELS

Per specifications, supply the following model(s):

Bell Scheduler System and Components

Description
Wireless Tone System: Includes Wireless Tone Generator, Event Scheduler Pro Software, and 2 Wireless Data Transceivers
Wireless Tone Generator and Event Scheduler Pro Software
Wireless Tone Generator
Bell

WTG Transceiver

- A. Transmission: Frequency range: 902 MHz – 923 MHz. Peak power consumption: 200mA typical. Sensitivity: -113 dBm Range: 200ft. + (indoor-environment dependent) Operating Temperature Range: -40o – 176oF (-40o – 80oC) Humidity: 10% - 90%.

Event Scheduler Pro Software

- A. Provide scheduling software for installation and programming by owner, compatible with the following PC operating systems: Windows NT with Service Pack 6a, Internet Explorer 5.01 Service Pack 2, Windows NT, Windows XP, Windows Vista, Windows 7, and valid administrator rights. Software shall be in form of a CD, suitable for operation in standard CD-ROM drives.

2.4 ADDITIONAL EQUIPMENT

Division 27 "Wireless Clock System"

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 Bell Scheduling 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 WTG and the outlet is operational and properly grounded.
- E. Verify that a compatible computer, meeting the scheduling software system requirements is available during software installation and system configuration.

3.2 INSTALLATION

- 1. General: Install system in accordance with applicable codes. Install equipment in accordance with manufacturer's written instructions. Install the WTG in location indicated, and secure to base using fasteners of type recommended by manufacturer, and suitable for the surface to which it is attached.
- 2. Align the antenna vertically.
- 3. Toggle LED display to channel to verify it matches the selected channel on the transmitter.
- 4. Toggle LED display to switch ID to verify it matches the selected switch ID number on the scheduling software.
- 5. Remove the smaller cover, then the larger cover from the unit for access to the selector switches. Set the dip switches as required for daylight savings time adjustment (if applicable).
- 6. Adjust WTG volume as required.
- 7. Confirm proper installation of the WTG and check volume by holding down the test function button.
- 8. Press the "reset" button to effect any changes in settings.
- 9. Relay output: If required, connect the relay output to the devices to be controlled. Confirm compatibility between relay output and devices.
- 10. Connect the WTG to a standard 120 volt outlet.
- 11. Confirm that the green LED is flashing, to indicate that the WTG is receiving a signal from the transmitter.
- 12. Primex Wireless Scheduler download sequence: • Connect computer to transmitter in accordance with manufacturer's instructions. • Download schedule per software instructions.
- 13. Connect transceivers to computer and transmitter in accordance with the manufacturer instructions.
- 14. Download schedule per software instructions.

3.3 FIELD INSPECTION

- A. Inspection: Make observations to verify that Bell Scheduling 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's system user 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.

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 WTG 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.

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SECTION 31 23 23
EPS INSULATION BOARD INFILL

PART 1 GENERAL

1.01 SUMMARY

- A. Section includes EPS geofoam fill under interior concrete slabs

1.02 REFERENCES

- A. ASTM D6817 - Standard Specification for Rigid, Cellular Polystyrene Geofoam.
- B. ASTM D7180 – Standard Specification for Use of Expanded Polystyrene Geofoam in Geotechnical Projects
- C. ASTM D7557 – Standard Guide for Sampling of Expanded Polystyrene Geofoam Specimens

1.03 SUBMITTALS

- A. Submit insulation board manufacturer's product literature and technical data, including:
 - 1. Technical Data in compliance with ASTM D6817 for Type specified.
 - 2. Manufacturer shall supply a product certificate showing evidence of UL Classification QORW Third Party Quality Control for ASTM D6817. Product certificates that only include ASTM C578 recognition are not equivalent and will be rejected.
 - 3. ICC-ES or UL Evaluation report with ASTM D6817 recognition for Type specified.
 - 4. 10-year physical property warranty.
- B. Shop drawings showing sheet or block layout.
- C. Quality Assurance: Submit the following:
 - 1. Initial Test Compliance: Testing from an ISO17025 Accredited Laboratory showing compliance with compressive resistance @ 1% deformation and flexural strength requirement of ASTM D6817 for Type specified prior to first shipment
 - 2. Ongoing Test Compliance: Testing from an ISO17025 Accredited Laboratory showing compliance with compressive resistance @ 1% deformation of ASTM D6817 for Type specified. Testing frequency shall be in compliance with ASTM D7557.

1.04 DELIVERY, STORAGE & HANDLING

- A. Deliver insulation board labeled with ASTM D6817 material Type.
- B. Store protected from moisture and sunlight prior to installation.
- C. EPS Insulation board should be considered combustible and should not be exposed to open flame or other ignition sources.
- D. Product should not be exposed to organic solvents, petroleum products and their vapors. Examples include but are not limited to are acetone, paint thinner, and gasoline.
- E. Provide temporary ballast or other restraint prior to and during installation.

1.05 WARRANTY

- A. Provide 10-year warranty covering the properties of the product.

PART 2 PRODUCTS

2.01 Manufacturers:

- A. ACH Foam Technologies, LLC, 90 Trowbridge Drive, Fond du Lac, WI 54936-0660
- B. Poly-Foam Inc., 116 Pine Street South, Lester Prairie, MN 55354
- C. DOW **The Dow Chemical Company in Minneapolis** - FilmTec Corporation
5400 Dewey Hill Rd. Edina, MN 55439; Tel: +1 (952) 914-4200
- D. AFM Corporation, 17645 Juniper Path, Suite 260, Lakeville, MN 55044

2.02 EPS

- A. EPS Insulation in compliance with ASTM D6817.
- B. Select one or more of the EPS Types from the Table, as required by the project:

TYPE - ASTM D6817	EPS12	EPS15
Density, min., kg/m ³ (lb/ft ³)	11.2 (0.70)	14.4 (0.90)
Compressive Resistance @ 1% deformation, min., kPa (psi)	15 (2.2)	25 (3.6)
Flexural Strength min., kPa (psi)	69 (10.0)	172 (25.0)
Oxygen Index, min., volume %	24.0	24.0

- C. All EPS blocks shall be treated by the manufacturer with a tested and proven termite treatment for below grade applications, 3 year minimum field exposure. The treatment shall be EPA registered, meet requirements of ICC ES AC239, and be recognized in a UL or ICC ES report.

PART 3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's Geofoam product data; including technical bulletins.

3.02 PREPARATION AND INSTALLATION

- A. Site Verification of Conditions: Verify conditions of substrate, grade and other conditions which affect installation of geofoam.
- B. Installation: Follow manufacturer's instructions for interior installations.

3.03 PROTECTION

- A. Protection: Protect installed product and finish surfaces from damage during construction as required.

END OF SECTION