

ADDENDUM NO. 2

June 17, 2024

PORTER COUNTY HIGHWAY DEPARTMENT – CENTRAL FACILITY

TO: ALL BIDDERS OF RECORD

This Addendum forms a part of and modifies the Bidding Requirements, Contract Forms, Contract Conditions, the Specifications, and the Drawings dated May 24, 2024 by A & Z Engineering and MartinRiley. Acknowledge receipt of the Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to disqualification.

This Addendum consists of Page ADD 2-1 through ADD 2-2, Revised Specification Section 01 60 00 - Product Requirements, and Addendum 2 from MartinRiley dated June 17, 2024 and consisting of 2 pages, Specification Sections 26 05 73 - Power System Studies, 26 24 16 - Panelboards, 26 31 13 - Engine Generators, 26 36 00 - Transfer Switches, 27 10 00 - Structured Cabling, 28 46 00 - Fire Detection and Alarm and 4 Drawings.

A. SPECIFICATION SECTION 00 00 20 - TABLE OF CONTENTS

1. ADD:

Specification Section 26 05 73 - Power System Studies
Specification Section 26 24 16 - Panelboards
Specification Section 26 32 13 - Engine Generators
Specification Section 26 36 00 - Transfer Switches
Specification Section 27 10 00 - Structured Cabling
Specification Section 28 46 00 - Fire Detection and Alarm

B. SPECIFICATION SECTION 01 60 00 - PRODUCT REQUIREMENTS

1. REPLACE:

Specification Section 01 60 00 - Product Requirements with the attached revised Section from MartinRiley.

C. SPECIFICATION SECTION 01 12 00 - MULTIPLE CONTRACT SUMMARY

1. Under 3.02 - General Requirements

B. Provided by all contractors as applicable.

1. Add:

All manufacturers listed on the equipment schedules in the drawings should be considered as a Basis of Design. The product has been selected as an example and standard of performance, appearance, function desired, or for one or more other reasons. The product named is used as the basis of comparison of other products which may be proposed or submitted for review, as long as they comply with all technical criteria and requirements as specified.

2. Under 3.03 - Bid Categories

I. BID CATEGORY NO. 9 – ELECTRICAL

1. ADD:

Specification Section 26 05 73 - Power System Studies
Specification Section 26 24 16 - Panelboards
Specification Section 26 32 13 - Engine Generators
Specification Section 26 36 00 - Transfer Switches
Specification Section 27 10 00 - Structured Cabling
Specification Section 28 46 00 - Fire Detection and Alarm

**SECTION 01 6000
PRODUCT REQUIREMENTS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Re-use of existing products.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations.
- E. Maintenance materials, including extra materials, spare parts, tools, and software.

1.02 RELATED REQUIREMENTS

- A. Section 01 2500 - Substitution Procedures: Substitutions made during procurement and/or construction phases.
- B. Section 01 4000 - Quality Requirements: Product quality monitoring.
- C. Section 01 7419 - Construction Waste Management and Disposal: Waste disposal requirements potentially affecting product selection, packaging and substitutions.

1.03 REFERENCE STANDARDS**1.04 SUBMITTALS**

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
 - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.
- D. Indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

PART 2 PRODUCTS**2.01 EXISTING PRODUCTS**

- A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by Contract Documents.

2.02 NEW PRODUCTS

- A. Provide new products unless specifically required or permitted by Contract Documents.
- B. See Section 01 4000 - Quality Requirements, for additional source quality control requirements.
- C. Use of products having any of the following characteristics is not permitted:
 - 1. Containing lead, cadmium, or asbestos.

2.03 PRODUCT OPTIONS

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.

- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.
- D. Products specified as "Basis of Design": The product has been selected as an example and standard of the performance, appearance, or function desired, or for one or more other reasons. The product named is used as the basis of comparison of other products which may be proposed or submitted for review. In some cases, other details or construction assemblies are based on the characteristics of the product named. Products named in addition to the Basis of Design product must still comply with other technical criteria and requirements listed.

2.04 MAINTENANCE MATERIALS

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.
- B. Deliver to Project site; obtain receipt prior to final payment.

PART 3 EXECUTION

3.01 SUBSTITUTION LIMITATIONS

- A. See Section 01 2500 - Substitution Procedures.

3.02 TRANSPORTATION AND HANDLING

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

3.03 STORAGE AND PROTECTION

- A. Provide protection of stored materials and products against theft, casualty, or deterioration.
- B. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.
 - 1. Structural Loading Limitations: Handle and store products and materials so as not to exceed static and dynamic load-bearing capacities of project floor and roof areas.
- C. Store and protect products in accordance with manufacturers' instructions.
- D. Store with seals and labels intact and legible.
- E. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- F. For exterior storage of fabricated products, place on sloped supports above ground.
- G. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- H. Comply with manufacturer's warranty conditions, if any.
- I. Do not store products directly on the ground.

- J. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- K. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
- L. Prevent contact with material that may cause corrosion, discoloration, or staining.
- M. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- N. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

END OF SECTION

ADDENDUM TWO

Porter County Highway Department
1955 IN-2
Valparaiso, IN 46385

MARTINRILEY architects/engineers
221 West Baker Street
Fort Wayne, Indiana 46802
260-422-7994

Commission No.: F22146

Addendum Date: 17 June 2024

Conditions: The following clarifications, amendments, additions, deletions, revisions and modifications are a part of the contract documents and change the original documents only in the manner and to the extent stated.

Copies of the Addendum shall be bound with all contract sets of drawings and specifications.

CLARIFICATIONS:

Rod X-bracing for PEMB in Truck Parking 140 is allowed in front of translucent wall panels.

Cold Storage Building is an alternate.

CHANGES TO THE SPECIFICATIONS:

Section 26 0573 Power System Studies, **ADD** section to volume.

Section 26 2416 Panelboards, **ADD** section to volume.

Section 26 3213 Engine Generators, **ADD** section to volume.

Section 26 3600 Transfer Switches, **ADD** section to volume.

Section 27 1000 Structured Cabling, **ADD** section to volume.

Section 28 4600 Fire Detection and Alarm, **ADD** section to volume.

CHANGES TO DRAWINGS:

Sheet E101 Electrical Power Plan **ADD** TV Box in Conference 114.

Sheet A602, A603 & A604 **MODIFY** Floor Finish Legend. Concrete reference to read, "Finished concrete. Refer to Finish Schedule for concrete finish system".

ATTACHMENTS:

A602 A603

A604 E101

Section 26 0573

Section 26 2416

Section 26 3213

Section 26 3600

Section 27 1000

Section 28 4600

END OF ADDENDUM NUMBER TWO

**SECTION 26 0573
POWER SYSTEM STUDIES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Short-circuit study.
- B. Protective device coordination study.
- C. Arc flash and shock risk assessment.
 - 1. Includes arc flash hazard warning labels.
- D. Criteria for the selection and adjustment of equipment and associated protective devices not specified in this section, as determined by studies to be performed.

1.02 RELATED REQUIREMENTS

- A. Section 26 0553 - Identification for Electrical Systems: Additional requirements for arc flash hazard warning labels.
- B. Section 26 2416 - Panelboards.

