BID PACKAGE 2 - ADDENDUM NO. #2

DATE: May 26, 2020

PROJECT: SCHEUMANN FAMILY INDOOR PRACTICE FACILITY
BALL STATE UNIVERSITY
MUNCIE, INDIANA

PROJECT NUMBER: RATIO #19132 / BSU# 2019-049.01 SI

OWNER: Ball State University
2000 West University Ave.
Muncie, Indiana 47306
Phone: (765) 289-1241

ARCHITECT / LANDSCAPE ARCHITECT:
RATIO ARCHITECTS, INC.
101 South Pennsylvania Street
Indianapolis, Indiana 46204-3684
Phone: (317) 633-4040
Fax: (317) 633-4153

MEP ENGINEER:
Heapy Engineering
1400 West Dorothy Lane
Dayton, Ohio 45409
Phone: (937) 224-0861

STRUCTURAL ENGINEER:
FRP Structural Engineers
9449 Priority Way West Drive, Suite 200
Indianapolis, Indiana 46240
Phone: (317) 872-8400

CIVIL ENGINEER:
Cripe
3939 Priority Way South Drive, Suite 200
Indianapolis, Indiana 46240
(317) 844-6777

LIFE SAFETY:
RTM Consultants, Inc.
6640 Parkdale Place
Indianapolis, IN 46254
Phone: (317) 329-7300

SPORTS GRAPHICS:
Section 127
1191 425 W South Street #127
Indianapolis, IN 46225
Phone: (317) 396-7300
This Addendum is issued in accordance with the provisions of Contract Documents and becomes a part of the Contract Documents as provided therein. The information contained herein modifies the original Bidding Documents dated April 20, 2020 and all prior Addenda as applicable. Requirements of the original Bidding Documents and previous Addenda remain in effect except as modified by this Addendum. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

PART 1 – GENERAL CLARIFICATIONS

1. TurfCare TCA 1400 was submitted.
   a. A Turf Groomer is not required for this project.

PART 2 - PROJECT MANUAL CHANGES

1. SECTION 002413 – BID CATEGORY DESCRIPTIONS
   Modify BC-09
   Note 19 – Exclude blocking. All blocking is to be installed by BC-20.
   Note 24 – This contractor shall exclude any plywood. All plywood will be provided by BC-20.
   Modify BC-14
   Add SECTION 210800 – Commissioning of Fire Suppression
   Modify BC-15
   Add SECTION 220800 – Commissioning of Plumbing
   Modify BC-16
   Add SECTION 230800 – Commissioning of HVAC
   Modify BC-17
   Add SECTION 079200 – Commissioning of Electrical Systems
   Add SECTION 079200 – Commissioning of Fire Alarm Systems
   Modify BC-19
   Add SECTION 079200 – Joint Sealants (Partial)
   Add Note 27 – This contractor shall include caulking of site concrete.

2. SECTION 004300 – BID FORM SUPPLEMENTS
   Replace with attached revised document. Updated alternates added in addendum #1 and modified appendixes F, G and I.

3. SECTION 012300 ALTERNATES
   Under Item 3.1 Add the following:
   S. Alternate No. 11 – Aluminum Finish on Panel Assemblies
      1. Base Bid: Provide aluminum finish AAMA 2605 as specified in spec sections 084513 Structured-polycarbonate-panel assemblies and 084523 Fiberglass-sandwich-panel assemblies.

4. SECTION 019100 COMMISSIONING
   Delete section from the Project Manual in its entirety.

5. SECTION 019113 GENERAL COMMISSIONING REQUIREMENTS
   Insert new section into the Project Manual.

6. SECTION 321823.29 – SYNTHETIC TURF
Modify Item 2.2.B.4. as follows:
"4. Minimum Total Weight ASTM D 5848 76 oz/square yard."

Modify Item 2.2.B.5 as follows:
"5. Tufting Gauge ASTM D 5793 3/8 inch (3/4 inch maximum)."

Modify Item 2.2.B.8. as follows:
"8. Tuft Bind Value ASTM D 1335 > 10 lbs."

Modify Item 2.2.G.5 as follows:
"5. Total Infill Weight Minimum 6 lbs./square foot minimum."

Delete Paragraph 3.5.D. in its entirety.

Modify Paragraph 3.7.C. as follows:
"C. Number of times is 2 times per year for 8 years through the warranty period."

Modify Item 3.3.D.3. as follows:
"3. In the case of all lines and logos, turf carpet must be cut with inlays installed with adhesive and seam tape so the inlays are flat and pile height is the same as surrounding turf areas. Shearing and gluing of inlays is acceptable. Hot melt of inlays is not acceptable."

Modify Items 2.2.G.3 and 4 as follows:
"3. Rubber Weight Minimum 3 -3.5 lbs./square foot.
4. Sand Weight Minimum 3-3.5 lbs./square foot."

Modify Item 3.3.F.5 as follows:
"5. Infill materials shall be installed to fill the voids between the fibers and allow the fibers to remain vertical and non-directional. The infill shall be installed to a depth of 1 ¾ inch. Infill density shall consist of 3-3.5 pounds of sand and 3-3.5 pounds of rubber per square foot. The Infill shall be placed so that there is a void of ½ inch to the top of the fibers."

7. SECTION 054000 – NON-LOAD BEARING COLD-FORMED METAL FRAMING FOR EXTERIOR WALLS.
Modify Article 1.5.A.1 to read ‘Design Loads: Based on ASCE 7 and FM Global DS 1-28, but…’ in lieu of ‘Design Loads: Based on ASCE 7, but…’

8. SECTION 074213.23 METAL COMPOSITE MATERIAL WALL PANELS
Delete section from the Project Manual in its entirety.

9. SECTION 074213.16 METAL PLATE WALL PANELS
Insert new section into the Project Manual.

10. SECTION 084523 – FIBERGLASS SANDWICH PANEL ASSEMBLIES
Modify Item 2.1.H.1 as follows:
"1. Thermal Transmittance (U-Factor): Fixed glazing and framing areas shall have U-factor as indicated below as determined according to NFRC 100."

Modify Item 2.1.H.2 as follows:
"2. Solar Heat Gain Coefficient (SHGC): Fixed glazing and framing areas shall have a SHGC as indicated below as determined according to NFRC 200."

Modify Paragraph 2.3.C. as follows:
"C. Panel U-Factor/System U-Factor: 0.23, measured in Btu/sq. ft. x h x deg F according to NFRC 100 or ASTM C 1363 using procedures described in ASTM C 1199 and ASTM E 1423.”
Modify Paragraph 2.3.D. as follows:

Modify Paragraph 2.3.E. as follows:
“Solar Heat Gain Coefficient (SHGC) for Panel/System: 0.22.“

11. SECTION 084513 – STRUCTURED POLYCARBONATE PANEL ASSEMBLIES
Modify Item 2.01.H.1 as follows:
“Thermal Transmittance (U-Factor): Fixed glazing and framing areas shall have U-factor as indicated below as determined according to NFRC 100.”

Modify Item 2.01.H.2. as follows:
“2. Solar-Heat-Gain Coefficient for the System: Fixed glazing and framing areas shall have a solar heat gain coefficient as indicated below as determined according to NFRC 200, center of glass.“

Modify Paragraph 2.03.E as follows:
“E. Panel U-Factor/System U-Factor: Not more than 0.23, measured in Btu/sq. ft. x h x deg F according to NFRC 100.”

Modify Paragraph 2.03.F. as follows:
“F. Visible Light Transmission (VLT): 16 percent.”

Modify Paragraph 2.03.G. as follows:
“G. Solar Heat Gain Coefficient (SHGC) for System: 0.22.”

12. SECTION 116623 GYMNASIUM EQUIPMENT
a. Add the following to Paragraph 2.1.A
“5. Aalco Manufactured Products
6. Sportsfield Specialties”

13. SECTION 233616 AIR TERMINAL UNITS
a. Paragraph 2.3 shall be modified to read as follows: “Units shall be manufactured by Price, Krueger, Titus, Trane, JCI, Nailor, Metalaire, or Tuttle & Bailey.”

14. SECTION 233700 AIR OUTLETS AND INLETS
a. Paragraph 2.1 shall be modified to read as follows: “Air distribution devices other than louvers and specialty products shall be Titus, Tuttle & Bailey, Kreuger, Price, Carnes, Metalaire. All devices of a common type shall be by the same manufacturer.”

PART 3 - DRAWING CHANGES

1. SHEET FP-001
   a. Replace this sheet in its entirety.

2. SHEET FP-101
   a. Replace this sheet in its entirety.

3. SHEET FP-501
   a. Replace this sheet in its entirety.

4. SHEET P-501
   a. Replace this sheet in it’s entirety.
PART 4 – GENERAL QUESTIONS

1. Sheet FP-001 indicates that the sprinkler system shall be calculated for HC-2 for a 0.20 over 2500 SF for ceilings from 30’ to 60’. It appears the peak of the building is at 70’. Are we to utilize the design parameters or follow FM Global?

   The peak of the building is 70’. BSU and FM Global both decided to utilize the 30’ to 60’ parameter for this facility.

2. Sheet FP-001 indicates that the sprinkler system shall be calculated per NFPA standards, yet FM Global Standards are indicated in the design table?

   Calculate per FM Global Standards. We will update the drawing.

3. FM Global does not permit the installation of storage and non-storage sprinklers under sloped roofs exceeding 20 degrees, unless certain circumstances are met. This project does not meet any of those circumstances. Are we to design per NFPA in that case?

   The building should be designed to use standard coverage non-storage upright or pendant sprinklers.

4. Sheet FP-001 indicates that the sprinklers shall be staggered. Is this insurance driven or can this be omitted?

   This is insurance driven and a requirement from FM Global.

5. Sheet FP-101 indicates the sprinkler zones requested. Are we permitted to follow a different zoning map?

   You are permitted to follow a different zoning map if you aren't adding any new zones. Please note that adding any additional zones would require additional flow switches, per the BSU Standard.

6. Sheet FP-101 indicates that multiple storage areas are labeled for HC-1 when typically, these areas are to be designed for HC-2. Please confirm the HC-1 is permitted?

   We will change our drawings to be HC-2 for these areas.

7. Sheet FP-501 indicates a pump rating of 900 gpm. The pump will need to be either a 750 gpm or 1,000 gpm pump please confirm which is to be utilized.

   750 gpm @ 70 psi is what we need. We will need to ride the curve to reach 900 gpm @ 62 psi needed, not to exceed 40HP. This will be updated on the schedule.

8. Sheet FP-501 says to provide the concrete pads for the fire and jockey pumps. Please confirm whose scope this would fall under.

   This will fall under the fire protection contractors' scope. We will modify the detail on FP501 to show instruction.

9. Are material pass throughs permitted to meet the XBE requirements?

   XBE requirements are per the state requirements.

10. Are BIM meetings to be held weekly/bi-weekly? If so, how long is the BIM process slated for?

    BIM meetings are held weekly until coordination is complete.

11. Please confirm that painting of sprinkler piping will be completed by BC 14.

    Painting of sprinkler piping to be the responsibility of BC11.

12. Are purlin clamps an acceptable means to hang in lieu of providing anchoring when on a sloping surface?

    Purlin clamps are acceptable if they are FM Global approved.
13. Spec Section 211312 2.1 indicates that piping 8" and larger is to be schedule 30. Please confirm whether schedule 10 or schedule 40 is to be used.

The BSU Standard states that Schedule 30 piping is to be used for pipe sizes 8" and larger.

14. Please confirm whether the maximum water velocities are to be followed or can we meet code requirements? Meeting these requirements will increase pipe sizes and the overall cost of the fire protection system.

Refer to our specifications.

15. Please confirm that all materials are to be FM approved. Note that extended coverage sprinklers are not permitted with cages.

