

ADDENDUM #1 (ONE)

September 22, 2022

**JOB #2022-09 A NEW TECHNOLOGY CENTER FOR
NATCHITOCHE PARISH SCHOOL BOARD
NATCHITOCHE, LOUISIANA
NATCHITOCHE PARISH SCHOOL BOARD - OWNER**

Yeager, Watson & Associates, LLC; Architects (Job #2022-09)

Each bidder shall note on his Bid Form receipt of Addendum #1; that his Bid is for the conditions set forth in this Addendum plus the complete Contract Documents.

SEALED PROPOSALS OF CURRENT LOUISIANA LICENSED GENERAL CONTRACTORS FOR #2022-09 A NEW TECHNOLOGY CENTER FOR NATCHITOCHE PARISH SCHOOL BOARD WILL BE RECEIVED BY THE NATCHITOCHE PARISH SCHOOL BOARD, 310 ROYAL ST., NATCHITOCHE, LOUISIANA 71457, UNTIL 2:00 PM LOCAL TIME, WEDNESDAY, SEPTEMBER 28, 2022.

SOLE RESPONSIBILITY FOR PROPER DELIVERY OF BID IN COMPLIANCE WITH THE OFFICIAL PROJECT ADVERTISEMENT IS THAT OF THE GENERAL CONTRACTOR.

PRE-BID CONFERENCE ATTENDEES (1:00 P.M. CST, MONDAY, SEPTEMBER 19TH, 2022)

<u>Pre- Bid Attendees</u>	<u>Company</u>	<u>Phone Number</u>
Perry Watson	YWA	318-202-5708
Michael Wynne	YWA	318-202-5708
Jim Verzwylt	PAE	318-473-2100
Nicholas Green	DMB	318-368-2622
Trent Descant	M. D. Descant	318-346-6657
Russ Jeansonne	Pat Williams Const.	318-460-0006
Chris Johnson	Bayou Construction Svcs.	512-755-0570
Justin Floyd	Tudor, Inc.	318-445-3606
Jason White	PPG Paints	351-244-2797
Lee Waskom	NPSB	318-332-0819
Mike Cozad	NPSB	318-521-3997
Ryan Shirley	NPSB	318-332-2885
Michelle Demery	NPSB	318-352-2358

PLAN ROOMS HOLDING CONTRACT DOCUMENTS:

CENTRAL BIDDING: www.centralauctionhouse.com

ISQFT/ Construct Connect: www.isqft.com

CMD/Dodge – cmdgroup.com

LAGC: centralauctionhouse.com/Category/4/LAGCPlanRooms

PROJECT MANUAL ARCHITECTURAL

Section 074113.16 – Standing Seam Metal Roof Panels

1. Change Standing Seam Metal Roof Panels Finish to “Galvalume Plus clear finish over galvalume”
074113.16.2.2.B.2.b. Exterior Finish: Change to Read: “Galvalume Plus clear finish over galvalume”
074113.16.2.6.A.1. Change to Read: “Galvalume Plus clear finish over galvalume”

Section 085653 – Security Windows

1. **Clarification:** only one shelf unit required at security window on exterior wall.
085653.2.2.14 : Shelf Unit: Change to Read: "...Mount inside at exterior window only".

Add Section 102239 – Folding Panel Partitions

1. **102239: ADD:** This entire section. (Attached in the Revision Documents at the end of this addendum.)

ARCHITECTURAL DRAWINGS

Add Detail Sheet X1:

1. **Add Sheet X1 Concrete Splash Pad Detail.** (Attached in the Revision Documents at the end of this addendum.)

OTHER ACCEPTABLE MANUFACTURERS – ARCHITECTURAL PRODUCTS

No Exceptions are taken to the following manufacturers and/or products for bidding purposes in addition to those specified. Substituting products other than those specified is based upon the best information now available. Should any modification be required to accommodate the substituted product, it is the responsibility of this supplier and/or subcontractor to include the cost of this modification in their quotation. It should be understood that any deviation from the products specified with respect to quality, details and performance in the opinion of the Architect in grounds for disapproval of this product subsequent to a contract award. Any manufacturer or product that is not listed here or in the Specifications shall be deemed NOT ACCEPTABLE for this project. Verification of this is the responsibility of the General Contractor. The Architect after Contract Award will strictly enforce this policy.

033000 Cast-In-Place Concrete (Vapor Retarders): Viper Vaporcheck II by Insulation Solutions; Tex-Trude X-TREME 15 mil vapor barrier.

042000 Unit Masonry: Mortor Web- Sandell Manufacturing Co., Inc.

054000 Cold-formed Metal Framing: CEMCO; JN LINROSE; Structural Steel Products; Telling.

064114 Plastic-Laminate-Faced Architectural Cabinets: Douglas Cabinet Company, Inc.; Allen Millwork; Mardel Products.

074113.16 Standing-Seam Metal Roof Panels (All Roof Systems must be able to warranty the 1:12 slopes indicated and meet or exceed the Single Source Weathertightness Warranty specified): McElroy Metal; Metal Sales, Architectural Metal Systems (AMS); American Building Components (ABC); ACI Metal Roofing Systems; Alliance Steel AS-24 Panel.

074213.13 Formed Metal Wall Panels: McElroy Metal; PAC-CLAD; ACI Metal Roofing Systems; Alliance Steel PBR Panel.

074293 Soffit Panels: McElroy Metal; PAC-CLAD; ACI Metal Roofing Systems; Alliance Steel A-12 Panel.

081113 Hollow Metal Doors and Frames: Premier Steel Doors and Frames; Steelcraft Mfg. Co.; MPI ; Republic Doors and Frames; Security Metal Products Corp.; Windsor Republic Doors

092216 Non-structural Metal Framing: CEMCO; JN LINROSE.

093013 Ceramic Tiling (Setting Materials): C-Cure Chemical Co.; Tex-Rite; Texas Cement Products.

095123 Acoustical Ceilings: Certainteed.

096513 Resilient Base and Accessories: Mannington.

099600 High Performance Coatings: PPG Paints

102113.17 Phenolic-Core Toilet Compartments: Scranton Hiney Hiders Solid Plastic Partitions.

102800 Toilet Accessories: A & J Washroom Accessories; McKinney-Parker.

104413 Fire Protection Cabinets: Potter Roemer.

104416 Fire Extinguishers: Potter Roemer.

105300 Polycarbonate Canopy System: Kingspan Light and Air Polycarbonate Canopy System/CPI Daylighting.

107301 Aluminum Canopies: Tennessee Valley Metals, Inc. Subject to closely matching canopy components and providing engineering; Avadek; Williams Fence & Aluminum.

123623.13 Plastic-Laminate-Clad Countertops: Douglas Cabinet Company, Inc.; Allen Millwork; Mardel Products.

133419 Metal Building System (If supplying any panels, manufacturer must match metal roof, wall and soffit gauges, profiles, and finishes as specified in 074113.16 & 074213.13, otherwise the specified panel shall be provided and installed): Alliance Steel Building Systems; Delta Consolidated, LLC; Red Dot Buildings; Ideal Steel LLC.

NOTE: ATTACHED TO THE END OF THIS ADDENDUM ARE THE FOLLOWING REVISION DOCUMENTS INCORPORATED INTO THIS PROJECT BY THIS ADDENDUM #1:

- **Section 102239 – Folding Panel Partitions**
- **X1 Concrete Splash Pad (8.5"x11" detail)**
- **CIVIL Addendum #1 Narrative & Drawings dated September 21, 2022**
- **MEP Addendum #1 Narrative & Drawings dated September 22, 2022**

END OF ADDENDUM #1 (ONE)

SECTION 102239 - FOLDING PANEL PARTITIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Manually operated, acoustical panel partitions.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 SUBMITTALS

- A. Product Data: For each type of product.

- B. Shop Drawings: For operable panel partitions.

1. Include plans, elevations, sections, attachment details.
2. Indicate stacking and operating clearances. Indicate location and installation requirements for hardware and track, blocking, and direction of travel.

- C. Samples: For each exposed product and for each color and texture specified.

- D. Setting Drawings: For embedded items and cutouts required in other work, including support-beam, mounting-hole template.

- E. Product Certificates: For each type of operable panel partition.

- F. Product test reports.

- G. Sample warranty.

- H. Operation and maintenance data.

1.4 QUALITY ASSURANCE

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

1.5 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of operable panel partitions that fail in materials or workmanship within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Acoustical Performance: Provide operable panel partitions tested by a qualified testing agency for the following acoustical properties according to test methods indicated:
 1. Sound-Transmission Requirements: Operable panel partition assembly tested for laboratory sound-transmission loss performance according to ASTM E90, determined by ASTM E413, and rated for not less than the STC indicated.
- B. Fire-Test-Response Characteristics: Provide panels with finishes complying with one of the following as determined by testing identical products by a testing and inspecting agency acceptable to authorities having jurisdiction:
 1. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency.
 - a. Flame-Spread Index: 25 or less.
 - b. Smoke-Developed Index: 450 or less.

2.2 OPERABLE ACOUSTICAL PANELS

- A. Operable Acoustical Panels: Partition system, including panels, seals, finish facing, suspension system, operators, and accessories.
 1. Basis-of-Design Product: Subject to compliance with requirements, provide Hufcor, Inc; Series 641 or a comparable product by one of the following:
 - a. Modernfold, Inc.
- B. Panel Operation: Manually operated, individual panels.
- C. Panel Construction: As required to support panel from suspension components and with reinforcement for hardware attachment. Fabricate panels with tight hairline joints and concealed fasteners. Fabricate panels so finished in-place partition is rigid; level; plumb; aligned, with tight joints and uniform appearance; and free of bow, warp, twist, deformation, and surface and finish irregularities.
- D. Dimensions: Fabricate operable acoustical panel partitions to form an assembled system of dimensions indicated and verified by field measurements.
- E. STC: Not less than 47.
- F. Panel Closure: Manufacturer's standard.
- G. Hardware: Manufacturer's standard as required to operate operable panel partition and accessories; with decorative, protective finish.

- H. Finish Facing: Vinyl-coated fabric wall covering.

2.3 SEALS

- A. Description: Seals that produce operable panel partitions complying with performance requirements and the following:
 - 1. Seals made from materials and in profiles that minimize sound leakage.
 - 2. Seals fitting tight at contact surfaces and sealing continuously between adjacent panels and between operable panel partition perimeter and adjacent surfaces, when operable panel partition is extended and closed.
- B. Horizontal Bottom Seals:
 - 1. Resilient, mechanical, retractable, constant-force-contact seal exerting uniform constant pressure on floor when extended, ensuring horizontal and vertical sealing and resisting panel movement.
 - 2. Mechanically Operated for Acoustical Panels: Extension and retraction of bottom seal by operating handle or built-in operating mechanism, with operating range not less than 2 inches (50 mm) between retracted seal and floor finish.

2.4 PANEL FINISH FACINGS

- A. Description: Finish facings for panels that comply with indicated fire-test-response characteristics and that are factory applied to operable panel partitions with appropriate backing, using mildew-resistant nonstaining adhesive as recommended by facing manufacturer's written instructions.
- B. Vinyl-Coated Fabric Wall Covering: Manufacturer's standard, mildew-resistant, washable, vinyl-coated fabric wall covering; complying with WA-101, Type II-Medium Duty; Class A.
 - 1. Color/Pattern: As selected by Architect from manufacturer's full range.
- C. Cap-Trimmed Edges: Protective perimeter-edge trim with tight hairline joints concealing edges of panel and finish facing.

2.5 SUSPENSION SYSTEMS

- A. Tracks: Steel or aluminum with adjustable steel hanger rods for overhead support, designed for operation, size, and weight of operable panel partition indicated. Size track to support partition operation and storage without damage to suspension system, operable panel partitions, or adjacent construction. Limit track deflection to no more than 0.10 inch (2.54 mm) between bracket supports. Provide a continuous system of track sections and accessories to accommodate configuration and layout indicated for partition operation and storage.
- B. Carriers: Trolley system as required for configuration type, size, and weight of partition and for easy operation; with ball-bearing wheels.
- C. Track Intersections, Switches, and Accessories: As required for operation, storage, track configuration, and layout indicated for operable panel partitions, and compatible with partition assembly specified. Fabricate track intersections and switches from steel or aluminum.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install operable panel partitions and accessories after other finishing operations, including painting, have been completed in area of partition installation.
- B. Broken, cracked, chipped, deformed, or unmatched panels are not acceptable.
- C. Broken, cracked, deformed, or unmatched gasketing or gasketing with gaps at butted ends is not acceptable.
- D. Light-Leakage Test: Illuminate one side of partition installation and observe vertical joints and top and bottom seals for voids. Adjust partitions for alignment and full closure of vertical joints and full closure along top and bottom seals.