1.03 REFERENCE STANDARDS

- A. ANSI Z535.4 - American National Standard for Product Safety Signs and Labels; 2023.
- B. IEEE 141 - IEEE Recommended Practice for Electric Power Distribution for Industrial Plants; 1993 (Reaffirmed 1999).
- C. IEEE 242 - IEEE Recommended Practice for Protection and Coordination of Industrial and Commercial Power Systems; 2001, with Errata (2003).
- D. IEEE 399 - IEEE Recommended Practice for Industrial and Commercial Power Systems Analysis; 1997.
- E. IEEE 551 - IEEE Recommended Practice for Calculating Short-Circuit Currents in Industrial and Commercial Power Systems; 2006.
- F. IEEE 1584 - IEEE Guide for Performing Arc-Flash Hazard Calculations; 2018, with Errata (2019).
- G. NEMA MG 1 - Motors and Generators; 2021.
- H. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.
- I. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. NFPA 70E - Standard for Electrical Safety in the Workplace; 2024.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate the work to provide equipment and associated protective devices complying with criteria for selection and adjustment, as determined by studies to be performed.
 - 2. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Sequencing:
 - 1. Submit study reports prior to or concurrent with product submittals.
 - 2. Do not order equipment until matching study reports and product submittals have both been evaluated by Architect.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Study reports, stamped or sealed and signed by study preparer.
- C. Product Data: In addition to submittal requirements specified in other sections, include manufacturer's standard catalog pages and data sheets for equipment and protective devices indicating information relevant to studies.
 - 1. Identify modifications made in accordance with studies that:
 - a. Can be made at no additional cost to Owner.
 - b. As submitted will involve a change to the contract sum.
- D. Certification that field adjustable protective devices have been set in accordance with requirements of studies.

1.06 POWER SYSTEM STUDIES

- A. Scope of Studies:
 - 1. Except where study descriptions below indicate exclusions, analyze system at each bus from primary protective devices of utility source down to each piece of equipment involved, including parts of system affecting calculations being performed (e.g. fault current contribution from motors).
 - 2. Include in analysis alternate sources and operating modes (including known future configurations) to determine worst case conditions.
- B. General Study Requirements:
 - 1. Comply with NFPA 70.
 - 2. Perform studies utilizing computer software complying with specified requirements; manual calculations are not permitted.
- C. Data Collection:
 - 1. Compile information on project-specific characteristics of actual installed equipment, protective devices, feeders, etc. as necessary to develop single-line diagram of electrical distribution system and associated input data for use in system modeling.
 - a. Utility Source Data: Include primary voltage, maximum and minimum three-phase and line-to-ground fault currents, impedance, X/R ratio, and primary protective device information.
 - 1) Obtain up-to-date information from Utility Company.
 - b. Generators: Include manufacturer/model, kW and voltage ratings, and impedance.
 - c. Motors: Include manufacturer/model, type (e.g. induction, synchronous), horsepower rating, voltage rating, full load amps, and locked rotor current or NEMA MG 1 code letter designation.
 - d. Transformers: Include primary and secondary voltage ratings, kVA rating, winding configuration, percent impedance, and X/R ratio.
 - e. Protective Devices:
 - 1) Circuit Breakers: Include manufacturer/model, type (e.g. thermal magnetic, electronic trip), frame size, trip rating, voltage rating, interrupting rating, available field-adjustable trip response settings, and features (e.g. zone selective interlocking).
 - 2) Fuses: Include manufacturer/model, type/class (e.g. Class J), size/rating, and speed (e.g. time delay, fast acting).
 - f. Protective Relays: Include manufacturer/model, type, settings, current/potential transformer ratio, and associated protective device.
 - g. Conductors: Include feeder size, material (e.g. copper, aluminum), insulation type, voltage rating, number per phase, raceway type, and actual length.
- D. Short-Circuit Study:
 - 1. Comply with IEEE 551 and applicable portions of IEEE 141, IEEE 242, and IEEE 399.
 - 2. For purposes of determining equipment short circuit current ratings, consider conditions that may result in maximum available fault current, including but not limited to:

- a. Maximum utility fault currents.
 - b. Maximum motor contribution.
 - c. Known operating modes (e.g. utility as source, generator as source, utility/generator in parallel, bus tie breaker open/close positions).
3. For each bus location, calculate the maximum available three-phase bolted symmetrical and asymmetrical fault currents. For grounded systems, also calculate the maximum available line-to-ground bolted fault currents.
- E. Protective Device Coordination Study:
 1. Comply with applicable portions of IEEE 242 and IEEE 399.
 2. Analyze alternate scenarios considering known operating modes (e.g. utility as source, generator as source, utility/generator in parallel, bus tie breaker open/close positions).
- F. Arc Flash and Shock Risk Assessment:
 1. Comply with NFPA 70E.
 2. Perform incident energy and arc flash boundary calculations in accordance with IEEE 1584 (as referenced in NFPA 70E Annex D), where applicable.
 3. Analyze alternate scenarios considering conditions that may result in maximum incident energy, including but not limited to:
 - a. Maximum and minimum utility fault currents.
 - b. Maximum and minimum motor contribution.
 - c. Known operating modes (e.g. utility as source, generator as source, utility/generator in parallel, bus tie breaker open/close positions).
- G. Study Reports:
 1. General Requirements:
 - a. Identify date of study and study preparer.
 - b. Identify study methodology and software product(s) used.
 - c. Identify scope of studies, assumptions made, implications of possible alternate scenarios, and any exclusions from studies.
 - d. Identify base used for per unit values.
 - e. Include single-line diagram and associated input data used for studies; identify buses on single-line diagram as referenced in reports, and indicate bus voltage.
 - f. Include conclusions and recommendations.
 2. Short-Circuit Study:
 - a. For each scenario, identify at each bus location:
 - 1) Calculated maximum available symmetrical and asymmetrical fault currents (both three-phase and line-to-ground where applicable).
 - 2) Fault point X/R ratio.
 - 3) Associated equipment short circuit current ratings.
 - b. Identify locations where the available fault current exceeds the equipment short circuit current rating, along with recommendations.
 3. Protective Device Coordination Study:
 - a. For each scenario, include time-current coordination curves plotted on log-log scale graphs.
 - b. For each graph include (where applicable):
 - 1) Partial single-line diagram identifying the portion of the system illustrated.
 - 2) Protective Devices: Time-current curves with applicable tolerance bands for each protective device in series back to the source, plotted up to the maximum available fault current at the associated bus.
 - 3) Conductors: Damage curves.
 - 4) Transformers: Inrush points and damage curves.
 - 5) Generators: Full load current, overload curves, decrement curves, and short circuit withstand points.
 - 6) Motors: Full load current, starting curves, and damage curves.
 - 7) Capacitors: Full load current and damage curves.

- c. For each protective device, identify fixed and adjustable characteristics with available ranges and recommended settings.
 - 1) Circuit Breakers: Include long time pickup and delay, short time pickup and delay, and instantaneous pickup.
 - 2) Include ground fault pickup and delay.
 - 3) Include fuse ratings.
 - 4) Protective Relays: Include current/potential transformer ratios, tap, time dial, and instantaneous pickup.
- d. Identify cases where either full selective coordination or adequate protection is not achieved, along with recommendations.
- 4. Arc Flash and Shock Risk Assessment:
 - a. For the worst case for each scenario, identify at each bus location:
 - 1) Calculated incident energy and associated working distance.
 - 2) Calculated arc flash boundary.
 - 3) Bolted fault current.
 - 4) Arcing fault current.
 - 5) Clearing time.
 - 6) Arc gap distance.
 - b. For purposes of producing arc flash hazard warning labels, summarize the maximum incident energy and associated data reflecting the worst case condition of all scenarios at each bus location.