Yes. Per our spec, all material to be FM Global approved

16. Please confirm that a skid mount fire pump system is not required as typically requested on other BSU projects.

Skid mount pump system is not required for this project.

17. Spec section 211313 1.6 indicates that the service and main pipe sizes shown on the drawings are not to be reduced. Currently the fire mains are shown as 8" pipe, if a smaller pipe size can be hydraulically utilized it can drastically save the load on the pre-manufactured building and reduce construction costs. Please confirm that we are to provide pricing for the 8" mains as shown on FP-101.

Yes, provide pricing for the 8" mains shown on the FP-101. If smaller pipe sizes can be proven after the hydraulic calculations, I have no issues with that.

18. Please confirm whether NFPA or FM Global standards are to be followed. If FM Global is required, please provide FM Global submittal contacts

FM Global standards are to be followed. Refer to BSU for FM Global submittal contacts.

19. On the three DX split systems is a BacNet interface required or does the owner just want a space temperature sensor in the space to monitor and alarm?

Split systems MS-1, MS-2, and MS-3 do not require a BacNET interface. Space temperature shall be monitored and alarmed.

20. Spec Section 236215 part 2.1 E. 12 calls for the large air cooled condensing units to have a BacNet interface but the temperature control drawings don’t show picking these points up? Please confirm this is required to be integrated to the BMS?.

Yes. Provide BacNET interface for ACCU-1 and ACCU-2.

21. The drawings do not show padding on chain link gates, single or double doors, and overhead garage doors. Can you confirm this is the intent: No padding on these egresses?

Correct

22. The specification says minimum height @ 72"/6'. The elevations show 86"/7-2" please confirm. There is a mandated 4" gap. Please confirm overall measurement from top of pad to grade.

Refer to drawings for pad heights.

23. The specification says that the tunnels are to be supported from the roof structure by attaching to the roof truss or uni-strut. Who is responsible for providing the support steel/uni-strut?
The tunnel Manufacturer is responsible for the supplemental steel supports.

24. The specification says that the tunnel is to be 12"Hx12'Wx70'L. The drawing show 30'H x 26' W x 85'-6'L. Can you confirm the correct dimensions?

Use the dimensions shown on the drawings.

25. The specifications call for #252 with 3/4" mesh. This is a golf net. Please see attached for industry standard substitution options. 1 3/4" Mesh @ #36 or #60.

The tighter weave is only to be located at the end panels.

26. There is no specification for this netting. This being a football facility we recommend the industry standard of 4" mesh in Dynema Ultra Cross or #36 Nylon. However, this is black netting. Please see attached product data for substitution.

This netting is required to be white.

27. How high do these netting systems start above grade? How high do these systems extend up?

Extend from grade to deck.

28. The drawings say these systems are to be motorized retractable. Motorized would only allow for vertical movement. Can we assume the intent is for them to rise up? Are the sideline alternate nets to be fixed in place?

All nets to have the ability to be retracted up. Horizontal movement is not required.

29. The drawings say this netting is to be "white' in color. The industry standard is "black". The only option in White ad 1 3/4", #26 Nylon. Please confirm the usage and intent.

Football is a primary usage, but facility will be used for softball, baseball, soccer and other sports.

30. The drawings are calling for "taped" to netting. The best we can provide is Velcro (hook and loop). I am assuming the University will receive alternates for actual industry standard hanging goal posts?

There is not an alternate for hanging goalposts. Velcro could be an acceptable base bid method. We'd have to be confident that it would stay in place over time.

31. Aluminum finish requirements favor one manufacturer over another. Requiring Kingspan Light + Air to price a custom match to a competitor’s color increases our cost. Please consider allowing us to price one of our thirteen standard colors, one or two of which are similar to the specified gray.

Alternate standard colors could be considered if close to the specified color. However, looking at the Kingspan website it appears there is only one gray option that looks to be darker.

32. Note that the architectural drawings are inconsistent in their labeling of translucent openings. Please clarify that all openings marked 084523 in the drawings will either be fiberglass sandwich panels or structural polycarbonate (if Bid Alternate #2 is accepted) and the intent is not to use both systems, but one or the other.

Correct - Base Bid is for fiberglass sandwich panels at all openings marked 084523. If the alternate is chosen, then all of these openings will be structural polycarbonate.

33. Page 6, 1.9.a.9 - Insurance coverage offers a minimum claim limit of (US) $15 million in the aggregate per annum. Astro Turfs limit is $10 million in the per claim and aggregate per annum. Can this be approved for this project?
This will not be approved for this project.

34. **Page 8, Turf Seaming: Seaming shall utilize a two-step, sewn/adhered method.**

1. **First Step:** All seams are to be sewn utilizing a machine approved by the manufacturer. The thread shall be treated to ensure it will maintain its tensile strength for a minimum of eight (8) years under heavy sports field use and while subjected to exterior elements. Sewn seams are to be completed using a double-locking thread method, which requires a flat seam stitch.

2. **Second Step:** After completion of sewing, the sewn seam and thread are to be reinforced and locked into place with a heat activated adhesive process. The heat activated adhesive seam must be a minimum of three (3) inches wide.

Astroturf utilizes sewn seams in its Rhino Slit-film products (XPE) and inlays would be glued. We utilize Glued seams for our Rootzone 3D Slit-film product and inlays would be glued. Can our recommended seaming methods be approved for this project?

Rhinozone seaming method is adequate. Glued seams for Rootzone product are not acceptable.

35. **Our XT Series product is listed under the Alternates (Section 01 23 00) as Alternate 8D. Can we bid our standard XT series product as constructed or do we need to still match the product attributes listed in the turf spec?**

Match product specified.

36. **Page 8 of the turf spec (Section 32 18 23) requires the turf seams to be sewn and then glued. However, page 12 states that turf panels shall be cart sewn and “minimal gluing will only be permitted to repair problem areas”, which seems contradictory. Please clarify.** We recommend sewn seams only. That mechanical bond would render the gluing portion unnecessary.

Sewn seams primarily; minimal gluing allowed per 3.3.D.

37. **Our standard method for inlaying markings is to shear and glue them. This is the method used at many universities across the country, including Purdue, Notre Dame, Ohio State, Indiana University, etc. We request that Ball State University consider accepting this method of inlaying. Attached is an excerpt from our SOP Manual outlining our Field Assembly procedure that includes sewing turf panels and shearing & gluing inlays**

Shear and glue of inlays is acceptable.

38. **Panel fire classification per ASTM D 635 is unclear. Per 084513 Part 2.03.H.3 and 084523 Part 2.3.A.4 only a general CC1 requirement is made. Typically, the interior and exterior layers of a panel are individually identified in a specification as they separately comply with the building code. Per 2012 IBC Table 2607.4 and the proposed size of many of the translucent openings being greater than 100 square feet, a CC1 interior and exterior glazing sheet are likely required. Please clarify.**

The CC1 requirement is for the entire panel.

39. **Please clarify the detail of taking the subgrade from 99'-00" to 100'-00" for the turf system.**
The turf contractor is required to provide all gravel and turf system required from 99'-00" in elevation up to 100'-00". For example if the turf system is 4" in makeup then the contractor needs to provide an additional 8" of gravel compacted and graded.

40. The pre-bid notes indicate milling and resurfacing, but the specifications and plans do not indicate that anywhere. The plans indicate full depth heavy duty and light duty paving sections, which is correct? If the roadway is to be milled, what depth is to be milled and replaced? Will the limits match the areas indicated on the plans for the light duty and heavy duty or will they extend further?

To meet LEED requirements bidders need to plan on milling/removing the existing asphalt/subgrade to the appropriate depth for either heavy duty or light duty paving. Bidders are to follow the extents noted on the drawings.

41. The pre-bid notes also indicate for the “millings to be diverted from a landfill”, can you clarify what is meant by that?

To meet LEED requirements bidders need to divert millings from a landfill. Millings should be sent somewhere they can be reused/recycled. The subcontractor shall provide documentation to the CM for tracking on where the millings are sent and the quantity/weight for LEED tracking purposes.

42. If the full depth section as per the plans is correct, will the site contractor, that is already been selected, be taking care of the excavation and stone subgrade for this section?

No, excavation and stone subgrade are to be by BC-18 contractor.

43. The pre-bid also indicated aggregate paving surfaces. This is indicated on the plans as a full depth placement of #2 and #53 stone. The area indicated on the plans for this placement already contains stone, so will this be removed and replaced by the site contractor, from the previous bid package, or is this all to be included in our price.

The aggregate paving surfaces will need to be removed and replaced by the BC-18 contractor.

44. Will all of the asphalt work take place in 2021?

Yes, BC-18 work will take place in 2021.

45. In Bid Category 9 item numbers 19 and 24 state that they fall under the responsibility of BC-19. Is this correct?

No, Bid Category 9 items numbers 19 and 24 should read responsibility of BC-20.

46. EF-2 calls for a manual switch but I don’t see one shown on the electrical drawings. Is this in the Temperature Controls scope or the electrical?

EF-2 manual switch will be in the controls scope.

47. General exhaust fans EF-1 and EF-2 call for insolation damper with end switch. Is this in the Temperature Controls scope of the mechanical sheet metal?


Damper is to be provided by BC-17 with wiring and connecting to controls by temperature controls contractor.

48. Are the two relief dampers on the east end of the building provided by the Temperature Controls contractor or the mechanical or other?

Relief dampers are to be supplied by BC-17.

49. Please confirm that the Variable Frequency Drives are to be furnished by the temperature controls contractor and installed by the EC? The Bid form supplements list Variable Frequency Drives under the Electrical but the specification is in division 23?

Temperature controls contractor is to supply the variable frequency drives for the Electrical contractor is to install. Bid form supplements will be updated.

50. Who is furnishing the OA and RA dampers for the blower coil unit? It is not clear in the documents.

BC-16 is responsible for OA and RA dampers.

51. Who is responsible for providing bollards or the bases?

Site electrical items shown on sheet E-101 are the responsibility of BC-17.

52. Who is responsible for the foundations at light or filming poles?

Foundations at light and filming poles is to be the responsibility of BC-20

53. What is the base bid for alternate #5.

Base bid for alternate #5 is no storage areas for east wall. This would leave exposed structure and scrim.

54. Who is responsible for the tube steel at the bench A3/A520?

BC-20 is responsible for the tube steel shown on A3/A520.

55. Who is responsible for exterior blocking?

BC-20 is responsible for exterior blocking.

56. Who is responsible for dimensional lumber shown at the perimeter of the field see B3/A520.

BC-20 is responsible for the dimensional lumber shown on B3/A520.

57. Who is responsible for dimensional lumber shown under the PEMB base flashing in A7/A502.

BC-20 is responsible for the dimensional lumber shown on A7/A502.

58. Who is responsible for the blocking for Owner Provided Graphics detailed on A1/A201?
BC-20 is responsible for the blocking for Owner Provided Graphics detailed on A1/A201.

59. In Alternate 4 for plywood on the interior of storage units, does the exterior wall get plywood too? C7/A503 shows plywood to 48” for the CMU water table alternate. Is this the only situation where the exterior wall gets plywood?

No, plywood should not be applied to the outside walls of storage areas. Alternate pricing should be as indicated in the detail.

PART 5 – ATTACHMENTS

A. Specification Section:
1. SECTION 004300 BID FORM SUPPLEMENTS
2. SECTION 074213.16 METAL PLATE WALL PANELS
3. SECTION 019113 GENERAL COMMISSIONING REQUIREMENTS
4. SECTION 210800 COMMISSIONING OF FIRE SUPPRESSION
5. SECTION 220800 COMMISSIONING OF PLUMBING
6. SECTION 230800 COMMISSIONING OF HVAC
7. SECTION 260800 COMMISSIONING OF ELECTRICAL SYSTEMS
8. SECTION 280800 COMMISSIONING OF FIRE ALARM SYSTEMS

B. Drawings:
1. SHEET FP-001 Legends, Symbols and Abbreviations
2. SHEET FP-101 First Level Fire Protection Plan
3. SHEET FP-501 Fire Protection Schedule and Details
4. SHEET P-501 Plumbing Details

END OF ADDENDUM NO. 2
DOCUMENT 00 43 00
BID FORM SUPPLEMENTS (CMc)

This form must be submitted with the Bid along with additional copies as requested in the Project Manual.