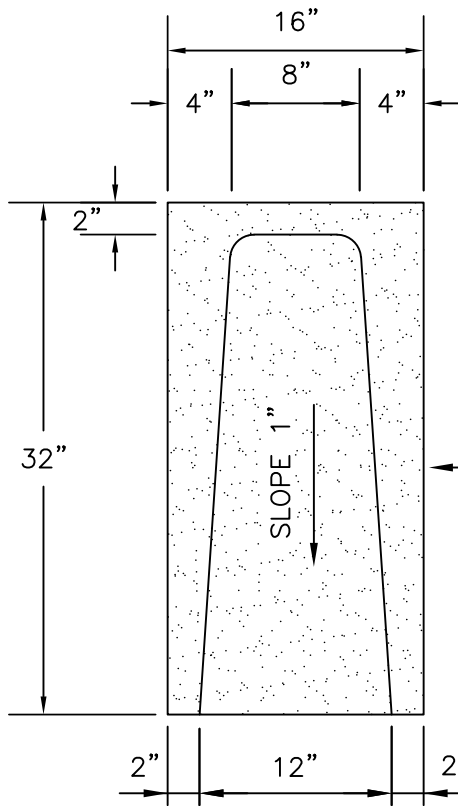
3.2 ADJUSTING

- A. Verify that safety devices are properly functioning.

3.3 DEMONSTRATION

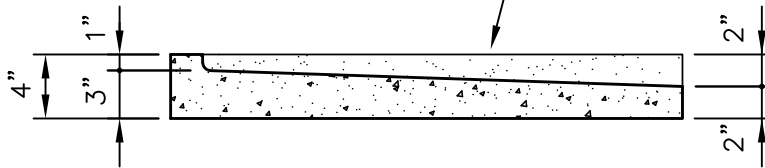
- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain operable panel partitions.

END OF SECTION 102239



PRECAST CONCRETE SPLASH PAD REINF. WITH 6 x 6, w1.4 x W1.4 W.W.F.

1 CONCRETE SPLASH PAD PLAN



2 CONCRETE SPLASH PAD SECTION

CONCRETE SPLASH PAD

SCALE

1" = 1'-0"

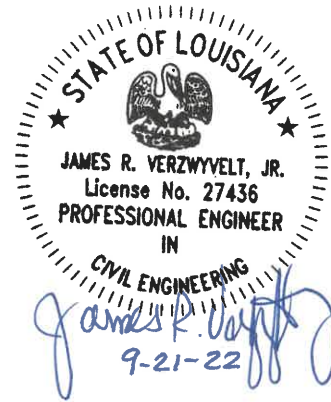
YWA YEAGER, WATSON & ASSOCIATES, INC.
AN ARCHITECTURAL CORPORATION

SEPT 2022

JOB #2022-09

X1

TO: ALL GENERAL CONTRACTORS BIDDING
FROM: PAN AMERICAN ENGINEERS, LLC
JIM VERZWYVELT, JR., P.E.
SUBJECT: 2022-09 A NEW TECHNOLOGY CENTER FOR
NATCHITOCHE PARISH SCHOOL BOARD
NATCHITOCHE, LOUISIANA
DATE: September 21, 2022
ADDENDUM # 1



This ADDENDUM is an integral part of the contract documents and shall be treated as such. Contractor shall acknowledge receipt of this ADDENDUM on the Bid Form.

PROJECT MANUAL

Section 323119 – Ornamental Aluminum Fence and Gates

1. Add Section 323119 – Ornamental Aluminum Fence and Gates. Note: Ornamental aluminum fence (and gates) (4' high) to be installed around perimeter of FRONT stormwater detention basin (to replace previously specified 4' high vinyl coated chain link fence).

DRAWINGS

Sheet C6 – Site Plan

1. Detail 2 – Site Plan Master Key: Revise Item 20 to read “4' High Ornamental Aluminum Fence and Double Gate (8' Wide). Note the following:
 - Ornamental aluminum fence and gates to be installed around perimeter of **FRONT stormwater detention basin ONLY**. New fencing and gates around rear stormwater detention basin to remain 4' high vinyl coated fencing as specified.
 - Construction requirements for ornamental aluminum fencing and gates to generally comply with Specifications Section 323119 – Ornamental Aluminum Fence and Gates (included in this addendum) and Sheet C31 – Fence and Gate Details.

Sheet C6 – Site Plan & Sheet C7 – Site Plan

1. Detail 1 – Plan: Revise Plan to include Master Key Items 22 and 23 related to cleaning and sealing all joints and cracks in existing concrete pavement to remain.
2. Detail 2 – Site Plan Master Key: Add the following items:
 - a. 22 – Clean and Seal All Joints in Existing Concrete Pavement to Remain
 - b. 23 – Clean and Seal All Cracks in Existing Concrete Pavement to Remain (see attached Drawing Sheet C6-R1 (8.5x11))
3. Detail 3 – Site Plan Notes: Replace Note 2 with the following:
 2. **The Contractor is Responsible for Erecting Necessary Construction Fencing and/or Barricades to Protect Construction Materials and Prevent Unauthorized Personnel from Entering any Hazardous Construction/Laydown Area. Construction fencing is NOT Required to be Erected Around the Entire Perimeter of the Site.**
4. Add Detail 5 – Concrete Pavement Removal and Replacement Work Notes.
5. Add Detail 6 – Concrete Joint and Crack Cleaning and Sealing Work Notes (see attached Drawing Sheet C6&C7-R1 (8.5x11))

SECTION 32 31 19ORNAMENTAL ALUMINUM FENCE AND GATESPART 1 - GENERAL

1.1 Scope: This Section covers materials, labor and all necessary items required for the installation of commercial grade ornamental aluminum fencing and gates around perimeter of front stormwater detention basin.

1.2 References:

- A. ASTM B 26/B 26M - Standard Specification for Aluminum-Alloy Sand Castings; 2005.
- B. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2004.
- C. ASTM B 210 - Standard Specification for Aluminum and Aluminum-Alloy Drawn Seamless Tubes; 2004.
- D. ASTM B 221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2005.
- E. ASTM B 247 - Standard Specification for Aluminum and Aluminum-Alloy Die Forgings, Hand Forgings, and Rolled Ring Forgings; 2000.
- F. ASTM B 429 - Standard Specification for Aluminum-Alloy Extruded Structural Pipe and Tube; 2002.
- G. ASTM C 1107 - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Non-shrink); 2002.
- H. ASTM E 488 - Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements; 1996.
- I. AA 30 - "Specifications for Aluminum Structures".
- J. Americans with Disabilities Act Accessibility Guidelines (ADA).

1.3 Submittals: Provide product data for fence, gates, hardware, etc. specified in accordance with Section 01 33 00 – Submittal Procedures.

- A. Project Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.

2. Storage and handling requirements and recommendations.
3. Installation methods.

B. Shop Drawings:

1. Submit Manufacturer's approved shop drawings detailing the section and elevation views of each product to be installed.
2. Coordinate with locations listed on Drawings.

C. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square representing actual product, color, and patterns.

1.5 Quality Assurance:

A. Manufacturer Qualifications: All primary products specified in this section will be supplied by a single manufacturer with a minimum of ten (10) years experience.

1.6 Delivery, Storage and Handling:

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.7 Project Conditions:

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.8 Warranty:

A. Provide Manufacturer's minimum ten-year warranty for aluminum fence components and gates and aluminum finishes.

PART 2 - PRODUCTS

2.1 Manufacturers:

A. Acceptable Manufacturer: OnGuard Ornamental Aluminum Fence, 18 Culnen Drive, Branchbury, New Jersey, 08876 (866-321-0001).

B. Acceptable Manufacturer: Elite Fence Products, Inc., 50925 Richard W. Boulevard, Chesterfield Twp., Michigan 48051 (800-783-1331).

C. Or approved equal.

2.2 Metals:

A. General: Provide metal free from pitting, seam marks, roller marks, stains, discolorations, and other imperfections where exposed to view on finished units.

B. Aluminum: Alloy and temper recommended by aluminum producer and finisher for type of use and finish indicated, and with not less than strength and durability properties of alloy and temper designated below for each aluminum form required.

1. Extruded Bar and Tube: ASTM B 221 (ASTM B 221 M), alloy 6063-T5/T52
2. Extruded Structural Pipe and Tube: ASTM B 429, alloy 6063-T832.
3. Plate and Sheet: ASTM B 209 (ASTM B 209M), alloy 6061-T6.
4. Die and Hand Forgings: ASTM B 247 (ASTM B 247 M), alloy 6061-T6
5. Castings: ASTM B 26/B 26M, alloy A356-T6.

C. Brackets, Flanges and Anchors: Cast or formed metal of same type of material and finish as supported rails, unless otherwise indicated.

1. Provide brackets with flange for concealed anchorage to hanger bolt.
2. Provide formed brackets with predrilled hole for exposed bolt anchorage.
3. Provide brackets with internal sleeve connectors.

2.3 Fasteners:

A. Anchors: Select fasteners of type, grade and class required to produce connections suitable for anchoring fencing to existing building walls.

2.4 Setting Material: Refer to Section 03 30 53 - Cast in Place Concrete – Civil Sitework.

2.5 Fences:

A. Fence Style: Commercial Grade Three-Line Picket - Standard fence with two (2) upper rails and one (1) lower rail. Pickets extend through upper rails. Pickets end flush with lower rail.

1. On-Guard: Starling Style (Commercial Grade).

2. Elite: EFS-10 Style (Commercial Grade).
3. Rails: Three - 1 3/8 inch wide by 1 1/4 inch deep aluminum channel.
4. Height: 4 feet – 0 inches.
5. Unsupported Span: Not to exceed 96 inches.

B. Pickets:

1. Style: 3/4 inch (19mm) extruded square aluminum with flat square tops.
2. Spacing: Picket spacing must disallow the passage of a 4 inch sphere through the fence at any point.

C. Support Posts:

1. Size: 2 inch square x 0.125 inch thick extruded aluminum posts.
2. Post Cap: Ball Cap.

D. Gate Posts:

1. Size: 3 inch square x 0.125 inch thick extruded aluminum posts.
2. Post Cap: Ball Cap.

2.6 Gate:

A. Walk gate to be double - 48 inch wide gate to result in 96 inch full opening.
Walk gate shall match fence and railing style and finish as indicated.

B. Gate hardware shall include hinges, plunger rod, gate latch and other required closure accessories to allow for full, unobstructed passage with both gates opened.

2.7 Fabrication:

A. Assemble fencing in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

B. All rail and upright intersections and all picket and rail intersections shall be joined by welding.

C. Brackets, Flanges, Fittings and Anchors: Provide manufacturer's standard wall brackets, flanges, miscellaneous fittings and anchors to connect fences to existing building walls.

D. Provide inserts and other anchorage devices to connect fencing to concrete or masonry. Fabricate anchorage devices capable of withstanding loads imposed by fencing. Coordinate anchorage devices with supporting structure.

- E. Shear and punch metals cleanly and accurately. Remove burrs from exposed cut edges.
- F. Cut, reinforce, drill and tap components as required to receive finish hardware, screws and similar items.
- G. Close exposed ends of fencing members, as necessary, with prefabricated end fittings.

2.8 Finishes:

A. General:

- 1. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- 2. Appearance of Finished Work:
 - a. Variations in appearance of abutting or adjacent units are acceptable if they are within one-half of the range of approved samples. Noticeable variations in the same unit are not acceptable.

B. Finish Coating: Prepare, pre-treat, and apply coating to exposed metal surfaces to comply with manufacturer's written instructions.

- 1. Material: AAMA 2604 - Polyester powder coating, 3 mil average film thickness; or,
- 2. Material: Kynar 500 coating
- 3. Color: Bronze or Black

2.9 Ground Rods: 5/8" nominal diameter x 8" long Copperweld rod, Burndy type GAR.

PART 3 - EXECUTION

3.1 Examination:

- A. Do not begin installation until all fencing, gates and components have been checked for damage and/or imperfections.

3.2 Installation:

- A. Install fence in accordance with manufacturer's instructions.