1.07 QUALITY ASSURANCE

- A. Study Preparer Qualifications: Professional electrical engineer licensed in Indiana and with minimum five years experience in the preparation of studies of similar type and complexity using specified computer software.
- B. Computer Software for Study Preparation: Use the latest edition of commercially available software utilizing specified methodologies.

PART 2 PRODUCTS

2.01 ARC FLASH HAZARD WARNING LABELS

- A. Provide warning labels complying with ANSI Z535.4 to identify arc flash hazards for each work location analyzed by the arc flash and shock risk assessment.
 - 1. Materials: Comply with Section 26 0553.
 - 2. Legend: Provide custom legend in accordance with NFPA 70E based on equipment-specific data as determined by arc flash and shock risk assessment.
 - a. Include the following information:
 - 1) Arc flash boundary.
 - 2) Available incident energy and corresponding working distance.
 - 3) Nominal system voltage.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install arc flash warning labels in accordance with Section 26 0553.

3.02 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Inspect and test in accordance with NETA ATS, except Section 4.
- C. Adjust equipment and protective devices for compliance with studies and recommended settings.
- D. Notify Architect of any conflicts with or deviations from studies. Obtain direction before proceeding.

3.03 CLOSEOUT ACTIVITIES

- A. Training: Include as part of the base bid training for Owner's personnel on electrical safety pertaining to arc flash and shock hazards.
 - 1. Use site-specific arc flash and shock risk assessment report as training reference, supplemented with additional training materials as required.

END OF SECTION

**SECTION 26 2416
PANELBOARDS****PART 1 GENERAL****1.01 RELATED REQUIREMENTS**

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- B. Section 26 0529 - Hangers and Supports for Electrical Systems.
- C. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- D. Section 26 0573 - Power System Studies: Additional criteria for the selection and adjustment of equipment and associated protective devices specified in this section.
- E. Section 26 2200 - Low-Voltage Transformers: Small power centers with integral primary breaker, transformer, and panelboard.

1.02 REFERENCE STANDARDS

- A. FS W-C-375 - Circuit Breakers, Molded Case; Branch Circuit and Service; 2013e, with Amendments (2022).
- B. NECA 1 - Standard for Good Workmanship in Electrical Construction; 2015.
- C. NECA 407 - Standard for Installing and Maintaining Panelboards; 2015.
- D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2020.
- E. CBEMA (ITIC) and IEC - (Computer Business Equipment Manufacturers Association or Information Technology Industry Council and International Electrotechnical Commission define clamping voltage tolerance guidelines for sensitive equipment)
- F. IEEE (Institute of Electrical and Electronic Engineering Inc.) C62.41.1 and C62.41.2 – 2002 rev. - (System shall be designed to meet C62.41)
- G. UL 1449 surge defined as 1.2 x 50us, 6000V open circuit voltage waveform and an 8 x 20us, 500A and 3kA short circuit current waveform is applied to benchmark the unit's suppression voltage.
- H. ANSI/IEEE C62.41.2-2002 (Category C3) surges defined as a 1.2 x 50us 10kV or 20kV open circuit voltage waveform and an 8 x 20us 10,000A short circuit current waveform are then applied at one minute intervals.
- I. ISO 9001:2000 - Quality standard / Military Standards (MIL-STD 220A)
- J. National Electrical Code 2008 rev. - (NEC Article 285 TVSS Installation practice/NEC Article 250.56 Grounding)
- K. NFPA-780 and CSA - (National Fire Protection Association)
- L. NEMA PB 1 - Panelboards; 2011.
- M. NEMA PB 1.1 - General Instructions for Proper Installation, Operation and Maintenance of Panelboards Rated 1000 Volts or Less; 2023.
- N. NETA ATS - Standard For Acceptance Testing Specifications For Electrical Power Equipment And Systems; 2021.
- O. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations; Current Edition, Including All Revisions.
- P. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations; Current Edition, Including All Revisions.
- Q. UL 67 - Panelboards; Current Edition, Including All Revisions.

- R. UL 489 - Molded-Case Circuit Breakers, Molded-Case Switches and Circuit Breaker Enclosures; Current Edition, Including All Revisions.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
 2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 3. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted panelboards where indicated.
 4. Verify with manufacturer that conductor terminations are suitable for use with the conductors to be installed.
 5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.
- B. Underwriters Laboratories 1449 - (UL 1449 3rd edition or current safety standard for Transient Voltage Surge Suppressors)
- C. Underwriters Laboratories 1283 - (UL 1283 listed as an electromagnetic interference filter that provides noise attenuation)
- D. Underwriters Laboratories 67 - (UL 67 internal integration of TVSS in panelboard)

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.
- C. SDP Requirements:
1. SDP Equipment Manual: The manufacturer shall furnish an installation manual with installation notes, start-up and operating instructions for the specified system. Installation instructions shall clearly state whether the system requires an external overcurrent device to maintain the system's UL 1449 3rd Edition listing.
 2. UL 1449 3rd Edition stipulation for fused SDP - The manufacturer's authorized representative is required to submit the following:
 - a. Certify that the SDP system is UL 1449 3rd Edition listed (UL Card) with UL Card.
 - b. Indicate the type of internal or external fusing that is incorporated in the TVSS system and what impact the fusing has on the performance of the device with respect to surge capacity and clamping levels.

1.05 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store panelboards in accordance with manufacturer's instructions and NECA 407.
- B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- C. Handle carefully in accordance with manufacturer's written instructions to avoid damage to panelboard internal components, enclosure, and finish.

1.07 FIELD CONDITIONS

- A. Maintain ambient temperature within the following limits during and after installation of panelboards:
1. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.

1.08 WARRANTY

- A. The SDP Manufacturer shall provide a product warranty for a period of not less than five 10 years from date of installation. Warranty shall cover unlimited replacement of SDP modules during the warranty period. Those firms responding to this specification shall provide proof that they have been regularly engaged in the design, manufacturing and testing of SDP for not less than twenty (25) years.

PART 2 PRODUCTS**2.01 MANUFACTURERS**

- A. Siemens Industry, Inc: www.usa.siemens.com.
- B. Schneider Electric; Square D Products; _____: www.schneider-electric.us/#sle.

2.02 PANELBOARDS - GENERAL REQUIREMENTS

- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
- B. Unless otherwise indicated, provide products suitable for continuous operation under the following service conditions:
 - 1. Altitude: Less than 6,600 feet.
 - 2. Ambient Temperature:
 - a. Panelboards Containing Circuit Breakers: Between 23 degrees F and 104 degrees F.
- C. Short Circuit Current Rating:
- D. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.
- E. Branch Overcurrent Protective Devices: Replaceable without disturbing adjacent devices.
- F. Bussing: Sized in accordance with UL 67 temperature rise requirements.
 - 1. Provide solidly bonded equipment ground bus in each panelboard, with a suitable lug for each feeder and branch circuit equipment grounding conductor.
- G. Conductor Terminations: Suitable for use with the conductors to be installed.
- H. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
 - 1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
 - 2. Boxes: Galvanized steel unless otherwise indicated.
 - a. Provide wiring gutters sized to accommodate the conductors to be installed.
 - 3. Fronts:
 - a. Fronts for Surface-Mounted Enclosures: Same dimensions as boxes.
 - b. Fronts for Flush-Mounted Enclosures: Overlap boxes on all sides to conceal rough opening.
 - 4. Lockable Doors: All locks keyed alike unless otherwise indicated.
- I. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.