To: Ball State University Board of Trustees
Ball State University
Muncie, IN 47306

Project: SCHEUMANN FAMILY INDOOR PRACTICE FACILITY

BSU Project No. 2019-049.01 SI

Date: [________________________]

Submitted by: (Bidder - please print the full name of your Proprietorship, Partnership, or Corporation)

(full address)

In accordance with Document 00 21 14 - Instructions to Bidders (AIA A701-2018), we include the Bid Form Supplements Appendices listed below. The information provided shall be considered an integral part of the Bid Form.

These Appendices are as follows:

Appendix A Receipt of Addenda/Project Completion and Liquidated Damages: If applicable, acknowledge receipt of all Addenda and fill in or acknowledge Completion time/Project Schedule, and acknowledge liquidated damages statement.

Appendix B Alternatives: When used, include the Cost variation to the Bid Price applicable to the Work described in the Contract Documents.

Appendix C Unit Prices: When used, include a listing of unit prices specifically requested by the Contract Documents.

Appendix D Principal Subcontractors: When used, include the names of all Primary Subcontractors and the portions of the Work they will perform.

Appendix E Supplementary General Construction Information: When used, list the requested Supplementary General Construction Information.

Appendix F Supplementary Mechanical Information: When used, list the requested Supplementary Mechanical Information.

Appendix G Supplementary Electrical Information: When used, list the requested Supplementary Electrical Information.

Appendix H Supplementary Telecommunication Information: When used, list the requested Supplementary Telecommunication Information.

Appendix I Synthetic Surface Field System Compliance Information: List the requested Information.
SUBMITTAL SCHEDULE OF APPENDICES

a. All bidders shall submit with their Bid the following Appendices:
   APPENDIX A – Receipt of Addenda/Project Completion/Liquidated Damages
   APPENDIX B – Alternatives
   APPENDIX C – Unit Prices
   APPENDIX D – Principal Subcontractors

b. The Low bidder, and the second and third bidders if requested, shall execute and submit to the Owner the remaining SUBCONTRACTOR AND MATERIAL QUESTIONNAIRES.

Submit to the Owner: Finance Office, 2000 West University Avenue, Muncie, Indiana, 47306; the following appendices within forty-eight (48) hours after date and time for receiving bids:

   APPENDIX E – Supplementary General Construction Information
   APPENDIX F – Supplementary Mechanical Information
   APPENDIX G – Supplementary Electrical Information
   APPENDIX H – Supplementary Telecommunication Information

BID FORM SUPPLEMENTS SIGNATURE(S)

(Bidder - please print the full name of your Proprietorship, Partnership, or Corporation)

____________________________________________________

(Authorized signing officer)

____________________________________________________

(Title of Person Signing)

ACKNOWLEDGEMENT

STATE OF __________________________ ss: __________________________
COUNTY OF __________________________

________________________________________ being duly sworn, deposes and says

that he/she is

________________________________________ of the above __________________________ and that the

________________________________________ (Title) __________________________ (Name of Organization)

statements contained in the foregoing Bid Form Supplements are true and correct.

Subscribed and sworn to before me this __________ day of __________, __________.

________________________________________
Notary Public

My Commission Expires: __________________________

County of Residence: __________________________
APPENDIX A - RECEIPT OF ADDENDA/PROJECT COMPLETION

1. ADDENDA

The Bidder acknowledges receipt of the following Addenda:

<table>
<thead>
<tr>
<th>Addendum No.</th>
<th>Dated</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

2. PROJECT COMPLETION

If this Bid is accepted, we will:

Commence on site work on the 21st of April 2020 and

Substantially Complete the Work by the 30th of March 2021.
APPENDIX B - ALTERNATIVES

The following amounts shall be added to or deducted from the Base Bid Sum. Refer to Section 01 23 00 - Alternates: Schedule of Alternates.

Alternate No. 1 – Decorative Metal Screens at Outdoor Equipment

Provide metal screens per Division 32 section “Decorative Fences and Gates”.

(Add) $ ________________

Alternate No. 2 – Structured Polycarbonate Panel Assemblies

Provide translucent wall panels as specified in Division 08 Section “Structured Polycarbonate Panel Assemblies”.

(Add) (Deduct) $ ________________

Alternate No. 3 – Second Condensing Unit

Provide a second condensing unit as indicated on Drawings.

(Add) $ ________________

Alternate No. 4 – Plywood at Storage Areas

Provide plywood at storage area walls with resilient base as specified in Division 06 Section “Interior Finish Carpentry” and Division 09 Section “Resilient Base and Accessories”.

(Add) $ ________________

Alternate No. 5 – East Wall Storage Areas

Provide storage areas at East Wall as indicated on Drawings.

(Add) $ ________________

Alternate No. 6A – Alternate Sports Lighting Package

Musco Lighting

(Add) $ ________________

Alternate No. 6B – Alternate Sports Lighting Package

Holophane

(Add) $ ________________
Alternate No. 6C – Alternate Sports Lighting Package

Ephesus

(Add) $ ________________

Alternate No. 7A – Temperature Controls

Automated Logic (local branch office)

(Add) $ ________________

Alternate No. 7B – Temperature Controls

Trane (local branch office)

(Add) $ ________________

Alternate No. 7C – Temperature Controls

Johnson Controls (local branch office)

(Add) $ ________________

Alternate No. 8A – Alternate Synthetic Turf Manufacturer

Provide similar system by SprinTurf, Ultrablade 50

(Add) $ ________________

Alternate No. 8B – Alternate Synthetic Turf Manufacturer

Provide Synthetic Field Surface System for complete field installation – Game Day Grass XPe52; Astro Turf LLC

(Add) $ ________________

Alternate No. 8C – Alternate Synthetic Turf Manufacturer

Provide Synthetic Field Surface System for complete field installation – Game Day Grass 3DX52; Astro Turf LLC

(Add) $ ________________

Alternate No. 8D – Alternate Synthetic Turf Manufacturer

Provide Synthetic Field Surface System for complete field installation – Field Turf XT Series; Field Turf Inc.

(Add) $ ________________
Alternate No. 8E – Alternate Synthetic Turf Manufacturer

Provide Synthetic Field Surface System for complete field installation – Mondo Slit-Film Series, distributed by Keifer USA

(Add) (Deduct) $ ________________

Alternate No. 9 – Decorative CMU

Provide add for decorative CMU at the base of the Pre Engineered Metal Building as shown on elevations and detail C7/A-503

(Add) (Deduct) $ ________________

Alternate No. 10 – Sideline Netting

Provide add for sideline netting shown in the Reflected Ceiling Plans. Netting to be similar to end-zone netting

(Add) (Deduct) $ ________________

Alternate No. 11 – Aluminum Finish on Panel Assemblies

Provide deduct for aluminum finish AAMA 2604 in lieu of AAMA 2605 for spec sections 084513 Structured-polycarbonate-panel assemblies and 084523 Fiberglass-sandwich-panel assemblies.

(Deduct) $ ________________
APPENDIX C - UNIT PRICES

The following are Unit Prices for specific portions of the Work as listed, and are applicable to authorized variations from the Contract Documents. Refer to Section 01 20 00 - Price and Payment Procedures: Unit Price Schedule.

<table>
<thead>
<tr>
<th>ITEM OF WORK</th>
<th>UNIT OF MEASUREMENT</th>
<th>UNIT VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$</td>
</tr>
</tbody>
</table>
# APPENDIX D - PRINCIPAL SUBCONTRACTORS

A. The following Work will be performed (or provided) by subcontractors and their performance of the Work will be coordinated by us:

B. The Bidder will make no changes to this list after submission, without a written request by the bidder and approval by the Owner.

C. Provide additional copies of this page as needed for a complete listing.

D. Indicate YES/NO if Subcontractor is required to be pre-qualified (contract value greater than $300,000). If yes, indicate certification expiration date.

<table>
<thead>
<tr>
<th>WORK SUBJECT</th>
<th>SUBCONTRACTOR</th>
<th>Pre-Qualified</th>
<th>Pre-Qualification Certification Expiration Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carpentry</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Air and Moisture Barrier</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doors, Frames and Hardware</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overhead Doors</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Div. 10 Accessories</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fencing and Gates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Telecommunications, Data and Electronic Security</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Synthetic Field Surface System</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Excavation and Grading</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX E – SUPPLEMENTARY GENERAL CONSTRUCTION INFORMATION

A. The following Work will be performed (or provided) by subcontractors and their performance of the Work will be coordinated by us:

B. We submit the following list of manufactures (or fabricators) of materials, applications, and specialties. All such materials, appliances, and specialties to be of such characteristics, design and construction will meet the requirements of the Construction Documents. The Bidder will make no changes to this list after submission, without a written request by the bidder and approval by the Owner.

C. Provide additional copies of this page as needed for a complete listing.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SUBCONTRACTOR</th>
<th>MANUFACTURER/SUPPLIER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Division 04 Unit Masonry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 05/09 Cold-Formed Metal Framing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 06 Carpentry</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 07 Waterproofing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 07 Thermal Insulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 07 Air and Moisture Barriers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 07 Roofing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 07 Firestopping</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 07 Joint Sealers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 08 Doors, Frames, and Hardware</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 08 Aluminum Entrances, Storefront, and Glazing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 08 Louvers and Vents</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 09 Gypsum Board Assemblies</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 09 Tiling (Ceramic)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(continued next page)
<table>
<thead>
<tr>
<th>Division 09 Carpet Tiles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Division 09 Acoustical Ceilings</td>
</tr>
<tr>
<td>Division 09 Painting</td>
</tr>
<tr>
<td>Division 10 Toilet Partitions and Accessories</td>
</tr>
<tr>
<td>Division 12 Plastic-Laminate Casework and Millwork</td>
</tr>
<tr>
<td>Division 32 Concrete Paving</td>
</tr>
<tr>
<td>Division 32 Asphalt Paving</td>
</tr>
</tbody>
</table>
APPENDIX F - SUPPLEMENTARY MECHANICAL INFORMATION

A. The following Work will be performed (or provided) by subcontractors and their performance of the Work will be coordinated by us:

B. We submit the following list of manufactures (or fabricators) of materials, applications, and specialties. All such materials, appliances, and specialties to be of such characteristics, design and construction will meet the requirements of the Construction Documents. The Bidder will make no changes to this list after submission, without a written request by the bidder and approval by the Owner.

C. Provide additional copies of this page as needed for a complete listing.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SUBCONTRACTOR</th>
<th>MANUFACTURER/SUPPLIER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Division 21 Fire Protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 22 Insulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 22 Valves</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 22 Sanitary Piping</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 22 Plumbing Fixtures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 22 Plumbing Specialties</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 22 Domestic Water Heaters</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 23 Insulation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 23 Instrumentation and Controls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 23 HVAC Piping</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 23 Vibration Controls</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 23 Identification for Piping and Equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 23 Testing, Adjusting, and Balancing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(continued next page)
<table>
<thead>
<tr>
<th>Division 23 Hydronic Pumps and Accessories</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Division 23 Ductwork</td>
<td></td>
</tr>
<tr>
<td>Division 23 HVAC Fans</td>
<td></td>
</tr>
<tr>
<td>Division 23 Air Terminal Units</td>
<td></td>
</tr>
<tr>
<td>Division 23 Condensing Units</td>
<td></td>
</tr>
<tr>
<td>Division 23 Ductless Split Air Conditioning Systems</td>
<td></td>
</tr>
<tr>
<td>Division 23 Air Rotation Units</td>
<td></td>
</tr>
<tr>
<td>Division 23 Blower-Coil Units</td>
<td></td>
</tr>
<tr>
<td>Division 23 Unit Heaters</td>
<td></td>
</tr>
<tr>
<td>Division 23 Variable Frequency Drives</td>
<td></td>
</tr>
</tbody>
</table>
### APPENDIX G – SUPPLEMENTARY ELECTRICAL INFORMATION

A. The following Work will be performed (or provided) by subcontractors and their performance of the Work will be coordinated by us:

B. We submit the following list of manufactures (or fabricators) of materials, applications, and specialties. All such materials, appliances, and specialties to be of such characteristics, design and construction will meet the requirements of the Construction Documents. The Bidder will make no changes to this list after submission, without a written request by the bidder and approval by the Owner.