- B. Space posts uniformly at 96 inches center to center unless otherwise indicated.
- C. Concrete Set Posts: Drill hole in firm, undisturbed or compacted soil. Holes shall be drilled to dimensions shown on the Drawings. Place concrete around post in a continuous pour. Trowel finish around posts and slope to direct water away from posts. Clean concrete residue from post bottom immediately after concrete has been poured.
- D. Gate Posts and Hardware: Set keepers, stops, sleeves and other accessories into concrete.
- E. Type and quantity of gate hinges shall be based on the application; weight, height and number of gate cycles.
- F. Gate hardware shall be provided by the manufacturer and shall be installed per manufacturer's recommendations.
- G. Check each post for vertical and top alignment, and maintain in position during placement and finishing operation.
- H. Align fence panels between post. Ensure panels and posts remain plumb throughout construction.
- I. Clean surfaces thoroughly with soap and water after installation is completed.

3.3 Grounding Devices:

- A. A grounding device shall be installed at max. 250' along fence and at each gate location as detailed on the Drawings.

3.4 Accessories:

- A. Install post caps and other accessories to complete fence.

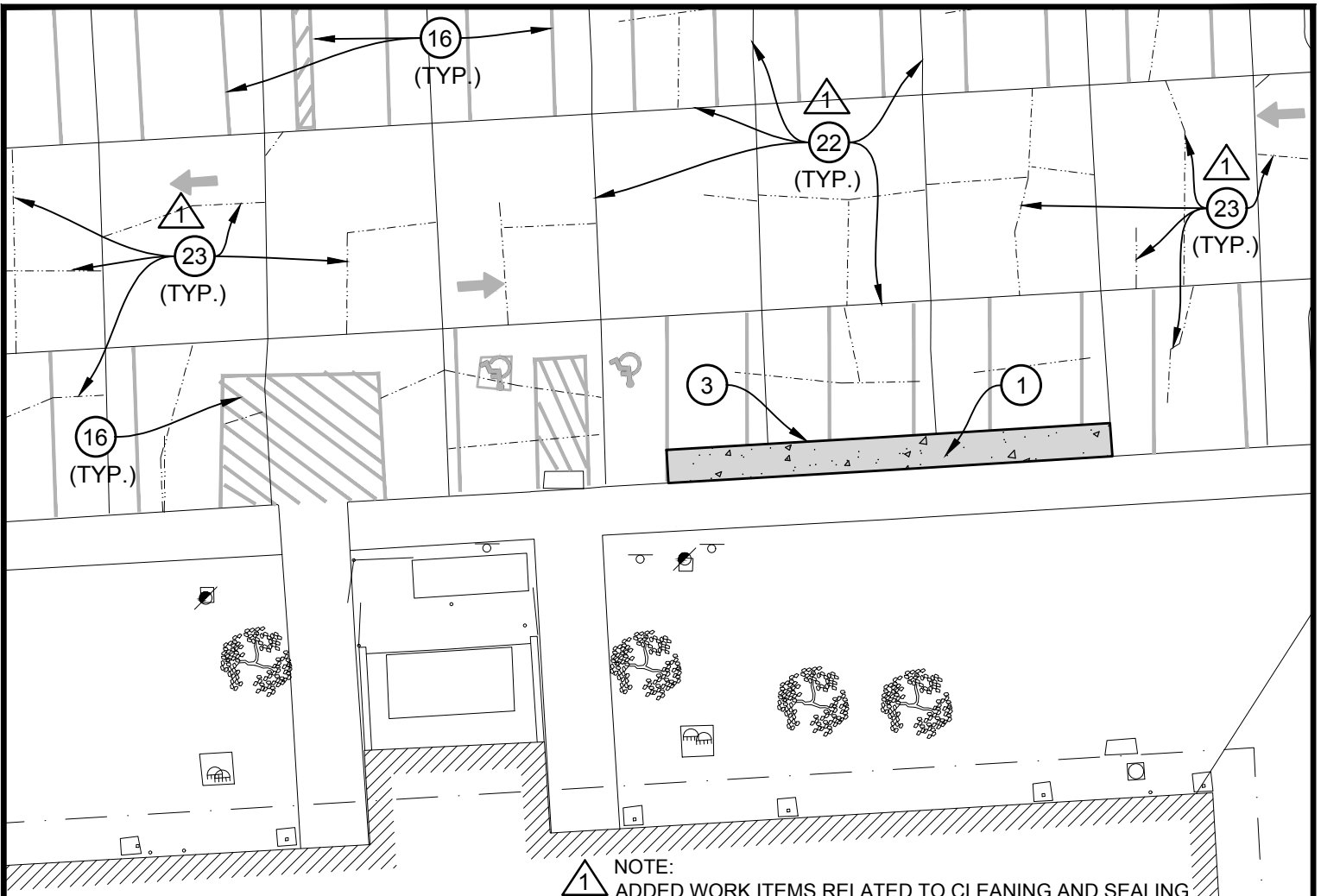
3.5 Cleaning:

- A. The CONTRACTOR shall clean the jobsite of excess materials; post-hole excavations shall be scattered uniformly away from posts.

3.6 Protection:

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

- END OF SECTION -



1 NOTE:
 ADDED WORK ITEMS RELATED TO CLEANING AND SEALING JOINTS AND CRACKS IN EXISTING CONCRETE PAVEMENT ARE APPLICABLE TO ALL PAVEMENT TO REMAIN ON SHEETS C6 AND C7. THIS PARTIAL DEPICTION IS TO ILLUSTRATE REQUIRED WORK ON BOTH SHEETS.

MAIN
OFFICE

1 PLAN

SCALE: 1" = 20'

2 SITE PLAN MASTER KEY

- 22** CLEAN AND SEAL ALL JOINTS IN EXISTING CONCRETE PAVEMENT TO REMAIN
- 23** CLEAN AND SEAL ALL CRACKS IN EXISTING CONCRETE PAVEMENT TO REMAIN

1 NOTE:
 THIS SHEET INDICATES ADDENDUM #1 ITEMS ONLY. SEE SHEET C6 FROM ORIGINAL DOCUMENTS FOR REMAINDER OF ITEMS AND INFORMATION.



FROM SHEET
C6
ADDENDUM 1

SITE PLAN

SCALE

1" = 20'

YWA YEAGER, WATSON & ASSOCIATES, LLC
ARCHITECTS

AUGUST 2022

JOB # 2022-09

C6
R1

5

CONCRETE PAVEMENT REMOVAL AND REPLACEMENT WORK NOTES

1. AFTER SAWCUT AND PAVEMENT AND BASE REMOVAL IN INDICATED AREAS, COMPACT EXPOSED, EXISTING SOIL SUBGRADE AND INSTALL TENSAR TRIAX TX160 GEOGRID OR APPROVED EQUAL.
2. INSTALL 8" STONE BASE (LDOTD SECTION 1003.03(B)) COMPACTED TO 95% STANDARD PROCTOR.
3. NEW JOINTS SHALL BE INSTALLED AS INDICATED.
4. FOR ALL JOINTS ABUTTING NEW CONCRETE TO EXISTING CONCRETE, INSTALL 1/2" BITUMINOUS IMPREGNATED OR POLYPROPYLENE EXPANSION JOINT MATERIAL AND JOINT BACKER ROD.
5. INSTALL #4 STEEL REINFORCEMENT BARS AT 18" ON CENTERS EACH WAY AT MID-DEPTH OF NEW CONCRETE PANELS. BARS SHALL TERMINATE AT ALL JOINTS.
6. FORM AND POUR 3,500 PSI (MIN. STRENGTH AT 28 DAYS), 6" THICK CONCRETE PAVEMENT WITH BROOM FINISH.
7. SEAL ALL JOINTS WITH COLD APPLIED, SINGLE COMPONENT, SILICONE SEALANT AT WIDTH/DEPTH RATIO AS RECOMMENDED BY THE SEALANT MANUFACTURER.
8. NEW PAVING SHALL BE SLOPED TO GENERALLY MATCH EXISTING PAVING SLOPE.
9. APPLY PAINTED STRIPING ON NEW CONCRETE PAVING AS INDICATED (ALLOW MINIMUM CURE TIME PRIOR TO APPLICATION).

6

CONCRETE JOINT AND CRACK CLEANING AND SEALING WORK NOTES

- * 1. REMOVE MAJORITY OF EXISTING SEALANT BY MECHANICAL MEANS.
- 2. POWER WASH TO REMOVE DEBRIS AND REMAINING SEALANT.
- 3. ROUTE CRACKS LESS THAN 1/8" IN WIDTH TO ACCEPT SEALANT.
- 4. AIR BLAST TO FURTHER REMOVE REMAINING DEBRIS FROM JOINT / CRACK AND DRY RESERVOIR.
- * 5. INSTALL BACKER ROD.
- 6. INSTALL SEALANT.
- * NOT REQUIRED FOR CRACK SEALING

1

FOR BIDDING PURPOSES CONTRACTOR SHALL INCLUDE IN THIS BID THE COST FOR ALL LABOR, EQUIPMENT AND MATERIALS TO CLEAN, PREPARE AND RE-SEAL JOINTS AND CRACKS IN EXISTING CONCRETE PAVING (TO REMAIN). (RE: C6-R1) (THIS ADDENDUM)

- * EXISTING JOINTS - 3,500 L.F.
- * EXISTING CRACKS - 1,500 L.F.

1

NOTE:
THIS SHEET INDICATES ADDENDUM #1 ITEMS ONLY.
SEE SHEETS C6 AND C7 FROM ORIGINAL DOCUMENTS
FOR REMAINDER OF ITEMS AND INFORMATION.

1

FROM SHEETS
C6 & C7
ADDENDUM 1

SITE PLAN

SCALE

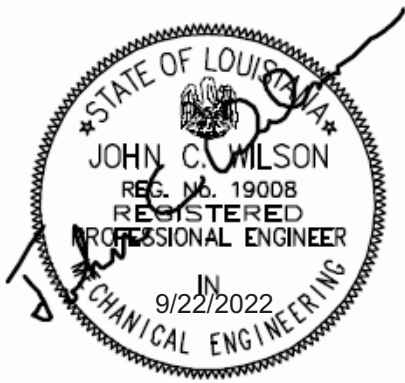
N.T.S.

YWA YEAGER, WATSON & ASSOCIATES, LLC
ARCHITECTS

AUGUST 2022

JOB # 2022-09

C6 & C7
R1



ADDENDUM #1
NEW TECHNOLOGY CENTER FOR
NATCHITOCHE PARISH SCHOOL BOARD
NATCHITOCHE, LOUISIANA
YWA PN 2022-09
GUTH PN 33-7181



September 22, 2022

THE FOLLOWING MODIFICATIONS AND/OR CLARIFICATIONS SHALL BE MADE TO THE DRAWING AND PROJECT MANUAL FOR THE CAPTIONED PROJECT:

MECHANICAL

EQUIPMENT APPROVALS

The following manufacturers are approved as substitutes for the items listed, subject to compliance with drawings, specifications, space limitation requirements, and comparison to the specified unit:

1. Mini-Split System Heat Pump:
 - a. Daikin FTX Series indoor unit and RX Series outdoor unit.

2. Air Ionization Systems:
 - a. BioClimatic Air Systems ActiveOx series

ELECTRICAL

DRAWINGS

1. Sheet E200:
 - a. Provide power to the sprinkler system bell located on the south wall, near the warehouse entrance. Provide 2#12, 1#12G-1/2" C. to panel A. Connect to a spare 20A-1P breaker to feed. Coordinate with the Sprinkler and Fire Alarm Contractors for location and required connections.

2. Sheet E300:
 - a. Provide a fire alarm system visual signal device, with 15 candela, in Entry Hall A101, centered between the training room doors.

 - b. Provide a fire alarm system audible/visual device, with 15 candela, in Entry Hall A101, on the east wall, centered between the door to the women's restroom and the training room wall.

- c. Provide three fire alarm system audible/visual devices in Warehouse A147. Provide one, with 135 candela, centered on the west wall, adjacent to file room and mechanical room. Provide a second, with 110 candela, located on the west wall, two feet north of the corner adjacent to Exit Hall A129. Provide a third, with 110 candela, located on the west wall two feet south on the corner, adjacent to Exit Hall A146.

3. Sheet E400:

- a. On the panelboard and feeder schedule, add the following fault currents; Panel “MD” – 22,000 AIC, Panel “A” Sections 1 and 2 – 22,000 AIC, Panel “SR” – 10,000 AIC.
- b. On the symbol schedule, add the symbol 20 inside a square. This symbol is a sprinkler system bell.