2.03 LIGHTING AND APPLIANCE PANELBOARDS

- A. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.
- B. Conductor Terminations:
 - 1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
 - 2. Main and Neutral Lug Type: Mechanical.
- C. Bussing:
 - 1. Phase Bus Connections: Arranged for sequential phasing of overcurrent protective devices.

2. Phase and Neutral Bus Material: Copper.
3. Ground Bus Material: Copper.
- D. Circuit Breakers: Thermal magnetic bolt-on type unless otherwise indicated.
- E. Enclosures:
 1. Provide surface-mounted or flush-mounted enclosures as indicated.
 2. Provide clear plastic circuit directory holder mounted on inside of door.

2.04 OVERCURRENT PROTECTIVE DEVICES

- A. Molded Case Circuit Breakers:
 1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
 2. Interrupting Capacity:
 - a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
 - b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
 3. Conductor Terminations:
 - a. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
 4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
 5. Multi-Pole Circuit Breakers: Furnish with common trip for all poles.

2.05 SDP

- A. Acceptable Manufacturers and Models:
 1. LEA International Inc. – LS200 P
 2. Manufacturers must comply with listed standards and any additions current revisions of industry standards. Products that do not comply with current industry standards will not be accepted.
- B. Equipment shall be a multi-stage parallel protector rated for VAC, PHASE, WIRE, plus ground. The equipment's minimum surge current capacity shall be 200kA per phase (L-N plus L-G) and 100kA per mode (L-N, L-G, L-L and N-G).
- C. The system protection modules shall contain a technology that utilizes a symmetrical array of balanced metal oxide varistors (MOV). Each MOV will be individually coordinated to pass UL 1449.
- D. All primary transient paths shall utilize copper wire, copper bus bar and lugs of equivalent capacity to provide equal impedance interconnection between phases. No plug-in module or components shall be used in surge carrying paths.
- E. Each protection module shall have a visual indicator that signifies that the protection circuitry is on line. The unit shall not be taken off line to verify integrity of system. Redundant status indicators shall be mounted on the front of the door that monitors the system protection circuitry.
- F. The system shall be modular with field replaceable modules.
- G. Each protection module shall have a capacitive filtering system connected in each Line to Neutral (LN)(Wye) mode or Line to Line (LL)(Delta) mode to provide EMI/RFI noise attenuation (UL 1283).
- H. Protection modes: The SDP shall provide Line to Neutral (LN)(Wye), Line to Ground (LG)(Wye or Delta), Line to Line (LL)(Delta) and Neutral to Ground (NG)(Wye) protection.
- I. Service Conditions: Rate surge protective device for continuous operation under the following conditions, unless otherwise indicated:
 1. MCOV: Maximum Continuous Operating Voltage of 110% or greater.
 2. Operating Temperature: 30 to 120 degrees F.

3. Humidity: 0 to 85 percent, non-condensing.
4. Altitude: Less than 20,000 feet above sea level.
- J. Equipment shall provide the following monitoring features: dry contacts, digital surge counter, and audible alarm with alarm disable switch. Unit shall also indicate loss of phase and have self diagnostic with message board that will help trouble shoot unit. Unit diagnostics should verify that the unit is installed properly (phase, neutral, and ground connection) and have good connectivity on all conductors.
- K. CBEMA (ITIC) & IEC - SVRs must meet voltage tolerance guidelines
 1. SVR clamp levels for wye and single phase (L-N, L-G and N-G):
 - a. 400-600V for 120V systems, 800-1200V for 277V systems and 1200-1500V for 347V systems
 2. SVR clamp levels for delta circuits (L-L and L-G):
 3. 1000-1200V for 240V systems, 1500-1800V for 480V systems and 1800-2000V for 600V systems
- L. Units shall be housed in a NEMA 4X enclosure.

PART 3 EXECUTION

3.01 EXAMINATION

- A. Verify that field measurements are as indicated.
- B. Verify that the ratings and configurations of the panelboards and associated components are consistent with the indicated requirements.
- C. Verify that mounting surfaces are ready to receive panelboards.
- D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Install panelboards in accordance with NECA 407 and NEMA PB 1.1.
- D. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
- E. Provide required support and attachment in accordance with Section 26 0529.
- F. Provide fire rated material when mounting panelboard directly to wood structure.
- G. Install flush-mounted panelboards so that trims fit completely flush to wall with no gaps and rough opening completely covered.
- H. Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches above the floor or working platform.
- I. Provide minimum of six spare 1 inch trade size conduits out of each flush-mounted panelboard stubbed into accessible space above ceiling and below floor.
- J. Provide grounding and bonding in accordance with Section 26 0526.
- K. Install all field-installed branch devices, components, and accessories.
- L. Install panelboards in accordance with NEMA PB 1.1 and NECA 1.
- M. Install panelboards plumb. Install recessed panelboards flush with wall finishes.
- N. Provide filler plates to cover unused spaces in panelboards.
- O. Provide spare conduits out of each recessed panelboard to an accessible location above ceiling. Identify each as SPARE.
- P. Ground and bond panelboard enclosure according to Section 26 0526.
- Q. SDP

1. The SDP system shall be installed with the shortest lead length possible not to exceed a foot and half (1.5') electrical feet from the power conductor(s) it is protecting, must have a grounding of 25 Ohms (NEC Article 250.56) or less and shall avoid any unnecessary or sharp bends. Utilize a 3 pole 60 amp breaker for connection means and a #6 wire.
2. SDP Manufacturer's representative shall visit site, verify installation, and submit to Contracting Officer a letter stating that equipment and installation meets intent of Contract Documents and manufacturer's warranties and that guarantees are in effect.
3. Independent SDP Testing:
 - a. High exposure with the 10 x 1,000s tests per IEEE C62.41.2 Section 7.2
 - b. Life Cycle/Repetitive Testing per C62.45-2002 section B.38 minimum of 1,000 to 2,000 times
4. National Electrical Code (NEC) 285 - Installation requirements for SDP.
 - a. Section 285.2, SDP must limit transient voltage by diverting or limiting surge current; it also should prevent continued flow of follow current while remaining capable of repeating these functions. SDP that utilize fuses must have repetitive surge capability that can survive its surge rating and meet UL 1449 3rd Edition.
 - b. Section 285.6, SDP shall be marked with a short circuit current rating and shall not be installed at a point on the system (ex. service, distribution or branch panels) where the available fault current (AIC rating) is in excess of that rating.

3.03 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Perform inspection, testing, and adjusting in accordance with Section 01 4000.
- C. Inspect and test in accordance with NETA ATS, except Section 4.
- D. Molded Case Circuit Breakers: Perform inspections and tests listed in NETA ATS, Section 7.6.1.1 for all main circuit breakers and circuit breakers larger than _____ amperes. Tests listed as optional are not required.
- E. Correct deficiencies and replace damaged or defective panelboards or associated components.

3.04 ADJUSTING

- A. Adjust tightness of mechanical and electrical connections to manufacturer's recommended torque settings.
- B. Adjust alignment of panelboard fronts.