C. Provide additional copies of this page as needed for a complete listing.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SUBCONTRACTOR</th>
<th>MANUFACTURER/SUPPLIER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Division 26 Switchboards</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 26 Panelboards</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 26 Motor Control Centers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 26 Enclosed Switches and Circuit Breakers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 26 Wiring Devices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 26 Fuses</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 26 Disconnect Switches</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 26 Contactors</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 26 Variable Frequency Drives</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 26 Surge Protection Devices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 26 Interior Lighting Fixtures (indicate for each fixture type)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(continued next page)
| Division 26 Exterior Lighting Fixtures and Poles (indicate for each fixture type) |
| Division 26 Lighting Control Devices |
| Division 26 Exit and Emergency Lighting |
| Division 26 Transformers |
| Division 26 Diesel Engine Driven Generator Set |
| Division 26 Automatic Transfer Switches |

---

**Ball State University Document 00 43 00 – BID FORM SUPPLEMENTS (CMc)**

Only project specific modifications approved by Ball State University, Facilities Planning & Management shall be made to this Document.

Document Origination Date: June 1, 2009
Document Revision Date: April 10, 2019
APPENDIX H – SUPPLEMENTARY TELECOMMUNICATION INFORMATION

A. The following Work will be performed (or provided) by subcontractors and their performance of the Work will be coordinated by us:

B. We submit the following list of manufactures (or fabricators) of materials, applications, and specialties. All such materials, appliances, and specialties to be of such characteristics, design and construction will meet the requirements of the Construction Documents. The Bidder will make no changes to this list after submission, without a written request by the bidder and approval by the Owner.

C. Provide additional copies of this page as needed for a complete listing.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>SUBCONTRACTOR</th>
<th>MANUFACTURER/SUPPLIER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Division 27 Identification</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 27 Hangers and Supports for Communications Systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 27 Surface Raceways for Communications Systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 27 Communications Cabinets, Racks, Frames, and Enclosures</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 27 Communications Copper Backbone Cabling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 27 Communications Optical Fiber Backbone Cabling</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 27 Data Communications Network Equipment</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 27 Data Communications Wireless Access Points</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 27 Distributed A/V Communications Systems</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 28 Access Control</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Division 28 Fire Detection and Alarm</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
APPENDIX I – SYNTHETIC SURFACE FIELD SYSTEM COMPLIANCE INFORMATION

A. We propose to provide the following synthetic surface field system for this project.
B. By marking each specified characteristic or performance value below with and ‘X’, we confirm that the synthetic surface field system proposed shall be of such characteristics, design and construction to meet the requirements of the Construction Documents and Specified Section 32 18 23 – Synthetic Field Surface System.
C. The following Work will be performed (or provided) by subcontractors and their performance of the Work will be coordinated by us:
D. We submit the following list of manufactures (or fabricators) of materials, applications, and specialties. All such materials, appliances, and specialties to be of such characteristics, design and construction will meet the requirements of the Construction Documents. The Bidder will make no changes to this list after submission, without a written request by the bidder and approval by the Owner.
E. Provide additional copies of this page as needed for a complete listing.

<table>
<thead>
<tr>
<th>ITEM</th>
<th>MANUFACTURER/SYSTEM</th>
<th>MANUFACTURER/SYSTEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synthetic Surface Field System</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPECIFIED CHARACTERISTIC - FIBER</td>
<td>COMPLIES (x)</td>
<td>COMPLIES (x)</td>
</tr>
<tr>
<td>Slit-film turf</td>
<td>Manufactured with C8 Polymer</td>
<td></td>
</tr>
<tr>
<td>Fiber Denier: Minimum 9000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fiber Thickness: Minimum 110 micron</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fiber Breaking Load: Minimum 22 lbs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fiber Melting Point: Minimum 220° F.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPECIFIED CHARACTERISTIC – TURF CONSTRUCTION</td>
<td>COMPLIES (x)</td>
<td>COMPLIES (x)</td>
</tr>
<tr>
<td>Minimum Face Weight: 50 oz/sq yd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Three Layer Primary Backing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum Primary Backing Weight: 6.5 oz/sq yd</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPECIFIED CHARACTERISTIC – INFILL</td>
<td>COMPLIES (x)</td>
<td>COMPLIES (x)</td>
</tr>
<tr>
<td>-------------------------------------</td>
<td>--------------</td>
<td>--------------</td>
</tr>
<tr>
<td><strong>Tufting Gauge:</strong> 3/8&quot; (3/4&quot; maximum)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Minimum Fiber Height:</strong> 2.25&quot;</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Tuft Bind Value:</strong> &gt; 10 lbs</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Grab Tear Strength:</strong> &gt;200 lbs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Infiltration Rate w/ Infill:</strong> Exceed 30 in/hr</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SPECIFIED CHARACTERISTIC – INSTALLED SYSTEM</th>
<th>COMPLIES (x)</th>
<th>COMPLIES (x)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sewn and Adhered Roll Seams</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Roll Seams Centered Between Yard Lines</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Inlaid Markings, Numbers, Logos Cut In through Entire Thickness of Turf and Adhered</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>G-Max Rating per Life of Warranty:</strong> &lt;190</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Manufacturer Qualifications

<table>
<thead>
<tr>
<th>Qualification</th>
<th>COMPLIES (x)</th>
<th>COMPLIES (x)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Minimum of 5 Years Manufacturing Experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum of Five (5) NCAA Division 1 Football and/or National Football League (NFL) Installations</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Minimum of 50 fields in play for at least two years</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

---

**END OF SECTION**
PART 1 – GENERAL

1.1 RELATED WORK

A. Division 2 – Fire Suppression

B. Division 22 – Plumbing

C. Division 23 - HVAC

D. Division 26 – Electrical

E. Division 28 – Fire Alarm

1.2 REFERENCES

A. Drawings and general provisions of contract, including general and supplementary conditions, general mechanical provisions and Division 01 Specification sections, apply to work of this section.

B. AABC Commissioning (ACG) Guideline.

C. ASHRAE Guideline 0 and 1.1

1.3 DESCRIPTION OF WORK

A. Commissioning is a systematic process of ensuring that all building systems perform interactively according to the Owner's Project Requirements (OPR) and construction documents. Commissioning is intended to achieve the following (but not limited to) specific objectives according to the Contract Documents

1. Verify that applicable equipment and systems are installed according to the manufacturer's recommendations and to industry accepted minimum standards and that they receive adequate operational checkout by the installing contractors.

2. Verify and document proper performance of equipment and systems.

3. Verify that operating and maintenance (O&M) documentation is complete

4. Verify that the Owner's operating personnel are adequately trained.

B. Commissioning is to be compliant with the requirements found in the USGBC LEED V4 EA- Prerequisite 1 (Fundamental Commissioning) and EA Credit 3 (Enhanced Commissioning).
1.4 COMMISSIONING AUTHORITY

A. The Commissioning Authority and/or agency is selected and employed by Owner. The Commissioning Authority shall be experienced in the commissioning of mechanical and electrical systems of the type installed on this project. Experience in construction process, direct digital control systems, test and balance, LEED and ASHRAE Guidelines 1.1 & 0 is mandatory. The Commissioning Authority shall not be associated with or employed by any contractor, or equipment supplier providing services on this project. Ball State University has directly contracted an independent third party commissioning agency (TechComm, Inc.) as the Commissioning Authority for this project

PART 2 – PRODUCTS (Not Applicable)

PART 3 – EXECUTION

3.1 SYSTEMS AND EQUIPMENT INCLUDED IN THE COMMISSIONING PROCESS

MECHANICAL

A. Air Rotation units.
B. Blower Coil Units
C. Air distribution systems & terminal boxes
D. Unit heaters
E. Exhaust
F. Spit System AC
G. DDC temperature control systems (BAS)

ELECTRICAL

H. Lighting and Daylighting Controls

PLUMBING

I. Domestic Hot Water Heating Systems

FIRE ALARM / SUPPRESSION

J. Fire Alarm System (Verification of Functional Testing Only)
K. Fire Protection System (Verification of Functional Testing Only)
3.2 COMMISSIONING PLAN

A. Commissioning Team:

1. The Commissioning Team (CT) shall consist of key parties involved in design, construction, and testing of this facility. It is necessary for each agency to appoint team members that will have long-term commitments to this project. Switching team members during the project will reduce the ability of the CT to provide continuity and acceptable results to the building owner. Team members must maintain an ongoing supervisory position on this project. At least one team member shall be provided by each of the parties listed below:

   a. Owner – Ball State University
   b. Commissioning Authority (CxA) – TechComm, Inc.
   c. Design Team (DT)
      • Architect – Ratio
      • Mechanical/Electrical/Plumbing Engineer – Heapy Engineering
   d. General Contractor (GC)
   e. Mechanical Contractor (MC)
   f. Sheet Metal Contractor (SM)
   g. Temperature Control Contractor (CC)
   h. Test and Balance Contractor (TAB)
   i. Electrical Contractor (EC)

B. Commissioning Meetings:

1. Commissioning meetings will be held in conjunction with progress meetings whenever possible. The CxA will be on site for the Cx meetings. Commissioning meetings will be used to address any problems that alter the design intent or affect the commissioning process. These meetings provide an open forum for exchange of ideas between contractors, vendors, designers, users, and owners.

C. Resolution Tracking Forms (RTF):

1. The use of Resolution Tracking Forms is a method employed by the CxA to monitor and record problems, their causes, and solutions. The use of these lists promotes communication between the installing contractors, design team, commissioning agent, and owner in order to expedite their resolution in a timely manner.

2. The CxA will regularly submit RTF’s to the Commissioning Team in order to document and resolve deficiencies as quickly as possible. The frequency of RTF submission will be adjusted as project conditions dictate.

D. System Installation Checklist’ (SIC’s)

1. SIC’s help ensure that systems have been installed properly, conform to the specifications, and are ready for safe start-up. The responsibility for carrying out these checks, as well as any corrective action, lies with the installing contractors. The CxA will prepare SIC’s based on the construction documents. These checklists will be created for HVAC systems and sub-systems. See “Systems and equipment included in the commissioning process” above. A master copy of the SIC’s will be bound in a three-ring binder and placed on the job site for use by the installing contractors or online Commissioning software will be used. No system is to be started until the appropriate SIC’s have been completed.
2. The CxA will review the SIC’s and spot check a sample prior to start-up. Equipment will be released for start-up only after these checklists have been completed by the installing contractor and reviewed by the CxA.

E. Start-Up:

1. During start-up, the installing contractor is responsible for completing the equipment manufacturer’s start-up checklists. These lists must be completed by the installing contractor and submitted to the CxA for inclusion in the final commissioning report.

2. Start-up of major HVAC systems will be monitored by the CxA. The appropriate contractors and/or manufacturers’ representatives will be required on site to perform start-up. No system will be started until the appropriate SIC’s have been completed. No system is to be started until the manufacturers’ checklists have been completed. Start-up will be performed according to the manufacturers’ recommended procedures. The CxA will visit the site to review completeness of installation in conjunction with progress meetings prior to starting HVAC equipment.