4. Sheet E401:

- a. On the Light Fixture Schedule, change the description of fixture “S1” to; 4’ LENSED STRIP LIGHT.
- b. On the light fixture schedule, change the description of fixtures A4, A5, A6, and A7 to read 2X4 backlit flatpanels.
- c. On the light fixture schedule, change W1 to the following fixture:
Kenall MS15CD-PP-DB-25L40K-DV 16” SQUARE WALL MOUNT
FIXTURE. VANDAL RESISTANT. WHITE LENS WITH CROSSBAR
DESIGN. 2600 LUMENS. 4000K COLOR TEMPERATURE. MOUNT
FIXTURE AT 12’ ABOVE SLAB.
- d. On the light fixture schedule, add the following fixtures:

W2 Kenall MS11CL-PP-DB-10L40K-DV-LEL-SA 12’ SQUARE WALL
MOUNT FIXTURE. WHITE LENS WITH CROSSBAR DESIGN. 1100 LUMENS. 4000K
COLOR TEMPERATURE. EMERGENCY BATTERY PACK. CONNECT CAHRGER TO
UNSWITCHED LEG. MOUNT THE FIXTURE CENTERED AT 7’-0” ABOVE SLAB.

W3 KENALL MS11CL-PP-DB-10L40K-DV SQUARE WALL MOUNT
FIXTURE. WHITE LENS WITH CROSSBAR DESIGN. 1100 LUMENS. 4000K COLOR
TEMPERATURE. NO BATTERY PACK, AND NO DEEP BACKBOX. MOUNT THE
FIXTURE CENTERED AT 7’-0” ABOVE SLAB. MOUNT AS INSTRUCTED BY THE
ARCHITECT. ROUTE CONDUIT TO THESE FIXTURES AS DIRECTED BY ARCHITECT.

5. Sheet E500:

- a. Replace Detail “B”, Communication Outlet, with the attached detail. Add note; “VERIFY NUBER OF DATA DROPS AT EACH LOCATION WITH OWNER AND ARCHITECT.”

SPECIFICATIONS

1. Add the attached specifications section 26 32 13, Package Engine Generator.
2. Add the attached specifications section 26 36 00, Transfer Switches.
3. Remove and replace section 28 31 11, Fire Alarm, with the attached specification section.

EQUIPMENT APPROVALS

The following manufacturers are approved as substitutes for the items listed, subject to compliance with drawings, specifications, space limitation requirements, and comparison to the specified unit:

1. Light Fixture:

<u>Type:</u>	<u>Manufacturer:</u>	<u>Catalog Number:</u>
A1	FSC LIGHTING	FPB-22-3500L-AOK
A2(E)	FSC LIGHTING	FPB-22-3500L-AOK-(EM10W)
A3(E)	LAMAR	LWT2250L-35D-(EM)
A4(E)	EIKO	BLP24-PS50-FCCT-U-D-A-(EM18W)
A5(E)	EIKO	BLP24-PS50-FCCT-U-D-A-(EM18W)
A6	LAMAR	LWT2470L-35D
A7	LAMAR	LWT2475L35D
D1(E)	PRESCOLITE	LFR-6RD-M-10L408-MD-DM1-(EMR)- LFR-6RD-T-MD-SWTCL-LFR-6RD-H
H1	ORE	UHB150-4K-BK-UNV-FL-120DEGREES
S1	COLUMBIA	MPS4-40VL-CW-EDU-(ELL14)
X1	COMPASS	CER

SECTION 26 32 13
PACKAGED ENGINE GENERATOR

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes packaged engine-generator sets for emergency standby power supply with the following features:
 - 1. Gas engine.
 - 2. Unit-mounted cooling system.
 - 3. Unit-mounted control and monitoring.
 - 4. Outdoor enclosure.
 - 5. Remote annunciator.
- B. Related Sections include the following:
 - 1. Division 26 Section 263600, "Transfer Switches," for transfer switches including sensors and relays to initiate automatic-starting and -stopping signals for engine-generator sets.

1.3 DEFINITIONS

- A. Operational Bandwidth: The total variation from the lowest to highest value of a parameter over the range of conditions indicated, expressed as a percentage of the nominal value of the parameter.

1.4 SUBMITTALS

- A. Product Data: For each type of packaged engine generator indicated. Include rated capacities, operating characteristics, and furnished specialties and accessories. In addition, include the following:
 - 1. Thermal damage curve for generator.
 - 2. Time-current characteristic curves and manufacturer recommended settings for generator protective device.
 - 3. List of all factor settings of relays; provide rely-setting and calibration instructions, including software, where applicable.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
 - 1. Dimensioned outline plan and elevation drawings of engine-generator set and other components specified.
 - 2. Wiring Diagrams: Power, signal, and control wiring.
 - 3. Submit fuel storage tank to State Fire Marshal for NFPA 30 review.
- C. Qualification Data: For manufacturer.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For packaged engine generators to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Operation and Maintenance Data," include the following:
 - 1. List of tools and replacement items recommended to be stored at Project for ready access. Include part and drawing numbers, current unit prices, and source of supply.
- F. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain packaged generator sets and auxiliary components through one source from a single manufacturer.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- D. Comply with ASME B15.1.
- E. Comply with NFPA 37.
- F. Comply with NFPA 70 (2014).
- G. Comply with NFPA 99.
- H. Comply with NFPA 110 requirements for Level 1 emergency power supply system.
- I. Comply with UL 2200.
- J. Engine Exhaust Emissions: Comply with applicable federal, state, and local government requirements.
- K. Comply with NFPA 30.
- L. Engine Exhaust Emissions: Comply with applicable state and local government requirements.
- M. Noise Emission: Company with applicable state and local government requirements due to sound emitted by generator set including engine, engine exhaust, engine cooling air intake and discharge, and other components of installation.

1.6 PROJECT CONDITIONS

- A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Using Agency or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service according to requirements indicated:
 - 1. Notify Architect and Using Agency in advance of proposed interruption of electrical service.
 - 2. Do not proceed with interruption of electrical service without Architect's written permission.
 - 3. Refer to Division 26 Section 260500, "Basic Electrical Materials and Methods," for additional requirements.
- B. Environmental Conditions: Engine-generator system shall withstand the following environmental conditions without mechanical or electrical damage or degradation of performance capability:
 - 1. Ambient Temperature: Minus 15 to plus 40 degrees C.
 - 2. Relative Humidity: 0 to 95 percent.
 - 3. Altitude: Sea level to 1000 feet (300 meters).

1.7 COORDINATION

- A. Coordinate size and location of concrete bases for package engine generators. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork requirements are specified in Division 3.

1.8 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of packaged engine generators and associated auxiliary components that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 5 years from date of Substantial Completion.

1.9 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, provide 12 months' full maintenance by skilled employees of manufacturer's designated service organization.

Include quarterly exercising to check for proper starting, load transfer, and running under load. Include routine preventive maintenance as recommended by manufacturer and adjusting as required for proper operation. Provide parts and supplies same as those used in the manufacture and installation of original equipment.

1.10 EXTRA MATERIALS

- A.** Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1.** Fuses: One for every 10 of each type and rating, but no fewer than one of each.
 - 2.** Indicator Lamps: Two for every six of each type used, but no fewer than two of each.
 - 3.** Filters: One set each of lubricating oil, fuel, and combustion-air filters.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A.** Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
- B.** Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1.** Caterpillar; Engine Div.
 - 2.** Generac Power Systems, Inc.
 - 3.** Onan/Cummins Power Generation; Industrial Business Group.

2.2 ENGINE-GENERATOR SET

- A.** Factory-assembled and -tested, engine-generator set.
- B.** Mounting Frame: Maintain alignment of mounted components without depending on concrete foundation; and have lifting attachments.
 - 1.** Rigging Diagram: Inscribed on metal plate permanently attached to mounting frame to indicate location and lifting capacity of each lifting attachment and generator-set center of gravity.
- C.** Capacities and Characteristics:
 - 1.** Power Output Ratings: Nominal ratings as indicated.
 - 2.** Output Connections: Three-phase, 4 wire.
 - 3.** Nameplates: For each major system component to identify manufacturer's name and address, and model and serial number of component.
- D.** Generator-Set Performance:
 - 1.** Steady-State Voltage Operational Bandwidth: 3 percent of rated output voltage from no load to full load.
 - 2.** Transient Voltage Performance: Not more than 20 percent variation for 50 percent step-load increase or decrease. Voltage shall recover and remain within the steady-state operating band within three seconds.
 - 3.** Steady-State Frequency Operational Bandwidth: 0.5 percent of rated frequency from no load to full load.
 - 4.** Steady-State Frequency Stability: When system is operating at any constant load within the rated load, there shall be no random speed variations outside the steady-state operational band and no hunting or surging of speed.
 - 5.** Transient Frequency Performance: Less than 5 percent variation for 50 percent step-load increase or decrease. Frequency shall recover and remain within the steady-state operating band within five seconds.

6. Output Waveform: At no load, harmonic content measured line to line or line to neutral shall not exceed 5 percent total and 3 percent for single harmonics. Telephone influence factor, determined according to NEMA MG 1, shall not exceed 50 percent.
7. Sustained Short-Circuit Current: For a 3-phase, bolted short circuit at system output terminals, system shall supply a minimum of 250 percent of rated full-load current for not less than 10 seconds and then clear the fault automatically, without damage to generator system components.
8. Start Time: Comply with NFPA 110, Type 10, system requirements.

2.3 ENGINE

- A. Fuel: Natural Gas.
- B. Maximum Piston Speed for Four-Cycle Engines: 2250 fpm (11.4 m/s).
- C. Lubrication System: The following items are mounted on engine or skid:
 1. Filter and Strainer: Rated to remove 90 percent of particles 5 micrometers and smaller while passing full flow.
 2. Thermostatic Control Valve: Control flow in system to maintain optimum oil temperature. Unit shall be capable of full flow and is designed to be fail-safe.
 3. Crankcase Drain: Arranged for complete gravity drainage to an easily removable container with no disassembly and without use of pumps, siphons, special tools, or appliances.
- D. Coolant Jacket Heater: Electric-immersion type, factory installed in coolant jacket system. Comply with NFPA 110 requirements for Level 1 equipment for heater capacity.
- E. Governor: Adjustable isochronous, with speed sensing.
- F. Cooling System: Closed loop, liquid cooled, with radiator factory mounted on engine-generator-set mounting frame and integral engine-driven coolant pump.
 1. Coolant: Solution of 50 percent ethylene-glycol-based antifreeze and 50 percent water, with anticorrosion additives as recommended by engine manufacturer.
 2. Size of Radiator: Adequate to contain expansion of total system coolant from cold start to 110 percent load condition.
 3. Expansion Tank: Constructed of welded steel plate and rated to withstand maximum closed-loop coolant system pressure for engine used. Equip with gage glass and petcock.
 4. Temperature Control: Self-contained, thermostatic-control valve modulates coolant flow automatically to maintain optimum constant coolant temperature as recommended by engine manufacturer.
 5. Coolant Hose: Flexible assembly with inside surface of nonporous rubber and outer covering of aging-, ultraviolet-, and abrasion-resistant fabric.
 - a. Rating: 50 psig (345 kPa) maximum working pressure with coolant at 180 degrees F (82 degrees C), and noncollapsible under vacuum.
 - b. End Fittings: Flanges or steel pipe nipples with clamps to suit piping and equipment connections.
- G. Muffler/Silencer: Critical type, sized as recommended by engine manufacturer and selected with exhaust piping system to not exceed engine manufacturer's engine backpressure requirements.
 1. Minimum sound attenuation of 25 dB at 500 Hz.
 2. Sound level measured at a distance of 10 feet (3 meters) from exhaust discharge after installation is complete shall be 85 dBA or less.
- H. Air-Intake Filter: Heavy-duty, engine-mounted air cleaner with replaceable dry-filter element and "blocked filter" indicator.
- I. Starting System: 12-V electric, with negative ground.