3.05 CLEANING

- A. Clean dirt and debris from panelboard enclosures and components according to manufacturer's instructions.
- B. Repair scratched or marred exterior surfaces to match original factory finish.

END OF SECTION

**SECTION 26 3213
ENGINE GENERATORS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Packaged engine generator system and associated components and accessories:
 - 1. Engine and engine accessory equipment.
 - 2. Alternator (generator).
 - 3. Generator set control system.
 - 4. Generator set enclosure.

1.02 RELATED REQUIREMENTS

- A. Section 23 1113 - Facility Fuel-Oil Piping:
 - 1. Remote main diesel fuel tank (bulk tank).
- B. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- C. Section 26 0529 - Hangers and Supports for Electrical Systems.
- D. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- E. Section 26 3600 - Transfer Switches.

1.03 REFERENCE STANDARDS

- A. ASTM D975 - Standard Specification for Diesel Fuel; 2023a.
- B. NECA/EGSA 404 - Standard for Installing Generator Sets; 2014.
- C. NEMA MG 1 - Motors and Generators; 2021.
- D. NFPA 30 - Flammable and Combustible Liquids Code; 2024.
- E. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- F. NFPA 99 - Health Care Facilities Code; 2024.
- G. NFPA 110 - Standard for Emergency and Standby Power Systems; 2022.
- H. UL 142 - Steel Aboveground Tanks for Flammable and Combustible Liquids; Current Edition, Including All Revisions.
- I. UL 2200 - Stationary Engine Generator Assemblies; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate compatibility of generator sets to be installed with work provided under other sections or by others.
 - 2. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment or other potential obstructions within the spaces dedicated for engine generator system.
 - 3. Coordinate arrangement of equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 4. Coordinate the work to provide electrical circuits suitable for the power requirements of the actual auxiliary equipment and accessories to be installed.
 - 5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product, including ratings, configurations, dimensions, finishes, weights, service condition requirements, and installed features. Include alternator starting capabilities, engine fuel consumption rates, and cooling, combustion air, and exhaust requirements.
- C. Fuel Storage Tank Calculations: Indicate maximum running time for generator set configuration provided.
- D. Manufacturer's factory emissions certification.
- E. Provide NFPA 110 required documentation from manufacturer where requested by authorities having jurisdiction, including but not limited to:
 - 1. Certified prototype tests.
 - 2. Torsional vibration compatibility certification.
 - 3. NFPA 110 compliance certification.
 - 4. Certified rated load test at rated power factor.
- F. Manufacturer's detailed field testing procedures.

1.06 QUALITY ASSURANCE

- A. Comply with the following:
 - 1. NFPA 70 (National Electrical Code).
 - 2. NFPA 110 (Standard for Emergency and Standby Power Systems); meet requirements for Level 1 system.
 - 3. NFPA 30 (Flammable and Combustible Liquids Code).
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
 - 1. Authorized service facilities located within 200 miles of project site.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience with engine generator systems of similar size, type, and complexity; manufacturer's authorized installer.
- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store generator sets in accordance with manufacturer's instructions and NECA/EGSA 404.
- B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- C. Handle carefully in accordance with manufacturer's instructions to avoid damage to generator set components, enclosure, and finish.

1.08 FIELD CONDITIONS

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.09 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.
- B. Provide minimum two year manufacturer warranty covering repair or replacement due to defective materials or workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Packaged Engine Generator Set:
 - 1. Caterpillar Inc; _____: www.cat.com/#sle.
 - 2. Cummins Power Generation Inc; _____: www.cumminspower.com/#sle.

3. Generac Power Systems; _____: www.generac.com/industrial/#sle. Generac Power Systems; _____: www.generac.com/industrial/#sle. Generac Power Systems; _____: www.generac.com/industrial/#sle.

2.02 PACKAGED ENGINE GENERATOR SYSTEM

- A. Provide new engine generator system consisting of all required equipment, sensors, conduit, boxes, wiring, piping, supports, accessories, system programming, etc. as necessary for a complete operating system that provides the functional intent indicated.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. System Description:
 - 1. Application: Emergency/standby.
 - 2. Configuration: Single packaged engine generator set operated independently (not in parallel).
- D. Packaged Engine Generator Set:
 - 1. Type: Diesel (compression ignition).
 - 2. Power Rating: 350 kW, standby.
 - 3. Voltage: As indicated on drawings.
- E. Generator Set General Requirements:
 - 1. Prototype tested in accordance with NFPA 110 for Level 1 systems.
 - 2. Factory-assembled, with components mounted on suitable base.
 - 3. List and label engine generator assembly as complying with UL 2200.
 - 4. Power Factor: Unless otherwise indicated, specified power ratings are at 0.8 power factor for three phase voltages and 1.0 power factor for single phase voltages.
 - 5. Provide suitable guards to protect personnel from accidental contact with rotating parts, hot piping, and other potential sources of injury.
- F. Service Conditions: Provide engine generator system and associated components suitable for operation under the service conditions at the installed location.
- G. Starting and Load Acceptance Requirements:
 - 1. Cranking Method: Cycle cranking complying with NFPA 110 (15 second crank period, followed by 15 second rest period, with cranking limiter time-out after 3 cycles), unless otherwise required.
 - 2. Cranking Limiter Time-Out: If generator set fails to start after specified cranking period, indicate overcrank alarm condition and lock-out generator set from further cranking until manually reset.
 - 3. Start Time: Capable of starting and achieving conditions necessary for load acceptance within 10 seconds (NFPA 110, Type 10).
 - 4. Maximum Load Step: Supports 100 percent of rated load in one step.
- H. Exhaust Emissions Requirements:
 - 1. Comply with federal (EPA), state, and local regulations applicable at the time of commissioning; include factory emissions certification with submittals.
 - 2. Do not make modifications affecting generator set factory emissions certification without approval of manufacturer and Engineer. Where such modifications are made, provide field emissions testing as necessary for certification.

2.03 ENGINE AND ENGINE ACCESSORY EQUIPMENT

- A. Provide engine with adequate horsepower to achieve specified power output at rated speed, accounting for alternator efficiency and parasitic loads.
- B. Engine Fuel System - Diesel (Compression Ignition):
 - 1. Fuel Source: Diesel, ASTM D975 No. 2-D or approved cold weather diesel blends.
 - 2. Fuel Storage: Sub-base fuel tank.
 - 3. Engine Fuel Supply: Provide engine-driven, positive displacement fuel pump with replaceable fuel filter(s), water separator, check valve to secure prime, manual fuel priming pump, and relief-bypass valve. Provide fuel cooler where recommended by