3. Commissioning Team members involved in installation, fabrication, manufacture, control, or design of equipment are required to be present as needed at the time of start-up. A factory-authorized technician is to be on site to start equipment when required by the specifications. This will minimize delays in bringing equipment on line and expedite acceptable functional performance in accordance with the construction documents.

F. Test and Balance (TAB) Monitoring:

1. In order to assure that the final TAB report format and content is acceptable, the TAB procedures and sample test forms will be reviewed by the CxA prior to the beginning of field TAB work.

2. TAB work will be monitored so that any problems that prevent or hinder proper air and water balance can be addressed and corrected with minimal delays. By addressing these problems as quickly as possible, we can assure that functional performance testing and owner training will take place on schedule.

3. A pencil copy of the TAB report is to be submitted to the CxA and Design Team for their review prior to conducting Functional Performance Testing. The CxA will be available during the TAB process in order to assist the TAB contractor in the effective completion of their scope of work.

G. Functional Performance Tests (FPT):

1. The CxA will write FPT’s based on the Basis of Design and Construction Documents. These tests will be created for HVAC systems and sub-systems. See “Systems and equipment included in the commissioning process” above.

2. Each system and sub-system will be tested by the CxA in the presence of entire Commissioning Team. This testing will be coordinated by the CxA. Witnessing the FPT’s can serve as a compliment to the O&M Training.

3. No FPT’s will be performed until the system and related sub-systems have been started, the System Installation Checklists have been completed, a preliminary TAB report has been submitted and reviewed, and the completion of the control system has been documented through point-to-point verification checklists and/or other “checklist” type documentation verifying all components, sensors, meters, etc. are connected and functioning properly.

4. The Functional Performance Tests shall include HVAC and related equipment as defined in “Systems and equipment included in the commissioning process” above.

a. Equipment and system will be tested in all designed operating modes. Proper operation will be verified in automatic control and all other applicable modes,
safeties, and interlocks will also be tested for proper operation as necessary to achieve Basis of Design conformance.

5. The CxA will record the results of the functional test on the procedure or test form. All deficiencies or non-conformance issues shall be noted and documented using either Resolution Tracking Forms or through Field Reports.
   a. Corrections of minor deficiencies identified may be made during the tests at the discretion of the CxA. In such cases the deficiency and resolution may or may not be documented.
   b. Every effort will be made to expedite the testing process and minimize unnecessary delays, while not compromising the integrity of the procedures. However, the CxA will not be pressured into overlooking deficient work or loosening acceptance criteria to satisfy scheduling or cost issues.

6. As tests progress and a deficiency is identified, the CxA will discuss the issue with the executing contractor.
   a. When there is no dispute on the deficiency and the Sub accepts responsibility to correct it:
      (a) The CxA documents the deficiency and the Sub’s response and intentions and they go on to another test or sequence. After the Sub corrects the deficiency, written notification is required indicating the equipment is ready to be retested.
      (b) The CxA reschedules the test and the test is repeated.
   b. If there is a dispute about a deficiency
      (a) The deficiency shall be documented with the subcontractor's response and a copy given to the Cx Team and to the contractor's representative assumed to be responsible.
      (b) Resolutions are first made at the lowest management level possible. Other parties are brought into the discussions as needed. Final interpretive authority is with the A/E.
      (c) The CxA documents the resolution process.
      (d) Once the interpretation and resolution have been determined, the appropriate party corrects the deficiency, written notification is required indicating the equipment is ready to be retested. The CxA reschedules the test and the test is repeated until satisfactory performance is achieved.

7. Cost of Retesting.
   a. The cost to retest a failed functional performance test due to incomplete work or inadequate prerequisite checkout shall be the responsibility of the sub-contractor responsible for the deficiency. These costs may include labor, travel expenses, lodging, and any other expenses incurred due to the failed test.

8. Off-season mode testing will be implemented as necessary to assure conformance with the BOD and construction documents. Installing contractors will be expected to participate as required by the project specifications.

H. Building Turn-Over / Owner Orientation / User Training:

1. The CxA will review O&M manuals, working closely with each contractor to achieve specificity and completeness.
2. The CxA will review as-built drawings, working closely with each contractor to achieve specificity and completeness.

3. Owner training will be coordinated with the assistance of the CxA. The training will be provided by the installing contractor or manufacturer’s representative and monitored by the CxA. This training should include both classroom training and hands-on operational training. The owner may choose to videotape this training for future use. The CxA will visit the site during the Turn-Over and Training period to assure that any on-going HVAC related problems are being addressed and corrected in a timely and efficient manner.

4. The CxA will assist the owner/user with warranty issues.

5. The CxA will assist in the coordination of off-season testing, calibrating, and servicing as specified in the contract documents.

6. The CxA will submit a Commissioning Report.

7. The CxA will prepare and submit a Systems Manual to the owner. The systems manual provides the owner with the information needed to understand, operate, and maintain the building mechanical systems and assemblies. This document expands on the traditional O&M manuals and is intended to be utilized as a day-to-day operational guide.

I. Warranty Review:

1. The CxA will participate in a 10 month warranty review of the HVAC system. This will include a review meeting with the owner, a discussion of warranty issues, energy usage, maintenance practices, usage changes, and chronic problems, as well as other issues affecting the operation of the HVAC systems.

3.4 ROLES AND RESPONSIBILITIES OF THE COMMISSIONING AUTHORITY (CxA)

A. Commissioning Authority (CxA): The CxA is not responsible for design concept, design criteria, compliance with codes, design or general construction scheduling, cost estimating, or construction management. The CxA may assist with problem-solving, non-conformance or deficiencies, but ultimately that responsibility resides with the General Contractor and the Design Team. The primary role of the CxA is to develop and coordinate the execution of a testing plan, observe and document performance that systems are functioning in accordance with the documented owner's requirements and in accordance with the Contract Documents. The Contractors participating in the commissioning will provide all tools or the use of tools to start, check-out and functionally test equipment and systems, except for specified monitoring or testing equipment used by the CxA.

1. The primary point of responsibility of the CxA is to inform the construction manager, the owner and design team on the status, integration, and performance of HVAC systems within the facility.

2. The CxA shall function as a catalyst and initiator to disseminate information and assist the design and construction teams in implementing completion of the construction process. This shall include verification of system installation, functional performance testing, and conformance with the intended design of each system. Services include: documenting construction observations, installation verification and functional performance testing, and documenting proper distribution of operating information to the owners O&M staff.

3. The CxA is to assist the responsible parties in maintaining a high quality level of installation by meeting or exceeding prevailing standards and specifications.

4. The CxA shall observe and coordinate testing as required to assure system performance meets the design intent.
5. The CxA shall document the results of the performance testing directly and/or assure that the appropriate technicians document testing.
6. The CxA shall provide technical expertise to oversee and verify the correction of deficiencies found during the commissioning process.
7. The CxA is to remain an independent party with specific HVAC knowledge of the project.
8. The CxA shall investigate the scope and extent of construction issues and facilitate communication to help determine responsibilities and resolutions. The CA shall monitor resolution for conformance with design intent and prevailing industry standards.
9. The CxA shall document the date of acceptance as determined by the construction manager, owner and design team. System Installation Checklists and Functional Performance Test results may be used in determining the start of the warranty period for HVAC systems and subsystems.
10. The CxA will review operating and maintenance materials for HVAC systems.
11. The CxA will review phasing plans as provided by the CM relating to temporary use of HVAC equipment, O&M considerations, warranty issues, impact of construction sequencing on occupied areas, and interruption of services from the existing equipment.
12. The CxA will monitor owner training to ensure it complies with the contract specifications.
13. The CxA is to return to the site at 10 months into the 12 month warranty period and review with facility staff the current building operation and the condition of outstanding issues related to the original and seasonal commissioning. Also interview facility staff and identify problems or concerns they have operating the building as originally intended. Make suggestions for improvements and for recording these changes in the O&M manuals. Identify areas that may come under warranty or under the original construction contract.
14. The CxA shall be an independent third party agency. The CxA shall not be financially associated with any of the Division 02 through 26 installing contractors on this project to avoid potential conflicts of interest.

3.5 ROLES AND RESPONSIBILITIES OF THE OWNER

A. Provide the “Owners Project Requirements” (OPR) documentation to the commissioning authority (CxA) for use in developing the commissioning plan.

B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities including, but not limited to the following:

1. Commissioning and coordination meetings.
2. Major system and equipment start-up.
4. Owner training sessions.

C. Provide utility services required for the commissioning process.

3.6 ROLES AND RESPONSIBILITIES OF THE DESIGN TEAM (DT)

A. Include commissioning requirements in the mechanical, electrical, and controls contracts, as well as other subcontracts, to assure full cooperation of all parties in the HVAC commissioning process.

B. Provide the “Basis of Design” (BOD) documentation to the Commissioning Authority (CxA) for use in developing the Commissioning Plan.
C. Assure acceptable representation with the means and authority to prepare and coordinate execution of the mechanical commissioning program as described in the contract documents.

D. Assure that the CxA shall receive a copy of all construction documents, addenda, change orders, and appropriate approved submittals and shop drawings for review and use in development of the commissioning plan.

E. Coordinate inclusion of commissioning activities in the construction documents.

F. Facilitate resolution of deficiencies identified by observation or performance testing.

3.7 ROLES AND RESPONSIBILITIES OF THE GENERAL CONTRACTOR (GC)

A. Facilitate the coordination of the commissioning work by the CxA, and with the CxA ensure that commissioning activities are being scheduled into the project construction schedule. Include the cost of all commissioning activities in the contract price.

B. Furnish a copy of all construction documents, addenda, change orders and approved submittals and shop drawings related to commissioned equipment to the CxA.

C. In each purchase order or subcontract written, include the requirements for submittal data, O&M data, commissioning tasks and training.

D. Ensure that all Subs execute their commissioning responsibilities according to the Contract Documents and schedule.

E. Designate a representative who shall attend a commissioning kickoff meeting and other necessary meetings scheduled by the CxA to facilitate the Commissioning process.

F. Assist with the coordinating the training of Owner operations and User personnel.

G. Prepare O&M manuals, according to the Contract Documents, including clarifying and updating the original sequences of operation to as-built conditions.

H. Ensure all Building Envelope pre-acceptance checklists have been completed prior to air barrier and thermal testing.

I. Ensure that applicable subcontractors participate in the envelope testing process and that any deficiencies found during the testing be appropriately addressed.

J. Ensure that Subcontractors execute seasonal or deferred functional performance testing, witnessed by the CxA, according to the specifications.

K. Ensure that Subcontractors correct items of non-compliance and make necessary adjustments to O&M manuals and as-built drawings for applicable issues identified in any seasonal testing.

3.8 ROLES AND RESPONSIBILITIES OF THE MECHANICAL CONTRACTOR (MC)

A. Each contractor in this division shall include in their quote the cost of participating in the commissioning process.
B. Include requirements for submittal data (including partial load data), O&M data, and training in each purchase order or sub-contract.

C. Assure cooperation and participation of specialty sub-contractors such as sheet metal, piping, refrigeration, water treatment, and TAB in commissioning activities.

D. Assure participation of major equipment manufacturers in appropriate startup, training, and testing activities.

E. Attend commissioning meetings scheduled by the CxA.

F. Assist the CxA in system verification and performance testing.

G. Perform all pipe and duct system testing, flushing and cleaning as required by project specifications and codes. These tests must be completed by the installing contractor and test results submitted to the CxA for inclusion in the final commissioning report and/or O&M manual.

H. Complete System Installation Checklists and manufacturers pre-start checklists prior to scheduling startup of HVAC equipment.

I. Monitor and respond to Resolution Tracking Forms distributed by the CxA in order to expedite corrective actions necessary to achieve design intent.