1. Components: Sized so they will not be damaged during a full engine-cranking cycle with ambient temperature at maximum specified in Part 1 "Project Conditions" Article.
2. Cranking Motor: Heavy-duty unit that automatically engages and releases from engine flywheel without binding.
3. Cranking Cycle: As required by NFPA 110 for system level specified.
4. Battery: Adequate capacity within ambient temperature range specified in Part 1 "Project Conditions" Article to provide specified cranking cycle at least three times without recharging.
5. Battery Cable: Size as recommended by engine manufacturer for cable length indicated. Include required interconnecting conductors and connection accessories.
6. Battery Compartment: Factory fabricated of metal with acid-resistant finish and thermal insulation. Thermostatically controlled heater shall be arranged to maintain battery above 10 deg C regardless of external ambient temperature within range specified in Part 1 "Project Conditions" Article. Include accessories required to support and fasten batteries in place.
7. Battery-Charging Alternator: Factory mounted on engine with solid-state voltage regulation and 35 A minimum continuous rating.
8. Battery Charger: Current-limiting, automatic-equalizing and float-charging type. Unit shall comply with UL 1236 and include the following features:
 - a. Operation: Equalizing-charging rate of 10 A shall be initiated automatically after battery has lost charge until an adjustable equalizing voltage is achieved at battery terminals. Unit shall then be automatically switched to a lower float-charging mode and shall continue to operate in that mode until battery is discharged again.
 - b. Automatic Temperature Compensation: Adjust float and equalize voltages for variations in ambient temperature from minus 40 degrees C to plus 60 degrees C to prevent overcharging at high temperatures and undercharging at low temperatures.
 - c. Automatic Voltage Regulation: Maintain constant output voltage regardless of input voltage variations up to plus or minus 10 percent.
 - d. Ammeter and Voltmeter: Flush mounted in door. Meters shall indicate charging rates.
 - e. Safety Functions: Sense abnormally low battery voltage and close contacts providing low battery voltage indication on control and monitoring panel. Sense high battery voltage and loss of ac input or dc output of battery charger. Either condition shall close contacts that provide a battery-charger malfunction indication at system control and monitoring panel.
 - f. Enclosure and Mounting: NEMA 250, Type 1, mount inside generator weather-proof housing.
 - g. Omissions: Unit shall comply with all applicable federal, state, and local standards and regulations.

2.4 CONTROL AND MONITORING

- A. Automatic Starting System Sequence of Operation: When mode-selector switch on the control and monitoring panel is in the automatic position, remote-control contacts in one or more separate automatic transfer switches initiate starting and stopping of generator set. When mode-selector switch is switched to the on position, generator set starts. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.

- B. Manual Starting System Sequence of Operation: Switching on-off switch on the generator control panel to the on position starts generator set. The off position of same switch initiates generator-set shutdown. When generator set is running, specified system or equipment failures or derangements automatically shut down generator set and initiate alarms. Operation of a remote emergency-stop switch also shuts down generator set.
- C. Configuration: Operating and safety indications, protective devices, basic system controls, and engine gages shall be grouped in a common control and monitoring panel mounted on the generator set. Mounting method shall isolate the control panel from generator-set vibration.
- D. Indicating and Protective Devices and Controls: As required by NFPA 110 for Level 2 system, and the following:
 - 1. AC voltmeter.
 - 2. AC ammeter.
 - 3. AC frequency meter.
 - 4. DC voltmeter (alternator battery charging).
 - 5. Engine-coolant temperature gage.
 - 6. Engine lubricating-oil pressure gage.
 - 7. Running-time meter.
 - 8. Ammeter-voltmeter, phase-selector switch(es).
 - 9. Generator-voltage adjusting rheostat.
 - 10. Start-stop switch.
 - 11. Overspeed shutdown device.
 - 12. Coolant high-temperature shutdown device.
 - 13. Coolant low-level shutdown device.
 - 14. Oil low-pressure shutdown device.
 - 15. Fuel tank derangement alarm.
 - 16. Fuel tank high-level shutdown of fuel supply alarm.
 - 17. Generator overload.
- E. Supporting Items: Include sensors, transducers, terminals, relays, and other devices and include wiring required to support specified items. Locate sensors and other supporting items on engine or generator, unless otherwise indicated.
- F. Connection to Data Link: A separate terminal block, factory wired to Form C dry contacts, for each alarm and status indication is reserved for connections for data-link transmission of indications to remote data terminals. Provide interface and connection to Building Management System; coordinate with Division 15 as required.
- G. Common Remote Audible Alarm: Comply with NFPA 110 requirements for Level 1 systems. Include necessary contacts and terminals in control and monitoring panel.
 - 1. Overcrank shutdown.
 - 2. Coolant low-temperature alarm.
 - 3. Control switch not in auto position.
 - 4. Battery-charger malfunction alarm.
 - 5. Battery low-voltage alarm.
- H. Remote Alarm Annunciator: Comply with NFPA 99. An LED labeled with proper alarm conditions shall identify each alarm event and a common audible signal shall sound for each alarm condition. Silencing switch in face of panel shall silence signal without altering visual indication. Connect so that after an alarm is silenced, clearing of initiating condition will reactivate alarm until silencing switch is reset. Cabinet and faceplate are surface- or flush-mounting type to suit mounting conditions indicated.

2.5 GENERATOR OVERCURRENT PROTECTION

- A. Generator Circuit Breaker: Molded-case, thermal-magnetic type; 100 percent rated; complying with NEMA AB 1 and UL 489.
 - 1. Tripping Characteristic: Designed specifically for generator protection.
 - 2. Trip Rating: Matched to generator rating.

3. Shunt Trip: Connected to trip breaker when generator set is shut down by other protective devices.
 4. Mounting: Adjacent to or integrated with control and monitoring panel.
- B.** Generator Protector: Microprocessor-based unit shall continuously monitor current level in each phase of generator output, integrate generator heating effect over time, and predict when thermal damage of alternator will occur. When signaled by generator protector or other generator-set protective devices, a shunt-trip device in the generator disconnect switch shall open the switch to disconnect the generator from load circuits. Protector shall perform the following functions:
1. Initiates a generator overload alarm when generator has operated at an overload equivalent to 110 percent of full-rated load for 60 seconds. Indication for this alarm is integrated with other generator-set malfunction alarms.
 2. Under single or three-phase fault conditions, regulates generator to 300 percent of rated full-load current for up to 10 seconds.
 3. As overcurrent heating effect on the generator approaches the thermal damage point of the unit, protector switches the excitation system off, opens the generator disconnect device, and shuts down the generator set.
 4. Senses clearing of a fault by other overcurrent devices and controls recovery of rated voltage to avoid overshoot.

2.6 GENERATOR, EXCITER, AND VOLTAGE REGULATOR

- A.** Comply with NEMA MG 1.
- B.** Drive: Generator shaft shall be directly connected to engine shaft. Exciter shall be rotated integrally with generator rotor.
- C.** Electrical Insulation: Class H or Class F.
- D.** Stator-Winding Leads: Brought out to terminal box to permit future reconnection for other voltages if required.
- E.** Construction shall prevent mechanical, electrical, and thermal damage due to vibration, overspeed up to 125 percent of rating, and heat during operation at 110 percent of rated capacity.
- F.** Enclosure: Drip-proof.
- G.** Instrument Transformers: Mounted within generator enclosure.
- H.** Voltage Regulator: Solid-state type, separate from exciter, providing performance as specified.
 1. Adjusting rheostat on control and monitoring panel shall provide plus or minus 5 percent adjustment of output-voltage operating band.
- I.** Strip Heater: Thermostatically controlled unit arranged to maintain stator windings above dew point.
- J.** Windings: Two-thirds pitch stator winding and fully linked amortisseur winding.

2.7 OUTDOOR GENERATOR-SET ENCLOSURE

- A.** Description: Vandal-resistant, weatherproof, sound attenuated steel housing, wind resistant up to 100 mph (160 km/h). Multiple panels shall be lockable and provide adequate access to components requiring maintenance. Panels shall be removable by one person without tools. Instruments and control shall be mounted within enclosure. Muffler Location: External to enclosure.
- B.** Engine Cooling Airflow through Enclosure: Maintain temperature rise of system components within required limits when unit operates at 110 percent of rated load for 2 hours with ambient temperature at top of range specified in system service conditions.
 1. Louvers: Fixed-engine, cooling-air inlet and discharge. Storm-proof and drainable louvers prevent entry of rain and snow.
 2. Vertical discharge.

2.8 VIBRATION ISOLATION DEVICES

- A.** Elastomeric Isolator Pads: Oil- and water-resistant elastomer or natural rubber, arranged in single or multiple layers, molded with a nonslip pattern and galvanized-steel baseplates of sufficient stiffness for uniform loading over pad area, and factory cut to sizes that match requirements of supported equipment.

2.9 FINISHES

- A.** Indoor and Outdoor Enclosures and Components: Manufacturer's standard finish over corrosion-resistant pretreatment and compatible primer.

2.10 SOURCE QUALITY CONTROL

- A.** Prototype Testing: Factory test engine-generator set using same engine model, constructed of identical or equivalent components and equipped with identical or equivalent accessories.
 - 1.** Tests: Comply with NFPA 110, Level 1 Energy Converters and with IEEE 115.

PART 3 - EXECUTION

3.1 EXAMINATION

- A.** Examine areas, equipment bases, and conditions, with Installer present, for compliance with requirements for installation and other conditions affecting packaged engine-generator performance.
- B.** Examine roughing-in of piping systems and electrical connections. Verify actual locations of connections before packaged engine-generator installation.
- C.** Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A.** Comply with packaged engine-generator manufacturers' written installation and alignment instructions and with NFPA 110.
- B.** Install packaged engine generator to provide access, without removing connections or accessories, for periodic maintenance.
- C.** Install packaged engine generator with elastomeric isolator pads on 4-inch- (100-mm-) high concrete base. Secure sets to anchor bolts installed in concrete bases. Concrete base construction is specified in Division 16 Sections.
- D.** Electrical Wiring: Install electrical devices furnished by equipment manufacturers but not specified to be factory mounted.

3.3 CONNECTIONS

- A.** Piping installation requirements are specified in Division 25 Sections. Drawings indicate general arrangement of piping and specialties.
- B.** Connect fuel, cooling-system, and exhaust-system piping adjacent to packaged engine generator to allow service and maintenance.
- C.** Connect engine exhaust pipe to engine with flexible connector.
- D.** Connect fuel piping to engines with a gate valve and union and flexible connector.
- E.** Ground equipment according to Division 26 Section 260526, "Grounding and Bonding."
- F.** Connect wiring according to Division 26 Section 260519, "Conductors and Cables."

3.4 IDENTIFICATION

- A.** Identify system components according to Division 26 Section 260500, "Basic Electrical Materials and Methods."

3.5 FIELD QUALITY CONTROL

- A.** Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.
- B.** Perform tests and inspections and prepare test reports.
 - 1.** Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- C.** Tests and Inspections:
 - 1.** Perform tests recommended by manufacturer and each electrical test and visual and mechanical inspection for "AC Generators and for Emergency Systems" specified in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 2.** NFPA 110 Acceptance Tests: Perform tests required by NFPA 110 that are additional to those specified here including, but not limited to, single-step full-load pickup test.
- D.** Coordinate tests with tests for transfer switches and run them concurrently.
- E.** Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
- F.** Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
- G.** Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- H.** Remove and replace malfunctioning units and retest and reinspect as specified above.
- I.** Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.

3.6 DEMONSTRATION

- A.** Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain packaged engine generators. Refer to Division 1 Section "Demonstration and Training."

END OF SECTION 23 32 13

**SECTION 26 36 00
TRANSFER SWITCHES**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provision, including General and Supplementary Conditions and Division 1 Specifications Sections, apply to this section.

1.2 SUMMARY

- A. Section includes automatic transfer switches rated 600 V and less.

1.3 SUBMITTALS

- A. Product Data: Include rated capacities, weights, operating characteristics, furnished specialties, and accessories.
- B. Shop Drawings: Dimensioned plans, elevations, sections, and details showing minimum clearances, conductor entry provisions, gutter space, installed features and devices, and material lists for each switch specified.
- C. Field quality-control reports.
- D. Operation and maintenance data.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Comply with NEMA ICS 1.
- C. Comply with NFPA 70.
- D. Comply with NFPA 99.
- E. Comply with NFPA 110.
- F. Comply with UL 1008 unless requirements of these Specifications are stricter.
- G. Comply with NFPA 70 (2014).