- manufacturer.
4. Engine Fuel Connections: Provide suitable, approved flexible fuel lines for coupling engine to fuel source.
 5. Main Fuel Tank (Bulk Tank): Comply with Section 23 1113.
 6. Sub-Base Fuel Tank:
 - a. Provide sub-base mounted, double-wall fuel tank with secondary containment; listed and labeled as complying with UL 142.
 - b. Tank Capacity: Size for minimum of 24 hours of continuous engine generator operation at 100 percent rated load, but not larger than permissible by applicable codes.
 - c. Features:
 - 1) Direct reading fuel level gauge.
 - 2) Normal atmospheric vent.
 - 3) Emergency pressure relief vent.
 - 4) Fuel fill opening with lockable cap.
 - 5) Dedicated electrical conduit stub-up area.
- C. Engine Starting System:
1. System Type: Electric, with DC solenoid-activated starting motor(s).
 2. Battery(s):
 - a. Battery Type: Lead-acid.
 - b. Battery Capacity: Size according to manufacturer's recommendations for achieving starting and load acceptance requirements under worst case ambient temperature; capable of providing cranking through two complete periods of cranking limiter time-outs without recharging.
 - c. Provide battery rack, cables, and connectors suitable for the supplied battery(s); size battery cables according to manufacturer's recommendations for cable length to be installed.
 3. Battery-Charging Alternator: Engine-driven, with integral solid-state voltage regulation.
 4. Battery Charger:
 - a. Provide dual rate battery charger with automatic float and equalize charging modes and minimum rating of 10 amps; suitable for maintaining the supplied battery(s) at full charge without manual intervention.
 - b. Capable of returning supplied battery(s) from fully discharged to fully charged condition within 24 hours, as required by NFPA 110 for Level 1 applications while carrying normal loads.
 - c. Furnished with integral overcurrent protection; current limited to protect charger during engine cranking; reverse polarity protection.
 - d. Provide integral DC output ammeter and voltmeter with five percent accuracy.
 - e. Provide alarm output contacts as necessary for alarm indications.
- D. Engine Speed Control System (Governor):
1. Single Engine Generator Sets (Not Operated in Parallel): Provide electronic isochronous governor for controlling engine speed/alternator frequency.
 2. Frequency Regulation, Electronic Isochronous Governors: No change in frequency from no load to full load; plus/minus 0.25 percent at steady state.
- E. Engine Lubrication System:
1. System Type: Full pressure, with engine-driven, positive displacement lubrication oil pump, replaceable full-flow oil filter(s), and dip-stick for oil level indication. Provide oil cooler where recommended by manufacturer.
- F. Engine Cooling System:
1. System Type: Closed-loop, liquid-cooled, with unit-mounted radiator/fan and engine-driven coolant pump; suitable for providing adequate cooling while operating at full load under worst case ambient temperature.
 2. Fan Guard: Provide suitable guard to protect personnel from accidental contact with fan.
- G. Engine Air Intake and Exhaust System:

1. Air Intake Filtration: Provide engine-mounted, replaceable, dry element filter.
2. Engine Exhaust Connection: Provide suitable, approved flexible connector for coupling engine to exhaust system.

2.04 ALTERNATOR (GENERATOR)

- A. Alternator: 4-pole, 1800 rpm (60 Hz output) revolving field, synchronous generator complying with NEMA MG 1; connected to engine with flexible coupling; voltage output configuration as indicated, with reconnectable leads for 3 phase alternators.
- B. Exciter:
 1. Exciter Type: Brushless; provide permanent magnet generator (PMG) excitation system; self-excited (shunt) systems are not permitted.
 2. PMG Excitation Short-Circuit Current Support: Capable of sustaining 300 percent of rated output current for 10 seconds.
 3. Voltage Regulation (with PMG excitation): Plus/minus 0.5 percent for any constant load from no load to full load.
- C. Temperature Rise: Comply with UL 2200.
- D. Insulation System: NEMA MG 1, Class H; suitable for alternator temperature rise.
- E. Enclosure: NEMA MG 1, drip-proof.
- F. Total Harmonic Distortion: Not greater than five percent.

2.05 GENERATOR SET CONTROL SYSTEM

- A. Provide microprocessor-based control system for automatic control, monitoring, and protection of generator set. Include sensors, wiring, and connections necessary for functions/indications specified.
- B. Control Panel:
 1. Control Panel Mounting: Unit-mounted unless otherwise indicated; vibration isolated.
 2. Generator Set Control Functions:
 - a. Automatic Mode: Initiates generator set start/shutdown upon receiving corresponding signal from remote device (e.g. automatic transfer switch).
 - b. Manual Mode: Initiates generator set start/shutdown upon direction from operator.
 - c. Reset Mode: Clears all faults, allowing generator set restart after a shutdown.
 - d. Emergency Stop: Immediately shuts down generator set (without time delay) and prevents automatic restarting until manually reset.
 - e. Cycle Cranking: Programmable crank time, rest time, and number of cycles.
 - f. Time Delay: Programmable for shutdown (engine cooldown) and start (engine warmup).
 - g. Voltage Adjustment: Adjustable through range of plus/minus 5 percent.
 3. Generator Set Status Indications:
 - a. Voltage (Volts AC): Line-to-line, line-to-neutral for each phase.
 - b. Current (Amps): For each phase.
 - c. Frequency (Hz).
 - d. Real power (W/kW).
 - e. Reactive power (VAR/kVAR).
 - f. Apparent power (VA/kVA).
 - g. Power factor.
 - h. Duty Level: Actual load as percentage of rated power.
 - i. Engine speed (RPM).
 - j. Battery voltage (Volts DC).
 - k. Engine oil pressure.
 - l. Engine coolant temperature.
 - m. Engine run time.
 - n. Generator powering load (position signal from transfer switch).
 4. Generator Set Protection and Warning/Shutdown Indications:

- a. Comply with NFPA 110; configurable for NFPA 110 Level 1 or Level 2, or NFPA 99 systems including but not limited to the following protections/indications:
 - 1) Overcrank (shutdown).
 - 2) Low coolant temperature (warning).
 - 3) High coolant temperature (warning).
 - 4) High coolant temperature (shutdown).
 - 5) Low oil pressure (shutdown).
 - 6) Overspeed (shutdown).
 - 7) Low fuel level (warning).
 - 8) Low coolant level (warning/shutdown).
 - 9) Generator control not in automatic mode (warning).
 - 10) High battery voltage (warning).
 - 11) Low cranking voltage (warning).
 - 12) Low battery voltage (warning).
 - 13) Battery charger failure (warning).
 - b. In addition to NFPA 110 requirements, provide the following protections/indications:
 - 1) High AC voltage (shutdown).
 - 2) Low AC voltage (shutdown).
 - 3) High frequency (shutdown).
 - 4) Low frequency (shutdown).
 - 5) Overcurrent (shutdown).
 - c. Provide contacts for local and remote common alarm.
 - d. Provide lamp test function that illuminates all indicator lamps.
5. Other Control Panel Features:
- a. Event log.

END OF SECTION

**SECTION 26 3600
TRANSFER SWITCHES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Transfer switches for low-voltage (600 V and less) applications and associated accessories:
 - 1. Automatic transfer switches.
 - 2. Includes service entrance rated transfer switches.
 - 3. Remote annunciators.

1.02 RELATED REQUIREMENTS

- A. Section 03 3000 - Cast-in-Place Concrete: Concrete equipment pads.
- B. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- C. Section 26 0529 - Hangers and Supports for Electrical Systems.
- D. Section 26 0553 - Identification for Electrical Systems: Identification products and requirements.
- E. Section 26 3213 - Engine Generators: For interface with transfer switches.

1.03 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate compatibility of transfer switches to be installed with work provided under other sections or by others.
 - 2. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances required by NFPA 70.
 - 3. Coordinate arrangement of equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 4. Coordinate the work with placement of supports, anchors, etc. required for mounting.
 - 5. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturer's standard catalog pages and data sheets for each product, including ratings, configurations, dimensions, finishes, weights, service condition requirements, and installed features.
- C. Evidence of qualifications for installer.
- D. Source quality control test reports.
- E. Operation and Maintenance Data: Include detailed information on system operation, equipment programming and setup, replacement parts, and recommended maintenance procedures and intervals.