J. Notify the CxA a minimum of two weeks in advance of scheduled system start-up.

K. Update drawings to as-built condition and review with the CxA throughout the construction process.

L. Schedule vendor and subcontractor provided training sessions as required by project specifications.

M. Provide written notification to the DT and the CxA that the following work has been completed in accordance with the project specifications, and that the equipment, systems, and sub-systems are operating in accordance with design intent and are ready for Functional Performance Testing.

1. HVAC equipment including fans, air handling units, dehumidification units, ductwork, dampers, terminal devices, etc.
2. Fire detection and smoke detection devices furnished under other divisions as they affect the operation of the HVAC systems.
3. That the Building Automation Systems are functioning in accordance to the design intent.

N. Participate in the Functional Performance Tests as needed to achieve design intent.

O. Participate in the off-season mode testing as needed to achieve design intent.

P. Participate in O&M Training as required by project specifications.

Q. Provide a complete set of as-built drawings and O&M manuals for review. The CxA shall review the as-built drawings and O&M manuals concurrently with the design team.

R. Issue a statement that TAB work has been completed and that the final TAB report has been submitted for review.
3.9 ROLES AND RESPONSIBILITIES OF THE TEST AND BALANCE CONTRACTOR (TAB)

A. Include cost for commissioning requirements in the contract price.

B. Attend commissioning meetings scheduled by the CxA.

C. Submit the TAB procedures and sample TAB forms to the CxA for review at least two weeks prior to beginning TAB work.

D. Notify the CxA a minimum of two weeks in advance of scheduled TAB work.

E. Monitor and respond to Resolution Tracking Forms distributed by the CxA in order to expedite corrective actions necessary to achieve design intent.

F. Participate in verification of the TAB report, which will consist of repeating any selected measurement contained in the TAB report where required by the CxA for verification or diagnostic purposes.

G. Participate in the Functional Performance Tests as needed to achieve design intent.

H. Participate in the off-season mode testing as needed to achieve design intent.

I. Participate in O&M Training as required by project specifications.

3.10 ROLES AND RESPONSIBILITIES OF THE TEMPERATURE CONTROL CONTRACTOR (CC)

A. Include cost for commissioning requirements in the contract price.

B. Review control sequence and component selection for conformance with design intent.
   1. Verify that specified safeties and interlocks have been selected.
   2. Verify proper selection of control valves and actuators based on design parameters.
   3. Verify proper selection of control dampers and actuators based on design parameters.
   4. Verify that sensor selection conforms to design intent.

C. Attend commissioning meetings scheduled by the CxA.

D. Provide the following submittals for use by the CxA:
   1. Hardware and software submittals.
   2. Control panel construction shop drawings.
   3. Narrative description of control sequences for each HVAC system and sub-system.
   4. Schematics showing all control points, sensor locations, point names, actuators, controllers, and where necessary, points of access.
   5. A list of all control points, including analog inputs, analog outputs, digital inputs, and digital outputs. Include the values of all parameters for each system point. Provide a separate list for each stand-alone control unit.
   6. A complete listing of all software routines employed in operating the control system. Also provide a program narrative that describes the logic flow of the software and the functions of each routine and sub-routine. The narrative should also explain individual math or logic operations that are not clear from reading the software listing.
   7. Hardware operation and maintenance manuals.
   8. Application software and project applications code manuals.
E. Verify that specified interfaces provided by others are compatible with BAS (Building Automation System) hardware and software.

F. Coordinate installation and programming of BAS with construction and commissioning schedules.

G. Complete System Installation Checklists and manufacturers’ pre-start checklists prior to scheduling startup of HVAC equipment.

H. Submit point-to-point verification checklists and/or other “checklist” type documentation documenting that all control devices are calibrated and are installed and are operating as specified.

I. Provide control system technician to assist during equipment startup.

J. Monitor and respond to Resolution Tracking Forms distributed by the CxA in order to expedite corrective actions necessary to achieve design intent.

K. Provide a control system technician to assist during verification and performance testing.

L. Provide system modifications to achieve system operation as defined by the design intent.

M. Provide the CxA with on-site and remote access to the DDC control system.

N. Provide support and coordination for TAB contractor. Provide all devices, such as portable operator terminals and all software for the TAB to use in completing TAB procedures.

O. Provide written notification to the DT and the CxA that the TCC scope of work has been completed in accordance with the project specifications and that the equipment, systems, and sub-systems are operating in accordance with design intent, sensors have been calibrated, and that BAS is functioning in accordance with design intent and that systems are ready for Functional Performance Testing.

P. Participate in the Functional Performance Tests as required to achieve design intent. Provide all devices, such as portable operator terminals and all software for the CxA to use in completing the Functional Performance Tests.

Q. Submit as-built control drawings and sequences of operation that reflect the final installed conditions.

R. Participate in the off-season mode testing as required to achieve design intent.

S. Participate in O&M Training as required by project specifications. Include training on hardware operations and programming.

3.11 ROLES AND RESPONSIBILITIES OF THE SHEET METAL CONTRACTOR (SM)

A. Include cost for commissioning requirements in the contract price.

B. Include requirements for submittal data (including partial load data), O&M data, and training in each purchase order or sub-contract.

C. Perform all duct system testing and cleaning as required by project specifications and codes. These tests must be completed by the installing contractor and submitted to the CxA for inclusion in the final commissioning report and/or O&M manual.
D. Assure participation of major equipment manufacturers in appropriate startup, training, and testing activities.

E. Attend commissioning meetings scheduled by the CxA.

F. Complete System Installation Checklists and manufacturers’ pre-start checklists prior to scheduling startup of HVAC equipment.

G. Monitor and respond to Resolution Tracking Forms distributed by the CxA in order to expedite corrective actions necessary to achieve design intent.

H. Update drawings to as-built condition and review with the CxA throughout the construction process.

I. Schedule vendor and subcontractor provided training sessions as required by project specifications.

J. Participate in the Functional Performance Tests as needed to achieve design intent.

K. Participate in the off-season mode testing as required to achieve design intent.

L. Participate in O&M Training as required by project specifications.

3.12 ROLES AND RESPONSIBILITIES OF THE ELECTRICAL CONTRACTOR (EC)

A. Include cost for commissioning requirements in the contract price.

B. Review design for provision of power to the HVAC equipment.

1. Verify proper hardware specifications exist for performance as defined by the project specifications.
2. Verify proper safeties and interlocks are included in the design of electrical connections for HVAC equipment.

C. Attend commissioning meetings scheduled by the CxA.

D. Verify proper installation and performance of all electrical services provided.

E. Complete System Installation Checklists and manufacturers’ pre-start checklists prior to scheduling startup of HVAC equipment.

F. Monitor and respond to Resolution Tracking Forms distributed by the CxA in order to expedite corrective actions necessary to achieve design intent.

G. Participate in the Functional Performance Tests as needed to achieve design intent.

H. In the presence of the CxA and appropriate Cx team members, the electrical contractor will demonstrate proper operation of lighting and daylighting controls.

I. Participate in O&M Training as required by project specifications.
END OF SECTION 019113
SECTION 074213.16 - METAL PLATE WALL PANELS

PART 1 - GENERAL

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

1.2 SUMMARY
   A. Section includes metal plate wall panels.

1.3 PREINSTALLATION MEETINGS
   A. Preinstallation Conference: Conduct conference at Project site.
      1. Meet with Owner, Architect, Owner's insurer if applicable, metal panel Installer, metal panel manufacturer's representative, structural-support Installer, and installers whose work interfaces with or affects metal panels, including installers of doors, windows, and louvers.
      2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
      3. Review methods and procedures related to metal panel installation, including manufacturer's written instructions.
      4. Examine support conditions for compliance with requirements, including alignment between and attachment to structural members.
      5. Review flashings, special siding details, wall penetrations, openings, and condition of other construction that affect metal panels.
      6. Review governing regulations and requirements for insurance, certificates, and tests and inspections if applicable.
      7. Review temporary protection requirements for metal panel assembly during and after installation.
      9. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.4 ACTION SUBMITTALS
   A. Product Data: For each type of product.
1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of panel and accessory.

B. Shop Drawings:
   1. Include fabrication and installation layouts of metal panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment assembly, trim, flashings, closures, and accessories; and special details.
   2. Accessories: Include details of the flashing, trim, and anchorage, at a scale of not less than 1-1/2 inches per 12 inches (1:10).

C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.
   1. Metal Panels: 12 inches (305 mm) long by actual panel width. Include fasteners, closures, and other metal panel accessories.

1.5 INFORMATIONAL SUBMITTALS
   A. Qualification Data: For Installer.
   B. Product Test Reports: For each product, tests performed by a qualified testing agency.
   C. Sample Warranties: For special warranties.

1.6 CLOSEOUT SUBMITTALS
   A. Maintenance Data: For metal panels to include in maintenance manuals.

1.7 QUALITY ASSURANCE
   A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.8 DELIVERY, STORAGE, AND HANDLING
   A. Deliver components, metal panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.
   B. Unload, store, and erect metal panels in a manner to prevent bending, warping, twisting, and surface damage.
C. Stack metal panels horizontally on platforms or pallets, covered with suitable weathertight and ventilated covering. Store metal panels to ensure dryness, with positive slope for drainage of water. Do not store metal panels in contact with other materials that might cause staining, denting, or other surface damage.

D. Retain strippable protective covering on metal panels during installation.

1.9 FIELD CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit assembly of metal panels to be performed according to manufacturers' written instructions and warranty requirements.

1.10 COORDINATION

A. Coordinate metal panel installation with rain drainage work, flashing, trim, construction of soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.11 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal panel systems that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

   a. Structural failures including rupturing, cracking, or puncturing.
   b. Deterioration of metals and other materials beyond normal weathering.

2. Warranty Period: Two years from date of Substantial Completion.

B. Special Warranty on Panel Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

   a. Color fading more than 5 Hunter units when tested according to ASTM D2244.
   b. Chalking in excess of a No. 8 rating when tested according to ASTM D4214.
   c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.
PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E330:

1. Wind Loads: As indicated on Drawings.
2. Other Design Loads: As indicated on Drawings.
3. Deflection Limits: For wind loads, no greater than 1/240 of the span.

B. Air Infiltration: Air leakage of not more than 0.06 cfm/sq. ft. (0.3 L/s per sq. m) when tested according to ASTM E283 at the following test-pressure difference:


C. Water Penetration: No water penetration when tested according to ASTM E331 at the following test-pressure difference:

1. Static: Pass water penetration test under 25.0 psf positive static air pressure difference for at least 15 minutes with 5 gallons per sf per hour of water applied in accordance with ASTM E331.
2. Dynamic: Pass water penetration test under 15.0 psf dynamic pressure difference for at least 15 minutes with 5 gallons per sf per hour of water applied in accordance with AAMA 501.1.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

E. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.
2.2 METAL PLATE WALL PANELS

A. Metal Plate Wall Panels: Provide factory-formed, metal plate wall panels fabricated from single sheets of metal formed into profile for installation method indicated. Include attachment assembly components, and accessories required for weathertight system.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   a. Centria.
   b. Dri-Design Wall Panel System.
   c. MetalWerks Architectural Plate Systems.

B. Panel Depth: 1-1/4 inches.

C. Aluminum Sheet: Tension-leveled, smooth aluminum sheet, ASTM B209, 3105-H14 Alloy, 0.080 inch thick.

   a. Color: Two custom colors
   b. MP1: To match Sherwin Williams, 7015 “Repose Gray”.
   c. MP2: To match Sherwin Williams, 6866 “Heartthrob”.

D. Weighty: Less than 2 lbs per square foot.

E. Panel Size: As indicated on Drawings.

F. Panel Joints: As indicated on Drawings.

G. Attachment Assembly: Rainscreen-principle system.

2.3 MISCELLANEOUS MATERIALS

A. Miscellaneous Metal Subframing and Furring: ASTM C645, cold-formed, metallic-coated steel sheet, ASTM A653/A653M, G90 (Z275 hot-dip galvanized) coating designation or ASTM A792/A792M, Class AZ50 (Class AZM150) aluminum-zinc-alloy coating designation unless otherwise indicated. Provide manufacturer's standard sections as required for support and alignment of metal panel system.