PART 2 - PRODUCTS

2.1 MANUFACTURED UNITS

- A. Contactor Transfer Switches:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AC Data Systems, Inc.
 - b. Caterpillar; Engine Div.
 - c. Emerson; ASCO Power Technologies, LP.
 - d. Generac Power Systems, Inc.
 - e. GE Zenith Controls.
 - f. Kohler Power Systems; Generator Division.
 - g. Onan/Cummins Power Generation; Industrial Business Group.
 - h. Russelectric, Inc.
 - i. Spectrum Detroit Diesel.
- B. Transfer Switches Using Molded-Case Switches or Circuit Breakers:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. AC Data Systems, Inc.
 - b. Eaton Electrical Inc.; Cutler-Hammer.
 - c. GE Zenith Controls.
 - d. Hubbell Industrial Controls, Inc.

- e. Lake Shore Electric Corporation.

2.2 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS

- A. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.
- B. Tested Fault-Current Closing and Withstand Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.
 - 1. Where transfer switch includes internal fault-current protection, rating of switch and trip unit combination shall exceed indicated fault-current value at installation location.
- C. Solid-State Controls: Repetitive accuracy of all settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.
- D. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.
- E. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism, mechanically and electrically interlocked in both directions.
- F. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.
 - 1. Switch Action: Double throw; mechanically held in both directions.
 - 2. Contacts: Silver composition or silver alloy for load-current switching. Conventional automatic transfer-switch units, rated 225 A and higher, shall have separate arcing contacts.
- G. Neutral Switching. Where four-pole switches are indicated, provide neutral pole switched simultaneously with phase poles.
- H. Neutral Terminal: Solid and fully rated, unless otherwise indicated.
- I. Battery Charger: For generator starting batteries.
 - 1. Float type rated 10 A.
 - 2. Ammeter to display charging current.
 - 3. Fused ac inputs and dc outputs.
- J. Enclosures: General-purpose NEMA 250, Type 1, complying with NEMA ICS 6 and UL 508, unless otherwise indicated.

2.3 AUTOMATIC TRANSFER SWITCHES

- A. Comply with Level 1 equipment according to NFPA 110.
- B. Switching Arrangement: Double-throw type, incapable of pauses or intermediate position stops during normal functioning, unless otherwise indicated.
- C. Signal-Before-Transfer Contacts: A set of normally open/normally closed dry contacts operates in advance of retransfer to normal source. Interval is adjustable from 1 to 30 seconds.
- D. Transfer Switches Based on Molded-Case-Switch Components: Comply with NEMA AB 1, UL 489, and UL 869A.
- E. In-Phase Monitor: Factory-wired, internal relay controls transfer so it occurs only when the two sources are synchronized in phase.
- F. Programmed Neutral Switch Position: Switch operator has a programmed neutral position arranged to provide a midpoint between the two working switch positions, with an intentional, time-controlled pause at midpoint during transfer.
- G. Automatic Transfer-Switch Features:
 - 1. Undervoltage Sensing for Each Phase of Normal Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage is adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
 - 2. Adjustable Time Delay: For override of normal-source voltage sensing to delay transfer and engine start signals. Adjustable from zero to six seconds, and factory set for one second.

3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
4. Time Delay for Retransfer to Normal Source: Adjustable from 0 to 30 minutes, and factory set for 10 minutes to automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
5. Test Switch: Simulate normal-source failure.
6. Switch-Position Pilot Lights: Indicate source to which load is connected.
7. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.
 - a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
 - b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."
8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
9. Transfer Override Switch: Overrides automatic retransfer control so automatic transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
10. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
11. Engine Shutdown Contacts: Instantaneous; shall initiate shutdown sequence at remote engine-generator controls after retransfer of load to normal source.
12. Engine Shutdown Contacts: Time delay adjustable from zero to five minutes, and factory set for five minutes. Contacts shall initiate shutdown at remote engine-generator controls after retransfer of load to normal source.
13. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods are adjustable from 10 to 30 minutes. Factory settings are for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:
 - a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
 - b. Push-button programming control with digital display of settings.
 - c. Integral battery operation of time switch when normal control power is not available.

2.4 SOURCE QUALITY CONTROL

- A. Factory test and inspect components, assembled switches, and associated equipment. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Floor-Mounting Switch: Anchor to floor by bolting.
 1. Concrete Bases: 4 inches (100 mm) high, reinforced, with chamfered edges. Extend base no more than 4 inches (100 mm) in all directions beyond the maximum dimensions of switch, unless otherwise indicated or unless required for seismic support. Construct concrete bases according to Section 16073 "Hangers and Supports for Electrical Systems."
- B. Identify components according to Division 26 Section "Basic Electrical Materials and Methods."

- C. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

3.2 CONNECTIONS

- A. Ground equipment according to Division 26 Section "Grounding and Bonding."
- B. Connect wiring according to Division 26 Section "Conductors and Cables."

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- B. Perform the following tests and inspections:
 - 1. After installing equipment and after electrical circuitry has been energized, test for compliance with requirements.
 - 2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
 - 3. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.
 - a. Check for electrical continuity of circuits and for short circuits.
 - b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.
 - c. Verify that manual transfer warnings are properly placed.
 - d. Perform manual transfer operation.
 - 4. After energizing circuits, demonstrate interlocking sequence and operational function for each switch at least three times.
 - a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.
 - b. Simulate loss of phase-to-ground voltage for each phase of normal source.
 - c. Verify time-delay settings.
 - d. Verify pickup and dropout voltages by data readout or inspection of control settings.
 - e. Perform contact-resistance test across main contacts and correct values exceeding 500 microhms and values for 1 pole deviating by more than 50 percent from other poles.
 - f. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.
 - 5. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.
 - a. Verify grounding connections and locations and ratings of sensors.
- C. Coordinate tests with tests of generator and run them concurrently.
- D. Report results of tests and inspections in writing. Record adjustable relay settings and measured insulation and contact resistances and time delays. Attach a label or tag to each tested component indicating satisfactory completion of tests.
- E. Remove and replace malfunctioning units and retest as specified above.
- F. Prepare test and inspection reports.

3.4 DEMONSTRATION

- A. Train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment as specified below. Refer to Section 01820 "Demonstration and Training."
- B. Coordinate this training with that for generator equipment.

END OF SECTION 26 36 00

**SECTION 28 31 11
FIRE ALARM**

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes fire alarm systems.

1.3 DEFINITIONS

- A. FACP: Fire alarm control panel.
- B. LED: Light-emitting diode.
- C. NICET: National Institute for Certification in Engineering Technologies.
- D. Definitions in NFPA 72 apply to fire alarm terms used in this Section.

1.4 SYSTEM DESCRIPTION

- A. Noncoded, addressable system; multiplexed signal transmission dedicated to fire alarm service only.

1.5 QUALITY ASSURANCE

- A. Codes: The equipment and installation shall comply with the current provisions of the following codes and standards:
 - 1. National Electric Code (2014).
 - 2. National Fire Alarm Code - NFPA 72 (2015) and all recommendations of Appendix "A."
 - 3. NFPA 13 (2016)
 - 4. Life Safety Code - NFPA 101 (2015).
 - 5. Local and State Building Codes.
 - 6. Americans With Disabilities Act Architectural Guidelines (ADAAG).
 - 7. Applicable portions of the Louisiana State Fire Marshal's Act, Parts 1 and 2.
 - 8. Current requirements of the Louisiana Fire Marshal's Office, Plan Review Section as outlined in <http://www.dps.state.la.us/sfm/>.
 - 9. All system components shall be listed by Underwriters Laboratories Inc. for use in fire protective signaling system under the following standards as applicable:
 - a. UL 268: Smoke Detectors for Fire Protective Signaling Systems.
 - b. UL 521: Heat Detectors for Fire Protective Signaling Systems.
 - c. UL1481: Power Supplies for Fire Protective Signaling Systems.
 - d. UL 864: Control Units for Fire Protective Signaling Systems.
- B. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.6 PERFORMANCE REQUIREMENTS

- A. Premises protection includes mixed construction and educational occupancy.
- B. Fire alarm signal initiation shall be by one or more of the following devices:
 - 1. Manual stations.
 - 2. Heat detectors.
 - 3. Flame detectors.
 - 4. Smoke detectors.
 - 5. Automatic sprinkler system water flow.
- C. Fire alarm signal shall initiate the following actions:
 - 1. Alarm notification appliances shall operate continuously.

2. Identify alarm at the FACP and remote annunciators.
 3. De-energize electromagnetic door holders.
 4. Transmit an alarm signal to the remote alarm receiving station.
 5. Unlock electric door locks in designated egress paths.
 6. Release fire and smoke doors held open by magnetic door holders.
 7. Activate voice/alarm communication system.
 8. Switch heating, ventilating, and air-conditioning equipment controls to fire alarm mode.
 9. Close smoke dampers in air ducts of system serving zone where alarm was initiated.
 10. Record events in the system memory.
 11. FACP shall shutdown HVAC equipment upon initiation of associated smoke detectors.
- D. Supervisory signal initiation shall be by one or more of the following devices or actions:
1. Operation of a fire-protection system valve tamper.
- E. System trouble signal initiation shall be by one or more of the following devices or actions:
1. Open circuits, shorts and grounds of wiring for initiating device, signaling line, and notification-appliance circuits.
 2. Opening, tampering, or removal of alarm-initiating and supervisory signal-initiating devices.
 3. Loss of primary power at the FACP.
 4. Ground or a single break in FACP internal circuits.
 5. Abnormal ac voltage at the FACP.
 6. A break in standby battery circuitry.
 7. Failure of battery charging.
 8. Abnormal position of any switch at the FACP or annunciator.
- F. System Trouble and Supervisory Signal Actions: Ring trouble bell and annunciate at the FACP and remote annunciators.

1.7 SUBMITTALS

- A. Provide one copy of all of the below listed documentation, in excess of the number of copies required in Division 1, for review by the Authority Having Jurisdiction.
- B. Product Data: For each item of equipment indicated and required, provide roughing-in diagrams and instructions for installation, operation, and maintenance suitable for inclusion in maintenance manuals. Include typical wiring diagrams for each item of fire alarm equipment being supplied. Include U. L. listings and all other information required by the Authority Having Jurisdiction.
- C. Shop Drawings: Provide shop drawings showing equipment/device locations and connecting wiring of entire fire alarm and detection system, on floor plans. Include wiring and riser diagrams. Provide all documentation required for review, by Authority Having Jurisdiction, to allow review by Engineer prior to submission. Provide additional information needed for review, by Authority Having Jurisdiction, to determine how the complete system operates as a whole. No work, including rough-in, shall be started without review by the Engineer and the Authority Having Jurisdiction, and without shop drawings stamped by the State Fire Marshal.
1. Shop Drawings shall be prepared by persons with the following qualifications:
 - a. Trained and certified by manufacturer in fire alarm system design.
 - b. Fire alarm certified by NICET, minimum Level 3.
 2. System Operation Description: Detailed description for this Project, including method of operation and supervision of each type of circuit and sequence of operations for manually and automatically initiated system inputs and outputs. Manufacturer's standard descriptions for generic systems are not acceptable.
 3. Device Address List: Coordinate with final system programming.
 4. System riser diagram with device addresses, conduit sizes, and cable and wire types and sizes.
 5. Wiring Diagrams: Power, signal, and control wiring. Include diagrams for equipment and for system with all terminals and interconnections identified. Show wiring color code.
 6. Duct Smoke Detectors: Performance parameters and installation details for each detector, verifying that each detector is listed for the complete range of air velocity, temperature, and humidity possible when air-handling system is operating.

7. Floor Plans: Indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits. Indicate dBA sound output of each audible notification appliance.
8. Batteries: Size Calculations.
- D. Qualification Data: For Installer.
- E. Field quality-control test reports.
- F. Operation and Maintenance Data: For fire alarm system to include in emergency, operation, and maintenance manuals. Comply with NFPA 72, Appendix A, recommendations for Owner's manual. Include abbreviated operating instructions for mounting at the FACP.
- G. Documentation:
 1. Approval and Acceptance: Provide the "Record of Completion" form according to NFPA 72 to Owner, Architect, and authorities having jurisdiction.
 2. Record of Completion Documents: Provide the "Permanent Records" according to NFPA 72 to Owner, Architect, and authorities having jurisdiction. Format of the written sequence of operation shall be the optional input/output matrix.
 - a. Hard copies on paper to Owner, Architect, and authorities having jurisdiction.
 - b. Electronic media may be provided to Architect.
- H. Provide completed Review Request Form and check for payment of review fee, all as required by The Office of the State Fire Marshal.