1.05 QUALITY ASSURANCE

- A. Comply with the following:
 - 1. NFPA 70 (National Electrical Code).
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience with power transfer systems of similar size, type, and complexity; manufacturer's authorized installer.

- D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Receive, inspect, handle, and store transfer switches in accordance with manufacturer's instructions.
- B. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
- C. Handle carefully in accordance with manufacturer's instructions to avoid damage to transfer switch components, enclosure, and finish.

1.07 FIELD CONDITIONS

- A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.08 WARRANTY

- A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS

2.01 MANUFACTURERS

- A. Transfer Switches:
 - 1. ASCO Power Technologies; _____: www.ascopower.com/#sle.
 - 2. Same as manufacturer of engine generator(s) used for this project.
 - a. Generac Power Systems; _____: www.generac.com/industrial/#sle.
- B. Products other than basis of design are subject to compliance with specified requirements and prior approval of Engineer. By using products other than basis of design, Contractor accepts responsibility for costs associated with any necessary modifications to related work, including any design fees.

2.02 TRANSFER SWITCHES

- A. Provide complete power transfer system consisting of all required equipment, conduit, boxes, wiring, supports, accessories, system programming, etc. as necessary for a complete operating system that provides the functional intent indicated.
- B. Provide products listed, classified, and labeled as suitable for the purpose intended.
- C. Applications:
- D. Construction Type: Either "contactor type" (open contact) or "breaker type" (enclosed contact) transfer switches complying with specified requirements are acceptable.
- E. Automatic Transfer Switch:
 - 1. Voltage: As indicated on the drawings.
 - 2. Ampere Rating: As indicated on the drawings.
 - 3. Neutral Configuration: Solid neutral (unswitched), except as indicated.
 - 4. Load Served: As indicated on the drawings.
 - 5. Primary Source: As indicated on the drawings.
 - 6. Alternate Source: As indicated on the drawings.
- F. Comply with NEMA ICS 10 Part 1, and list and label as complying with UL 1008 for the classification of the intended application (e.g. emergency, optional standby).
- G. Do not use double throw safety switches or other equipment not specifically designed for power transfer applications and listed as transfer switch equipment.
- H. Load Classification: Classified for total system load (any combination of motor, electric discharge lamp, resistive, and tungsten lamp loads with tungsten lamp loads not exceeding 30 percent of the continuous current rating) unless otherwise indicated or required.
- I. Switching Methods:

1. Open Transition:
 - a. Provide break-before-make transfer without a neutral position that is not connected to either source, and with interlocks to prevent simultaneous connection of the load to both sources.
 2. Obtain control power for transfer operation from line side of source to which the load is to be transferred.
- J. Service Conditions: Provide transfer switches suitable for continuous operation at indicated ratings under the service conditions at the installed location.
- K. Enclosures:
1. Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
 2. Finish: Manufacturer's standard unless otherwise indicated.
- L. Short Circuit Current Rating:
- M. Automatic Transfer Switches:
1. Description: Transfer switches with automatically initiated transfer between sources; electrically operated and mechanically held.
 2. Control Functions:
 - a. Automatic mode.
 - b. Test Mode: Simulates failure of primary/normal source.
 - c. Voltage and Frequency Sensing:
 - 1) Undervoltage sensing for each phase of primary/normal source; adjustable dropout/pickup settings.
 - 2) Undervoltage sensing for alternate/emergency source; adjustable dropout/pickup settings.
 - 3) Underfrequency sensing for alternate/emergency source; adjustable dropout/pickup settings.
 - d. Outputs:
 - 1) Contacts for engine start/shutdown (except where direct generator communication interface is provided).
 - 2) Auxiliary contacts; one set(s) for each switch position.
 - e. Adjustable Time Delays:
 - 1) Engine generator start time delay; delays engine start signal to override momentary primary/normal source failures.
 - 2) Transfer to alternate/emergency source time delay.
 - 3) Retransfer to primary/normal source time delay.
 - 4) Engine generator cooldown time delay; delays engine shutdown following retransfer to primary/normal source to permit generator to run unloaded for cooldown period.
 - f. In-Phase Monitor (Open Transition Transfer Switches): Monitors phase angle difference between sources for initiating in-phase transfer.
 - g. Engine Exerciser: Provides programmable scheduled exercising of engine generator selectable with or without transfer to load; provides memory retention during power outage.
 3. Status Indications:
 - a. Connected to alternate/emergency source.
 - b. Connected to primary/normal source.
 - c. Alternate/emergency source available.
 4. Automatic Sequence of Operations:
 - a. Upon failure of primary/normal source for a programmable time period (engine generator start time delay), initiate starting of engine generator where applicable.
 - b. When alternate/emergency source is available, transfer load to alternate/emergency source after programmable time delay.
 - c. When primary/normal source has been restored, retransfer to primary/normal source after a programmable time delay. Bypass time delay if alternate/emergency source

- fails and primary/normal source is available.
- d. Where applicable, initiate shutdown of engine generator after programmable engine cooldown time delay.
- N. Remote Annunciators:
 - 1. Remote Annunciator Mounting: Wall-mounted; Provide flush-mounted annunciator for finished areas and surface-mounted annunciator for non-finished areas unless otherwise indicated.
 - 2. Transfer Switch Status Indications:
 - a. Connected to alternate/emergency source.
 - b. Connected to primary/normal source.
 - c. Alternate/emergency source available.

2.03 SOURCE QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Perform production tests on transfer switches at factory to verify operation and performance characteristics prior to shipment. Include certified test report with submittals.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Perform work in accordance with NECA 1 (general workmanship).
- B. Install products in accordance with manufacturer's instructions.
- C. Arrange equipment to provide minimum clearances and required maintenance access.
- D. Provide required support and attachment in accordance with Section 26 0529.
- E. Install transfer switches plumb and level.
- F. Unless otherwise indicated, mount floor-mounted transfer switches on properly sized 3 inch high concrete pad constructed in accordance with Section 03 3000.
- G. Provide grounding and bonding in accordance with Section 26 0526.
- H. Identify transfer switches and associated system wiring in accordance with Section 26 0553.

3.02 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Prepare and start system in accordance with manufacturer's instructions.
- C. Automatic Transfer Switches:
 - 1. Inspect and test in accordance with NETA ATS, except Section 4.
 - 2. Perform inspections and tests listed in NETA ATS, Section 7.22.3. The insulation-resistance tests listed as optional are not required.
- D. Correct defective work, adjust for proper operation, and retest until entire system complies with Contract Documents.

3.03 CLEANING

- A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.04 CLOSEOUT ACTIVITIES

3.05 PROTECTION

- A. Protect installed transfer switches from subsequent construction operations.

3.06 MAINTENANCE

- A. Provide trouble call-back service upon notification by Owner:
 - 1. Provide on-site response within 4 hours of notification.
 - 2. Include allowance for call-back service during normal working hours at no extra cost to Owner.

3. Owner will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time; include hourly rate and definition of normal working hours in maintenance contract.

END OF SECTION

**SECTION 27 1000
STRUCTURED CABLING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Communications system design requirements.
- B. Communications pathways.
- C. Copper cable and terminations.
- D. Communications outlets.
- E. Communications grounding and bonding.
- F. Communications identification.