B. Panel Accessories: Provide components required for a complete, weathertight panel system including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal panels unless otherwise indicated.
C. Flashing and Trim: Provide flashing and trim formed from same material as metal panels as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal panels.

D. Panel Fasteners: Self-tapping screws designed to withstand design loads. Provide exposed fasteners with heads matching color of metal panels by means of plastic caps or factory-applied coating. Provide EPDM or PVC sealing washers for exposed fasteners.

2.4 FABRICATION

A. General: Fabricate and finish metal panels and accessories at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

1. Provide components of modular metal panel system that are products of one manufacturer, including modular metal panels, head and sill trim, bottom weep, starter flash, and metal copings.

B. Modular Metal Panels: Fabricate modular metal panels requiring no further fabrication or modification in field.

1. Horizontal Joints: Dry seal, drained and back ventilated.
2. Vertical Joints: Pre-formed returns
3. Reveals: 3/4-inch (19mm)

C. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's recommendations and recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated.

1. Form exposed sheet metal accessories that are without excessive oil canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
3. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces of accessories exposed to view.
4. Fabricate attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal recommended in writing by metal panel manufacturer.
a. Size: As recommended by SMACNA's "Architectural Sheet Metal Manual" or metal wall panel manufacturer for application but not less than thickness of metal being secured.

2.5 FINISHES

A. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Aluminum Panels and Accessories:

1. Three-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal panel supports, and other conditions affecting performance of the Work.

1. Examine wall framing to verify that girts, angles, channels, studs, and other structural panel support members and anchorage have been installed within alignment tolerances required by metal wall panel manufacturer.

2. Examine wall sheathing to verify that sheathing joints are supported by framing or blocking and that installation is within flatness tolerances required by metal wall panel manufacturer.

   a. Verify that air- or water-resistive barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Examine roughing-in for components and systems penetrating metal panels to verify actual locations of penetrations relative to seam locations of metal panels before installation.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Miscellaneous Supports: Install subframing, furring, and other miscellaneous panel support members and anchorages according to ASTM C754 and metal panel manufacturer's written recommendations.

3.3 INSTALLATION

A. General: Install metal panels according to manufacturer's written instructions in orientation, sizes, and locations indicated. Install panels perpendicular to supports unless otherwise indicated. Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Shim or otherwise plumb substrates receiving metal panels.
2. Flash and seal metal panels at perimeter of all openings. Fasten with self-tapping screws. Do not begin installation until air- or water-resistive barriers and flashings that will be concealed by metal panels are installed.
3. Install screw fasteners in predrilled holes.
4. Locate and space fastenings in uniform vertical and horizontal alignment.
5. Install flashing and trim as metal panel work proceeds.
6. Locate panel splices over, but not attached to, structural supports. Stagger panel splices and end laps to avoid a four-panel lap splice condition.
7. Align bottoms of metal panels and fasten with blind rivets, bolts, or self-tapping screws. Fasten flashings and trim around openings and similar elements with self-tapping screws.
8. Provide weathertight escutcheons for pipe- and conduit-penetrating panels.

B. Fasteners:

1. Aluminum Panels: Use stainless-steel fasteners for surfaces exposed to the exterior; use aluminum or galvanized-steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action as recommended in writing by metal panel manufacturer.

D. Attachment Assembly, General: Install attachment assembly required to support metal plate wall panels and to provide a complete weathertight wall system, including subgirts, perimeter extrusions, tracks, drainage channels, panel clips, and anchor channels.

E. Installation: Attach metal plate wall panels to supports at locations, spacings, and with fasteners recommended by manufacturer to achieve performance requirements specified.
1. Horizontal Joinery: Working from base of installation to top, connect upper panel to lower panel at joinery.
2. Vertical Joinery: Provide reveal between vertical ends of panels as shown on shop drawings.
3. Galvanic Action: Where elements of modular metal wall system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by manufacturer.
4. Rainscreen Systems: Do not apply sealants to joints unless otherwise indicated.

F. Rainscreen-Principle Installation: Install using manufacturer's standard assembly with vertical channel that provides support and secondary drainage assembly, draining at base of wall. Notch vertical channel to receive support pins. Install vertical channels supported by channel brackets or adjuster angles and at locations, spacings, and with fasteners recommended by manufacturer. Attach metal plate wall panels by inserting horizontal support pins into notches in vertical channels and into flanges of panels. Leave horizontal and vertical joints with open reveal.

1. Install metal plate wall panels to allow individual panels to be installed and removed without disturbing adjacent panels.
2. Do not apply sealants to joints unless otherwise indicated.

G. Accessory Installation: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.

1. Install components required for a complete metal panel system including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items. Provide types indicated by metal panel manufacturer; or, if not indicated, provide types recommended in writing by metal panel manufacturer.

H. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that are permanently watertight.

1. Install exposed flashing and trim that is without buckling and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof performance.
2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet (3 m) with no joints allowed within 24 inches (605 mm) of corner or intersection. Where lapped expansion provisions cannot be used or would not be sufficiently waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with mastic sealant (concealed within joints).
3.4 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal plate wall panel units within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m), non-accumulative, on level, plumb, and location lines as indicated, and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

1. Inspect framing that will support modular metal panel system to determine if support components are installed as indicated on approved shop drawings and are within tolerances acceptable to modular metal wall panel system manufacturer.

   a. Maximum deviations acceptable to modular metal panel system manufacturer:

      1) 1/4-inch in 20 feet (6.4 mm in 6 m) vertically or horizontally from face plane of framing.
      2) 1/2-inch (12.7 mm) maximum deviation from flat substrate-on any building elevation.
      3) 1/8-inch in 5 feet (3.2 mm in 1.5 m).

2. Confirm presence of acceptable framing members to match installation requirements of modular metal panel system.

   a. Confirm framing minimum .048 inch/18 ga. (1.22 mm) at maximum 24 inch (610 mm) spacing.

3. Verify that window, door, louver and other penetrations match layout on shop drawings.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect completed metal wall panel installation, including accessories.

B. Remove and replace metal wall panels where tests and inspections indicate that they do not comply with specified requirements.

C. Additional tests and inspections, at Contractor's expense, are performed to determine compliance of replaced or additional work with specified requirements.

D. Prepare test and inspection reports.
3.6 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, if any, as metal panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

B. After metal panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

C. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 074213.16
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes commissioning process requirements for fire suppression systems, assemblies, and equipment.

B. Related Sections:
   1. Division 01 Section “General Commissioning Requirements” for general commissioning process requirements.
   2. Division 21 Sections for Fire Suppression equipment and systems.
   3. Division 22 Sections for Plumbing systems and equipment.
   4. Division 23 Sections for HVAC equipment, systems, and control requirements.
   5. Division 26 Sections for Electrical equipment, systems, and control requirements.
   6. Division 28 Section for Fire Alarm systems

1.3 COMMISSIONING AUTHORITY

1.04 The Commissioning Authority (CxA) has been contracted directly with the owner for this project. The CxA has overall responsibility for planning and coordinating the commissioning process. However commissioning involves all parties involved in the design and construction process, including the fire suppression (Division 21) contractor.

1.05 CONTRACTOR RESPONSIBILITY

A. The fire suppression (Division 21) contractor and/or equipment supplier will be required to operate devices in all operating mode as needed to demonstrate functionality. All testing is to be witnessed by the CxA and selected commissioning team members. Specifically, representatives from the Owners O&M staff and design team. Installing contractors will be required to provide the CxA all specified start-up and testing documentation prior to conducting functional testing.

B. The cost to retest a failed functional performance test due to incomplete work or inadequate prerequisite checkout shall be the responsibility of the installing contractor. Costs may be incurred by the any or all of the witnessing Cx team members. These costs may include labor, travel expenses, lodging, or other expenses.

C. Commissioning responsibilities are further defined in Division 01 Section “General Commissioning Requirements”. These responsibilities apply to all specialty sub-contractor and major equipment suppliers within Division 21. Each contractor and supplier shall review Division 01 Section 019113 and include cost to participate in the commissioning process in their contract price.
PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 210800
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes commissioning process requirements for hot water heating systems, assemblies, and equipment.

B. Related Sections:
   1. Division 01 Section “General Commissioning Requirements” for general commissioning process requirements.
   2. Division 21 Sections for Fire Suppression equipment and systems.
   3. Division 22 Sections for Plumbing systems and equipment.
   4. Division 23 Sections for HVAC equipment, systems, and control requirements.
   5. Division 26 Sections for Electrical equipment, systems, and control requirements.
   6. Division 28 Section for Fire Alarm systems

1.3 COMMISSIONING AUTHORITY

1.04 The Commissioning Authority (CxA) has been contracted directly with the owner for this project. The CxA has overall responsibility for planning and coordinating the commissioning process. However commissioning involves all parties involved in the design and construction process, including the plumbing (Division 22) contractor.

1.05 CONTRACTOR RESPONSIBILITY

A. The plumbing (Division 22) contractor's responsibilities are defined in Division 01 Section “General Commissioning Requirements”. These responsibilities apply to all specialty subcontractor and major equipment suppliers within Division 22. Each contractor and supplier shall review Division 01 Section 019113 and include cost to participate in the commissioning process in the contract price.

B. The cost to retest a failed functional performance test due to incomplete work or inadequate prerequisite checkout shall be the responsibility of the installing contractor. Costs may be incurred by the any or all of the witnessing Cx team members. These costs may include labor, travel expenses, lodging, or other expenses.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 220800
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes commissioning process requirements for HVAC&R systems, assemblies, and equipment.

B. Related Sections:
   1. Division 01 Section “General Commissioning Requirements” for general commissioning process requirements.
   2. Division 21 Sections for Fire Suppression equipment and systems.
   3. Division 22 Sections for Plumbing systems and equipment.
   4. Division 23 Sections for HVAC equipment, systems, and control requirements.
   5. Division 26 Sections for Electrical equipment, systems, and control requirements.
   6. Division 28 Section for Fire Alarm systems

1.3 COMMISSIONING AUTHORITY

A. The Commissioning Authority (CxA) has been contracted directly with the owner for this project. The CxA has overall responsibility for planning and coordinating the HVAC commissioning process. However commissioning involves all parties involved in the design and construction process, including the mechanical (Division 23) contractor, and all specialty sub-contractor within Division 23, such as sheet metal, piping, refrigeration, water treatment, and temperature controls, Test and Balance, plus major equipment suppliers as required.

1.04 CONTRACTOR RESPONSIBILITY

A. The mechanical (Division 23) contractor’s responsibilities are defined in Division 01 Section “General Commissioning Requirements”. These responsibilities apply to all specialty sub-contractor and major equipment suppliers within Division 23. Each contractor and supplier shall review Division 01 Section 019113 and include cost to participate in the commissioning process in their contract price.

B. The cost to retest a failed functional performance test due to incomplete work or inadequate prerequisite checkout shall be the responsibility of the installing contractor. Costs may be incurred by the any or all of the witnessing Cx team members. These costs may include labor, travel expenses, lodging, or other expenses.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 230800
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes commissioning process requirements for electrical systems, assemblies, and equipment.

B. Related Sections:
   1. Division 01 Section “General Commissioning Requirements” for general commissioning process requirements.
   2. Division 21 Sections for Fire Suppression equipment and systems.
   3. Division 22 Sections for Plumbing systems and equipment.
   4. Division 23 Sections for HVAC equipment, systems, and control requirements.
   5. Division 26 Sections for electrical equipment, systems, and control requirements.