1.8 QUALITY ASSURANCE

- A. Installer:
 1. An electrician or NICET Level 1 (or higher) Fire Alarm Technician shall install conduit for the fire alarm system.
 2. An electrician or NICET Level 1 (or higher) Fire Alarm Technician shall be allowed to install wire or cable.
 3. An electrician or NICET Level 1 or higher Fire Alarm Technician shall be allowed to install and terminate fire alarm devices.
 4. A NICET Level 3 (or higher) Fire Alarm Technician shall supervise the installation of the fire alarm system and shall terminate cabling in cabinets and panels.
 5. A NICET Level 3 (or higher) Fire Alarm Technician shall program addressable systems and shall perform all specified tests and inspection; and shall prepare all specified reports.
- B. Installer Qualifications: Where a NICET level Fire Alarm Technician is required to perform installation tasks, personnel shall be trained and certified by manufacturer for installation of units required for this Project.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

1.9 EXTRA MATERIALS

- A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 1. Lamps for Remote Indicating Lamp Units: Quantity equal to 10 percent of amount installed, but not less than 1 unit.
 2. Lamps for Strobe Units: Quantity equal to 10 percent of amount installed, but not less than 1 unit.
 3. Smoke, Fire, and Flame Detectors: Quantity equal to 10 percent of amount of each type installed, but not less than 1 unit of each type.
 4. Detector Bases: Quantity equal to 2 percent of amount of each type installed, but not less than 1 unit of each type.
 5. Keys and Tools: One extra set for access to locked and tamperproofed components.
 6. Audible and Visual Notification Appliances: One of each type installed.
 7. Fuses: Two of each type installed in the system.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. FACP and Equipment:
 - a. Edwards Systems Technology Inc.
 - b. Faraday, LLC.
 - c. NOTIFIER; a GE-Honeywell Company.
 - d. Siemens Building Technologies, Inc.; a Cerberus Division.
 - e. Silent Knight; a GE-Honeywell Company.
 - f. SimplexGrinnell LP; a Tyco International Company.

2.2 FACP

- A. General Description:
1. Modular, power-limited design with electronic modules, UL 864 listed.
 2. Addressable initiation devices that communicate device identity and status.
 - a. Temperature sensors shall additionally test for and communicate the sensitivity range of the device.
 3. Addressable control circuits for operation of mechanical equipment.
- B. Alphanumeric Display and System Controls: Arranged for interface between human operator at the FACP and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.
1. Annunciator and Display: Liquid-crystal type, 80 characters, minimum.
 2. Keypad: Arranged to permit entry and execution of programming, display, and control commands.
- C. Circuits:
1. Signaling Line Circuits: NFPA 72, Class B.
 - a. System Layout: Install no more than 50 addressable devices on each signaling line circuit.
 2. Notification-Appliance Circuits: NFPA 72, Class B.
 3. Actuation of alarm notification appliances, emergency voice communications, annunciation, shall occur within 10 seconds after the activation of an initiating device.
 4. Electrical monitoring for the integrity of wiring external to the FACP for mechanical equipment shutdown and magnetic door-holding circuits is not required, provided a break in the circuit will cause doors to close and mechanical equipment to shut down.
- D. Loop Controller
1. The communications format between Loop Controllers and analog Devices shall be multiplexed digital.
 2. Controller shall provide the ability to set the sensitivity and alarm verification of individual detectors on the circuit.
 3. Loop Controller shall be capable of reporting unexpected changes to the wiring in the circuit.
 4. Loop controller shall be able to report the following device specific information:
 - a. Device Address.
 - b. Device Type.
 - c. Hours of Operation.
 - d. Current Detector Sensitivity Values and the Extent of Environmental Compensation.
 - e. Controller shall contain separate RS232 printer/programming and modular jack ports for programming locally via a personal computer or downloading through modems from a remote personal computer.
- E. Number of Recorded Alarms and Troubles.
- F. Smoke-Alarm Verification:
1. Initiate audible and visible indication of an "alarm verification" signal at the FACP.

2. Activate a listed and approved "alarm verification" sequence at the FACP and the detector.
 3. Sound general alarm if the alarm is verified.
 4. Cancel FACP indication and system reset if the alarm is not verified.
- G.** Notification-Appliance Circuit: Operation shall sound in a temporal pattern, complying with ANSI S3.41.
- H.** Power Supply for Supervision Equipment: Supply for audible and visual equipment for supervision of the ac power shall be from a dedicated dc power supply, and power for the dc component shall be from the ac supply.
- I.** Alarm Silencing, Trouble, and Supervisory Alarm Reset: Manual reset at the FACP and remote annunciators, after initiating devices are restored to normal.
1. Silencing-switch operation halts alarm operation of notification appliances and activates an "alarm silence" light. Display of identity of the alarm zone or device is retained.
 2. Subsequent alarm signals from other devices or zones reactivate notification appliances until silencing switch is operated again.
 3. When alarm-initiating devices return to normal and system reset switch is operated, notification appliances operate again until alarm silence switch is reset.
- J.** Walk Test: A test mode to allow one person to test alarm and supervisory features of initiating devices. Enabling of this mode shall require the entry of a password. The FACP and annunciators shall display a test indication while the test is underway. If testing ceases while in walk-test mode, after a preset delay, the system shall automatically return to normal.
- K.** Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, trouble, and supervisory signals to a remote alarm station through a digital alarm communicator transmitter and telephone lines] [radio alarm transmitter.
- L.** Service Modem: Ports shall be RS-232 for system printer and for connection to a dial-in terminal unit.
1. The dial-in port shall allow remote access to the FACP for programming changes and system diagnostic routines. Access by a remote terminal shall be by encrypted password algorithm.
- M.** Indication of Events: On receipt of signal, record alarm, supervisory, and trouble events. Identify zone, device, and function. Include type of signal (alarm, supervisory, or trouble), and date and time of occurrence. Differentiate alarm signals from all other printed indications. Commands initiate the printing of a list of existing alarm, supervisory, and trouble conditions in the system and a historical log of events.
- N.** Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signal, supervisory and digital alarm communicator transmitter shall be powered by the 24-V dc source.
1. The alarm current draw of the entire fire alarm system shall not exceed 80 percent of the power-supply module rating.
 2. Power supply shall have a dedicated circuit breaker for this connection at the service entrance equipment. Paint the breaker handle red and identify it with "FIRE ALARM SYSTEM POWER."
- O.** Secondary Power: 24-V dc supply system with batteries and automatic battery charger and an automatic transfer switch.
1. Batteries: Sealed lead calcium.
 2. Battery and Charger Capacity: Comply with NFPA 72.
- P.** Surge Protection:
1. Install surge protection on normal ac power for the FACP and its accessories.
 2. Install surge protectors recommended by FACP manufacturer. Install on all system wiring external to the building housing the FACP.
- Q.** Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.
- R.** See Supervised Audio Amplifiers concerning survivability on loss of local CPU.
- S.** Data Line Format shall be a standard data transfer protocol.

- T. All electrical connections to panel from points external to the building shall be provided with a surge suppressor that shall withstand 6 kilovolts voltage transients to chassis ground. All power supply circuits shall also have U.L. listed surge suppressers of the same rating.
- U. Control Panel shall enter a stand-alone mode upon loss of communication with the other existing control panels. When in the stand-alone mode, the area control panel shall be capable of performing all of its pre-programmed actions and sequences and shall fully support all installed Optional device loop cards. When in stand-alone mode, the control panel shall be capable of operating all associated annunciators and shall be capable of activating actions in other control panels which have been configured in the stand-alone network.
- V. Panel shall be modular for ease of installation, maintenance, and configuration. Each Control panel shall contain a full complement of circuit boards to support the supervised Inputs/Outputs of all network nodes without change or additional hardware. Each control panel shall have a 80 Character backlit Liquid Crystal Display (LCD). The panel shall contain sealed, Lead-Acid batteries to support all present and future identified functions as required by code for a proprietary supervising station system with an automatic means for transmitting alarms to the fire department per NFPA 72; 4-3.5.1.
- W. Unit shall contain as a minimum, a real time clock; keypad; buttons for scrolling data on the LCD; front panel switches for Reset, Alarm Silence, Trouble Silence, Drill/All Call; and LEDs for Normal, Alarm, Supervisory, Trouble and Test/Program. The keypad shall provide control capability to command all system functions, entry of alpha/numeric information and field programming. Two password levels shall prevent unauthorized system control or programming.
- X. Cabinet: Lockable metal enclosure. Arrange interior components so operations required for testing or for normal maintenance of the system are performed from the front of the enclosure. If more than one unit is required to form a complete control panel, fabricate with matching modular unit enclosure to accommodate components and to allow ample gutter space for field wiring and interconnecting panels. Individual Cabinets shall be full-tiered maximum size available. Keys shall be same as pull station keys. Provide the appropriate trim and flush/semi-flush mount cabinets in finished areas concealing conduits and panel knock-outs.
 - 1. Identify each enclosure with an engraved, red, laminated, phenolic-resin nameplate with lettering not less than 1 inch (25 mm) high. Identify individual components and modules within cabinets with permanent labels.
 - 2. Mounting: Flush or semi-flush mount in finished spaces. Surface mount in equipment rooms.
 - 3. Provide blank plates for all unused cabinet tiers or sections.
- Y. Alarm and Supervisory Systems: Separate and independent in the control panel. Printed circuit boards shall consist of plug-in cards. Construction requiring removal of field wiring for module replacement is unacceptable.
- Z. Indications: Local, visible, and audible signals announce alarm, supervisory, and trouble conditions. Each type of audible alarm shall have a different sound.
- AA. Resetting Controls: Prevent the resetting of alarm, supervisory, or trouble signals while the alarm or trouble condition still exists.
- BB. Instructions: Printed or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.
- CC. Provide area type smoke detector for "local" protection on ceiling above FACP.

2.3 EMERGENCY POWER SUPPLIES

- A. General: Components include valve-regulated, recombinant sealed lead acid battery; charger; and an automatic transfer switch.
 - 1. Battery Nominal Life Expectancy: 5 years, minimum.
- B. General: Components include battery, charger, and an automatic transfer switch.
 - 1. Battery Nominal Life Expectancy: 5 years, minimum.
- C. Battery Capacity: Comply with NFPA 72. Provide 24 hours of standby capacity and 15 minutes of full operation capacity, after 4 hours of standby, for all power supplies.

- D. Battery Charger: Solid-state, fully automatic, variable-charging-rate type. Provide capacity for 150 percent of the connected system load while maintaining batteries at full charge. If batteries are fully discharged, the charger recharges them completely within four hours. Charger output is supervised as part of system power supply supervision.
- E. Integral Automatic Transfer Switch: Transfers the load to the battery without loss of signals or status indications when normal power fails.

2.4 REMOTE POWER SUPPLIES WITH BATTERY CHARGERS

- A. Remote power supplies shall consist of a filtered, regulated 24VDC output that may be configured to drive up to four audible/visible signal circuits and standby battery charging circuit. The outputs shall be controlled by other system controlled signal circuits so the power supply can act as a power booster or be extended when it is located at the end of a partially or fully loaded signal circuit. The remote power supplies shall also be used to power duct detectors, etc. The remote power supplies shall be connected to the addressable fire alarm panel for power supply supervision and for alarm initiation. Provide cabinet key-lock using the same keying as that on the fire alarm control panel cabinets. Provide ammeter and voltmeter integral to power supply cabinet. Provide area type smoke detector for "local" protection on ceiling above remote power supply.

2.5 MANUAL FIRE ALARM BOXES

- A. Description: UL 38 listed; finished in red with molded, raised-letter operating instructions in contrasting color. Station shall show visible indication of operation. Mounted on recessed outlet box; if indicated as surface mounted, provide manufacturer's surface back box.
 1. Double-action mechanism requiring two actions to initiate an alarm, breaking-glass or plastic-rod and pull-lever type. With integral addressable module, arranged to communicate manual-station status (normal, alarm, or trouble) to the FACP.
 2. Station Reset: Key- or wrench-operated switch.

2.6 SYSTEM SMOKE DETECTORS

- A. General Description:
 1. UL 268 listed, operating at 24-V dc, nominal.
 2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
 3. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. Provide terminals in the fixed base for connection of building wiring.
 4. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
 5. Integral Visual-Indicating Light: LED type. Indicating detector has operated and power-on status. Include remote indicator for all concealed smoke detectors.
- B. Photoelectric Smoke Detectors:
 1. Sensor: LED or infrared light source with matching silicon-cell receiver.
 2. Detector Sensitivity: Between 2.5 and 3.5 percent/foot (0.008 and 0.011 percent/mm) smoke obscuration when tested according to UL 268A.
- C. Duct Smoke Detectors:
 1. Photoelectric Smoke Detectors:
 - a. Sensor: LED or infrared light source with matching silicon-cell receiver.
 - b. Detector Sensitivity: Between 2.5 and 3.5 percent/foot (0.008 and 0.011 percent/mm) smoke obscuration when tested according to UL 268A.
 2. UL 268A listed, operating at 24-V dc, nominal.
 3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to the FACP.
 4. Plug-in Arrangement: Detector and associated electronic components shall be mounted in a plug-in module that connects to a fixed base. The fixed base shall be designed for mounting directly to the air duct. Provide terminals in the fixed base for connection to building wiring.

5. Self-Restoring: Detectors shall not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type. Indicating detector has operated and power-on status. Provide remote status and alarm indicator and test station where detector is concealed.
7. Sampling Tubes: Design and dimensions as recommended by manufacturer for the specific duct size, air velocity, and installation conditions where applied.
8. Relay Fan Shutdown: Rated to interrupt fan motor – control circuit.

2.7 NOTIFICATION APPLIANCES

- A. Description: Equipped for mounting as indicated and with screw terminals for system connections.
 1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly.
- B. Visible Alarm Devices: Xenon strobe lights listed under UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1 inch (25 mm) high letters on the lens.
 1. Rated Light Output: indicated candela values.
 2. Strobe Leads: Factory connected to screw terminals.

2.8 REMOTE ANNUNCIATOR

- A. Description: Duplicate annunciator function of the FACP for alarm, supervisory, and trouble indications. Remote annunciator shall not be capable of acknowledging, silencing, resetting, and testing.
 1. Mounting: Flush cabinet, NEMA 250, Class 1.
- B. Display Type and Functional Performance: Alphanumeric display same as the FACP.

2.9 ADDRESSABLE INTERFACE DEVICE

- A. Description: Microelectronic monitor module listed for use in providing a system address for listed alarm-initiating devices for wired applications with normally open contacts.
- B. Integral Relay: Capable of providing a direct signal to HVAC equipment for shutdown upon initiation of associated smoke detectors.

2.10 DIGITAL ALARM COMMUNICATOR TRANSMITTER

- A. Listed and labeled according to UL 632.
- B. Functional Performance: Unit receives an alarm, supervisory, or trouble signal from the FACP, and automatically captures one or two telephone lines and dials a preset number for a remote central station. When contact is made with the central station(s), the signal is transmitted. The unit supervises up to two telephone lines. Where supervising 2 lines, if service on either line is interrupted for longer than 45 seconds, the unit initiates a local trouble signal and transmits a signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. When telephone service is restored, unit automatically reports that event to the central station. If service is lost on both telephone lines, the local trouble signal is initiated.
- C. Secondary Power: Integral rechargeable battery and automatic charger. Battery capacity is adequate to comply with NFPA 72 requirements.
- D. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

2.11 WIRE AND CABLE

- A. Wire and cable for fire alarm systems shall be UL listed and labeled as complying with NFPA 70, Article 760.
- B. Signaling Line Circuits: Twisted, shielded pair, size as recommended by system manufacturer.
- C. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 degrees C, color-coded insulation.
 1. Low-Voltage Circuits: No. 16 AWG, minimum.
 2. Line-Voltage Circuits: No. 12 AWG, minimum.

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

- A. Smoke or Heat Detector Spacing:
 - 1. Smooth ceiling spacing shall not exceed 30 feet (9 meters) or the rating of the detector which ever is smaller.
 - 2. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas, shall be determined according to Appendix A in NFPA 72.
 - 3. Spacing of heat detectors shall be determined based on guidelines and recommendations in NFPA 72.
- B. HVAC: Locate detectors not closer than 3 feet (1 meters) from air-supply diffuser or return-air opening.
- C. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of the duct.
- D. Remote Status and Alarm Indicators: Install near each smoke detector and each sprinkler water-flow switch and valve-tamper switch that is not readily visible from normal viewing position. Locate in public space near the device they monitor.
- E. Audible Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling or 90 inches AFF; which ever is lower. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille.
- F. Visible Alarm-Indicating Devices: Install so entire lens at least 6 inches (150 mm) below the ceiling or between 80 and 96 inches above finished floor; whichever is lower.
- G. Combination audible/visual devices: Same as for visual devices.
- H. FACP: Surface and Flush mount with tops of cabinets not more than 72 inches (1830 mm) above the finished floor.
- I. Annunciator: Install with top of panel not more than 72" (1830 mm) above finished floor.

3.2 WIRING INSTALLATION

- A. Install wiring according to the following:
 - 1. NECA 1.
 - 2. TIA/EIA 568-A.
- B. Wiring Method: Install wiring in metal raceway according to Division 26 Section "Raceways and Boxes."
 - 1. Fire alarm circuits and equipment control wiring associated with the fire alarm system shall be installed in a dedicated raceway system. This system shall not be used for any other wire or cable.
- C. Wiring Method:
 - 1. Cables and raceways used for fire alarm circuits, and equipment control wiring associated with the fire alarm system, may not contain any other wire or cable.
 - 2. Fire-Rated Cables: Use of 2-hour fire-rated fire alarm cables, NFPA 70 Types MI and CI, is not permitted as an option to a raceway system.
 - 3. Signaling Line Circuits: Power-limited fire alarm cables shall not be installed in the same cable or raceway as signaling line circuits.
- D. Wiring within Enclosures: Separate power-limited and non-power-limited conductors as recommended by manufacturer. Install conductors parallel with or at right angles to sides and back of the enclosure. Bundle, lace, and train conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal according to the system's wiring diagrams. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.
- E. Cable Taps: Use numbered terminal strips in junction, pull, and outlet boxes, cabinets, or equipment enclosures where circuit connections are made.
- F. Color-Coding: Color-code fire alarm conductors differently from the normal building power wiring. Use one color-code for alarm circuit wiring and a different color-code for supervisory circuits. Color-code audible alarm-indicating circuits differently from alarm-initiating circuits. Use different colors for visible alarm-indicating devices. Paint fire alarm system junction boxes

and covers red. Fire alarm system raceways shall be red or marked with red paint on minimum five foot centers; coordinate paint locations with conduit fittings so paint does not interfere with ground integrity of raceway system.

3.3 IDENTIFICATION

- A.** Identify system components, wiring, cabling, and terminals according to Division 26 Section "Basic Electrical Materials and Methods."
- B.** Install instructions frame in a location visible from the FACP.
- C.** Paint power-supply disconnect switch red and label "FIRE ALARM."

3.4 GROUNDING

- A.** Ground the FACP and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to the FACP.

3.5 FIELD QUALITY CONTROL

- A.** Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust field-assembled components and equipment installation, including connections. Report results in writing.
- B.** Perform the following field tests and inspections and prepare test reports:
 - 1.** Before requesting final approval of the installation, submit a written statement using the form for Record of Completion shown in NFPA 72.
 - 2.** Perform each electrical test and visual and mechanical inspection listed in NFPA 72. Certify compliance with test parameters. All tests shall be conducted under the direct supervision of a NICET technician certified under the Fire Alarm Systems program at Level III.
 - 3.** Visual Inspection: Conduct a visual inspection before any testing. Use as-built drawings and system documentation for the inspection. Identify improperly located, damaged, or nonfunctional equipment, and correct before beginning tests.
 - 4.** Testing: Follow procedure and record results complying with requirements in NFPA 72.
 - a.** Detectors that are outside their marked sensitivity range shall be replaced.
 - 5.** Test and Inspection Records: Prepare according to NFPA 72, including demonstration of sequences of operation by using the matrix-style form in Appendix A in NFPA 70.

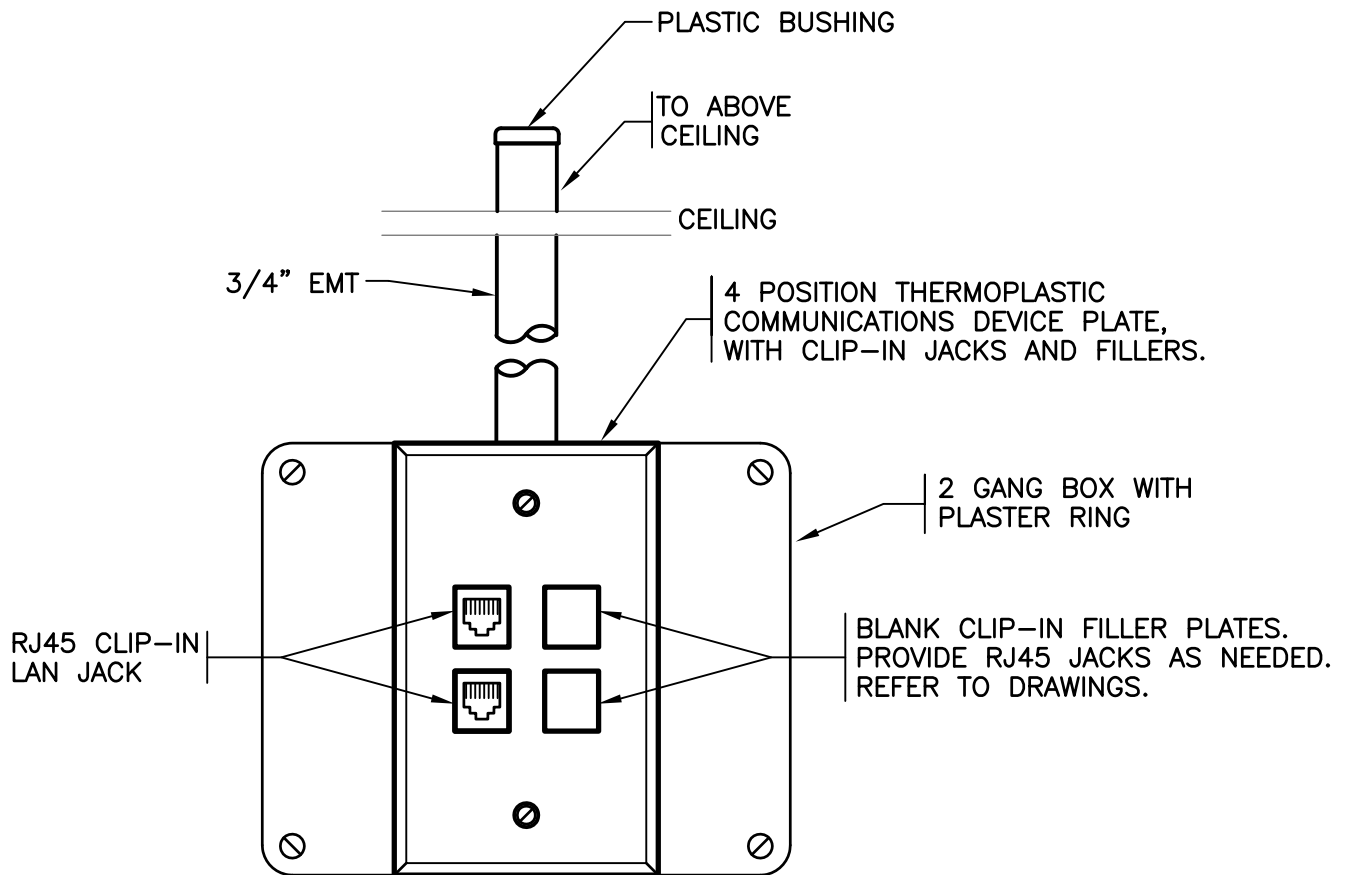
3.6 ADJUSTING

- A.** Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project outside normal occupancy hours for this purpose.
- B.** Follow-Up Tests and Inspections: After date of Substantial Completion, test the fire alarm system complying with testing and visual inspection requirements in NFPA 72. Perform tests and inspections listed for three monthly, and one quarterly, periods.
- C.** Semiannual Test and Inspection: Six months after date of Substantial Completion, test the fire alarm system complying with the testing and visual inspection requirements in NFPA 72. Perform tests and inspections listed for monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.
- D.** Annual Test and Inspection: One year after date of Substantial Completion, test the fire alarm system complying with the testing and visual inspection requirements in NFPA 72. Perform tests and inspections listed for monthly, quarterly, semiannual, and annual periods. Use forms developed for initial tests and inspections.

3.7 DEMONSTRATION

- A.** Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain the fire alarm system, appliances, and devices.

END OF SECTION 28 31 11



B DETAIL—COMMUNICATIONS OUTLET
 NO SCALE