1.3 COMMISSIONING AUTHORITY

A. The Commissioning Authority (CxA) has been contracted directly with the owner for this project. The CxA has overall responsibility for planning and coordinating the HVAC commissioning process. However commissioning involves all parties involved in the design and construction process, including the electrical (Division 26) contractor, as many HVAC system components require electrical power and controls in order to operate as specified.

1.4 CONTRACTOR RESPONSIBILITY

A. The electrical (Division 26) contractor’s responsibilities are defined in Division 01 Section “General Commissioning Requirements”. Each contractor and equipment supplier within Division 26 shall review Division 01 Section 019113 and include cost to participate in the commissioning process in their contract price.

B. The cost to retest a failed functional performance test due to incomplete work or inadequate prerequisite checkout shall be the responsibility of the installing contractor. Costs may be incurred by the any or all of the witnessing Cx team members. These costs may include labor, travel expenses, lodging, or other expenses.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 260800
PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section includes commissioning process requirements for fire suppression systems, assemblies, and equipment.

B. Related Sections:

1. Division 01 Section “General Commissioning Requirements” for general commissioning process requirements.
2. Division 21 Sections for Fire Suppression equipment and systems.
3. Division 22 Sections for Plumbing systems and equipment.
4. Division 23 Sections for HVAC equipment, systems, and control requirements.
5. Division 26 Sections for Electrical equipment, systems, and control requirements.
6. Division 28 Section for Fire Alarm systems

1.3 COMMISSIONING AUTHORITY

1.04 The Commissioning Authority (CxA) has been contracted directly with the owner for this project. The CA has overall responsibility for planning and coordinating the commissioning process. However commissioning involves all parties involved in the design and construction process, including the fire alarm (Division 28) contractor.

1.05 CONTRACTOR RESPONSIBILITY

A. The fire alarm (Division 28) contractor and/or equipment supplier will be required to operate devices in all operating mode as needed to demonstrate functionality. All testing is to be witnessed by the CxA and selected commissioning team members. Specifically, representatives from the Owners O&M staff and design team. Installing contractors will be required to provide the CxA all specified start-up and testing documentation prior to conducting functional testing.

B. The cost to retest a failed functional performance test due to incomplete work or inadequate prerequisite checkout shall be the responsibility of the installing contractor. Costs may be incurred by the any or all of the witnessing Cx team members. These costs may include labor, travel expenses, lodging, or other expenses.

C. Commissioning responsibilities are further defined in Division 01 Section “General Commissioning Requirements”. These responsibilities apply to all specialty sub-contractor and major equipment suppliers within Division 28. Each contractor and supplier shall review Division 01 Section 019113 and include cost to participate in the commissioning process in their contract price.
PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION (Not Applicable)

END OF SECTION 280800
BSU Scheumann Family Indoor Practice Facility
2650 West Bethel Avenue
Muncie, IN 47304

Fire Suppression Contractor (Division 21)

Piping Symbols

1. Fire Suppression Contractor shall design and install bottom connection (90°).

2. Hazard Category HC-2 (Ceilings from 30 ft to 60 ft).

3. 0.20 GPM / 2500 SQ FT.

4. Total square footage of project is 85,000 square feet.

5. Flow switch

6. Gate valve

7. Supervisory valve

8. Automatic sprinkler system and supervisory alarm system for the entire building.

9. Building to be totally fire suppressed.

10. Concealed two piece adjustable pendant quick response type with white finish cover plate.

11. Sprinklers in exposed areas shall be quick response type without all wall to be parallel with the practice field.

12. Sprinklers shall be staggered upward the roof such that every other row of sprinklers moving upward the roof are halfway through the spray pattern.

13. All piping shown with spray shown as quick response type. All piping not shown or sized on the drawings, piping sizing shall be based on fire suppression contractor's hydraulic calculations.

14. Hydraulic calculations indicated a larger size is necessary. For piping not shown or sized on the drawings, piping sizing shall be based on fire suppression contractor's hydraulic calculations.

15. The sprinkler deflectors shall be directed to be parallel with the roof.

16. The sprinkler heads shall be staggered upward the roof such that every other row of sprinklers moving upward the roof are halfway through the spray pattern.

17. All piping shown with spray shown as quick response type.

18. All piping not shown or sized on the drawings, piping sizing shall be based on fire suppression contractor's hydraulic calculations.

19. At owner's request, working drawing.
NOTES

1. NO PIPING SHALL ROUTE OVER THIS SPACE, UNLESS SERVING THIS SPACE.

BP2 100% CONSTRUCTION DOCUMENTS 03/30/2020 BP2 BID SET 04/20/2020

1 ADDENDUM #2 05/19/2020
1. ECCENTRIC REDUCER
2. COMPOUND PRESSURE/VACUUM GAUGE
3. BALL DRIP VALVE, EXTEND DISCHARGE TO FLOOR DRAIN
4. AUTOMATIC AIR RELEASE VALVE
5. BRONZE CHECK VALVE WITH 0.09375" ORIFICE IN CLAPPER
6. 0.25" PLUG
7. CONNECT TO FIRE PUMP CONTROLLER PRESSURE SWITCH
8. CONNECT TO JOCKEY PUMP CONTROLLER PRESSURE SWITCH
9. GLOBE VALVE
10. TEXT HEADER CONTROL VALVE SUPERVISED CLOSED
11. CASING (CIRCULATION) RELIEF VALVE
12. SUCTION PRESSURE SUSTAINING VALVE
13. SUCTION PRESSURE SUSTAINING VALVE SENSING PIPING
14. CONCRETE PAD

NOTES:
1. FIRE PUMP AND JOCKEY PUMP, [AND SUSTAINING VALVE ] PRESSURE SENSING PIPING SHALL BE COPPER, BRASS OR SERIES 300 STAINLESS STEEL.
2. FIRE PUMP SUCTION PIPING ARRANGEMENT SHALL BE COMPLIANT WITH FIRE PUMP MANUFACTURER'S INSTALLATION INSTRUCTIONS.
3. PROVIDE CONCRETE PAD FOR BOTH FIRE AND JOCKEY PUMP. ALL BASES, CURBS AND SUPPORTS SHALL BE INCLUDED IN THE FIRE SUPPRESSION CONTRACTS. SUPPORT METHOD SHALL BE CONCRETE BASES AND PADS WITH ANCHOR BOLTS CAST IN PLACE. BASES SHALL BE FORMED ON ALL SIDES AND HAND TROWELED TO A SMOOTH, DENSE FINISH WITH NEATLY CHAMFERED CORNERS. LARGE CONCRETE PADS ON GRADE SHALL BE CONSTRUCTED WITH REINFORCING STEEL OR REINFORCING ROADWAY MESH.

SCALE: 1/8" = 1'-0"

ELECTRIC - FIELD ASSEMBLED FIRE AND JOCKEY PUMP PIPING
BSU Scheumann Family Indoor Practice Facility
2650 West Bethel Avenue
Muncie, IN 47304

NOTES
1. WATER SERVICE BACKFLOW PREVENTION
   - Use air gap over mop sink.
   - Combination temperature-pressure relief valve.
   - Vacuum relief valve.
   - Air gap over mop sink.
   - Use all three at gas-fired equipment connections.

2. BASE MOUNTED PUMP - END SUCTION
   - Use air gap over mop sink.
   - Combination temperature-pressure relief valve.
   - Vacuum relief valve.
   - Air gap over mop sink.

3. WATER SERVICE ANCHOR
   - Use air gap over mop sink.
   - Combination temperature-pressure relief valve.
   - Vacuum relief valve.
   - Air gap over mop sink.

4. VENT THRU SIDEWALL
   - Use air gap over mop sink.
   - Combination temperature-pressure relief valve.
   - Vacuum relief valve.
   - Air gap over mop sink.

5. TYPICAL GAS CONNECTION AT EQUIPMENT
   - Use air gap over mop sink.
   - Combination temperature-pressure relief valve.
   - Vacuum relief valve.
   - Air gap over mop sink.

6. DOMESTIC WATER HEATER PIPING
   - Use air gap over mop sink.
   - Combination temperature-pressure relief valve.
   - Vacuum relief valve.
   - Air gap over mop sink.

7. PRESSURE GAUGE
   - Water service anchor.
   - Use air gap over mop sink.
   - Combination temperature-pressure relief valve.
   - Vacuum relief valve.
   - Air gap over mop sink.

8. P/T UNION
   - Use air gap over mop sink.
   - Combination temperature-pressure relief valve.
   - Vacuum relief valve.
   - Air gap over mop sink.

9. PRESSURE REDUCER BACKFLOW PREVENTER
   - Use air gap over mop sink.
   - Combination temperature-pressure relief valve.
   - Vacuum relief valve.
   - Air gap over mop sink.

10. AIR GAP FITTING
    - Use air gap over mop sink.
    - Combination temperature-pressure relief valve.
    - Vacuum relief valve.
    - Air gap over mop sink.

11. FLANGE CONNECTION
    - Use air gap over mop sink.
    - Combination temperature-pressure relief valve.
    - Vacuum relief valve.
    - Air gap over mop sink.

12. METERED WELDED ANGLE
    - Use air gap over mop sink.
    - Combination temperature-pressure relief valve.
    - Vacuum relief valve.
    - Air gap over mop sink.

13. SADDLE BOLT TO ANGELS
    - Use air gap over mop sink.
    - Combination temperature-pressure relief valve.
    - Vacuum relief valve.
    - Air gap over mop sink.

14. EXTERIOR WALL
    - Use air gap over mop sink.
    - Combination temperature-pressure relief valve.
    - Vacuum relief valve.
    - Air gap over mop sink.

15. PRESSURE GAUGE
    - Use air gap over mop sink.
    - Combination temperature-pressure relief valve.
    - Vacuum relief valve.
    - Air gap over mop sink.

16. WATER SERVICE ANCHOR
    - Use air gap over mop sink.
    - Combination temperature-pressure relief valve.
    - Vacuum relief valve.
    - Air gap over mop sink.

17. WATER SERVICE BACKFLOW PREVENTION
    - Use air gap over mop sink.
    - Combination temperature-pressure relief valve.
    - Vacuum relief valve.
    - Air gap over mop sink.

18. BASE MOUNTED PUMP - END SUCTION
    - Use air gap over mop sink.
    - Combination temperature-pressure relief valve.
    - Vacuum relief valve.
    - Air gap over mop sink.

19. VENT THRU SIDEWALL
    - Use air gap over mop sink.
    - Combination temperature-pressure relief valve.
    - Vacuum relief valve.
    - Air gap over mop sink.

20. TYPICAL GAS CONNECTION AT EQUIPMENT
    - Use air gap over mop sink.
    - Combination temperature-pressure relief valve.
    - Vacuum relief valve.
    - Air gap over mop sink.

21. DOMESTIC WATER HEATER PIPING
    - Use air gap over mop sink.
    - Combination temperature-pressure relief valve.
    - Vacuum relief valve.
    - Air gap over mop sink.

22. PRESSURE GAUGE
    - Use air gap over mop sink.
    - Combination temperature-pressure relief valve.
    - Vacuum relief valve.
    - Air gap over mop sink.

23. P/T UNION
    - Use air gap over mop sink.
    - Combination temperature-pressure relief valve.
    - Vacuum relief valve.
    - Air gap over mop sink.

24. FLANGE CONNECTION
    - Use air gap over mop sink.
    - Combination temperature-pressure relief valve.
    - Vacuum relief valve.
    - Air gap over mop sink.

25. METERED WELDED ANGLE
    - Use air gap over mop sink.
    - Combination temperature-pressure relief valve.
    - Vacuum relief valve.
    - Air gap over mop sink.

26. SADDLE BOLT TO ANGELS
    - Use air gap over mop sink.
    - Combination temperature-pressure relief valve.
    - Vacuum relief valve.
    - Air gap over mop sink.

27. EXTERIOR WALL
    - Use air gap over mop sink.
    - Combination temperature-pressure relief valve.
    - Vacuum relief valve.
    - Air gap over mop sink.