1.02 RELATED REQUIREMENTS

- A. Section 26 0526 - Grounding and Bonding for Electrical Systems.
- B. Section 26 0533.13 - Conduit for Electrical Systems.
- C. Section 26 0536 - Cable Trays for Electrical Systems.
- D. Section 26 0533.16 - Boxes for Electrical Systems.
- E. Section 26 2726 - Wiring Devices.

1.03 REFERENCE STANDARDS

- A. BICSI N1 - Installation Practices for Telecommunications and ICT Cabling and Related Cabling Infrastructure, 1st Edition; 2019.
- B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. TIA-568 (SET) - Commercial Building Telecommunications Cabling Standard Set; 2020.
- D. TIA-569 - Telecommunications Pathways and Spaces; 2019e, with Addendum (2022).
- E. TIA-606 - Administration Standard for Telecommunications Infrastructure; 2021d.
- F. TIA-607 - Generic Telecommunications Bonding and Grounding (Earthing) for Customer Premises; 2019d, with Addendum (2021).
- G. UL 514C - Nonmetallic Outlet Boxes, Flush-Device Boxes, and Covers; Current Edition, Including All Revisions.
- H. UL 1863 - Communications-Circuit Accessories; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

- A. Coordination:
 - 1. Coordinate requirements for service entrance and entrance facilities with Communications Service Provider.
 - 2. Coordinate the work with other trades to avoid placement of other utilities or obstructions within the spaces dedicated for communications equipment.
 - 3. Coordinate arrangement of communications equipment with the dimensions and clearance requirements of the actual equipment to be installed.
 - 4. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Field Test Reports.

1.06 QUALITY ASSURANCE

- A. Products: Listed, classified, and labeled as suitable for the purpose intended.
- B. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Keep stored products clean and dry.

PART 2 PRODUCTS**2.01 SYSTEM DESIGN**

- A. Provide a complete permanent system of cabling and pathways for voice and data communications, including cables, conduits and wireways, pull wires, support structures, enclosures and cabinets, and outlets.
 - 1. Comply with TIA-568 (SET) (cabling) and TIA-569 (pathways) (commercial standards).
 - 2. Provide fixed cables and pathways that comply with NFPA 70 and TIA-607 and are UL listed or third party independent testing laboratory certified.
 - 3. Provide connection devices that are rated for operation under conditions of 32 to 140 degrees F at relative humidity of 0 to 95 percent, noncondensing.
 - 4. In this project, the term plenum is defined as return air spaces above ceilings, inside ducts, under raised floors, and other air-handling spaces.
- B. Main Distribution Frame (MDF): Centrally located support structure for terminating horizontal cables that extend to telecommunications outlets, functioning as point of presence to external service provider.
 - 1. Locate main distribution frame as indicated on the drawings.
- C. Cabling to Outlets: Specified horizontal cabling, wired in star topology to distribution frame located at center hub of star; also referred to as "links".

2.02 PATHWAYS

- A. Conduit: As specified in Section 26 0533.13; provide pull cords in all conduit.
- B. Cable Trays: As specified in Section 26 0536.
- C. Overhead Service Entrance: Weatherhead or service entrance fitting located on outside of building with galvanized rigid steel or intermediate metallic conduit running to entrance facility.

2.03 COPPER CABLE AND TERMINATIONS

- A. Copper Cable Terminations: Insulation displacement connection (IDC) type using appropriate tool; use screw connections only where specifically indicated.
- B. Jacks and Connectors: Modular RJ-45, non-keyed, terminated with 110-style insulation displacement connectors (IDC); high impact thermoplastic housing; suitable for and complying with same standard as specified horizontal cable; UL 1863 listed.
 - 1. Performance: 500 mating cycles.
 - 2. Voice and Data Jacks: 8-position modular jack, color-coded for both T568A and T568B wiring configurations.

2.04 COMMUNICATIONS OUTLETS

- A. Outlet Boxes: Comply with Section 26 0533.16.
 - 1. Provide depth as required to accommodate cable manufacturer's recommended minimum conductor bend radius.
- B. Wall Plates:
 - 1. Comply with system design standards and UL 514C.
 - 2. Accepts modular jacks/inserts.
 - 3. Capacity:

4. Wall Plate Material/Finish - Flush-Mounted Outlets: Match wiring device and wall plate finishes specified in Section 26 2726.

2.05 GROUNDING AND BONDING COMPONENTS

- A. Comply with TIA-607.

2.06 IDENTIFICATION PRODUCTS

- A. Comply with TIA-606.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL

- A. Comply with latest editions and addenda of TIA-568 (SET) (cabling), TIA-569 (pathways), TIA-607 (grounding and bonding), BICSI N1, NFPA 70, and SYSTEM DESIGN as specified in PART 2.
- B. Comply with Communication Service Provider requirements.
- C. Grounding and Bonding: Perform in accordance with TIA-607 and NFPA 70.

3.02 INSTALLATION OF PATHWAYS

- A. Install pathways with the following minimum clearances:
 1. 48 inches from motors, generators, frequency converters, transformers, x-ray equipment, and uninterruptible power systems.
 2. 12 inches from power conduits and cables and panelboards.
 3. 5 inches from fluorescent and high frequency lighting fixtures.
 4. 6 inches from flues, hot water pipes, and steam pipes.
- B. Conduit, in Addition to Requirements of Section 26 0533.13:
- C. Outlet Boxes:
 1. Coordinate locations of outlet boxes provided under Section 26 0533.16 as required for installation of telecommunications outlets provided under this section.

3.03 INSTALLATION OF EQUIPMENT AND CABLING

- A. Cabling:
 1. Do not bend cable at radius less than manufacturer's recommended bend radius; for unshielded twisted pair use bend radius of not less than 4 times cable diameter.
 2. Do not over-cinch or crush cables.
 3. Do not exceed manufacturer's recommended cable pull tension.
 4. When installing in conduit, use only lubricants approved by cable manufacturer and do not chafe or damage outer jacket.
- B. Service Loops (Slack or Excess Length): Provide the following minimum extra length of cable, looped neatly:
 1. At Distribution Frames: 120 inches.
 2. At Outlets - Copper: 12 inches.
- C. Copper Cabling:
 1. For 4-pair cables in conduit, do not exceed 25 pounds pull tension.
 2. Use T568B wiring configuration.
- D. Identification:
 1. Use wire and cable markers to identify cables at each end.
 2. Use manufacturer-furnished label inserts, identification labels, or engraved wallplate to identify each jack at communications outlets with unique identifier.

3.04 FIELD QUALITY CONTROL

- A. See Section 01 4000 - Quality Requirements, for additional requirements.
- B. Comply with inspection and testing requirements of specified installation standards.
- C. Visual Inspection:
 1. Inspect cable jackets for certification markings.

2. Inspect cable terminations for color coded labels of proper type.
 3. Inspect outlet plates and patch panels for complete labels.
- D. Testing - Copper Cabling and Associated Equipment:
- E. Final Testing: After all work is complete, including installation of telecommunications outlets, and telephone dial tone service is active, test each voice jack for dial tone.

END OF SECTION

**SECTION 28 4600
FIRE DETECTION AND ALARM****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Fire alarm system design and installation, including all components, wiring, and conduit.
- B. Transmitters for communication with supervising station.

1.02 RELATED REQUIREMENTS**1.03 REFERENCE STANDARDS**

- A. 36 CFR 1191 - Americans with Disabilities Act (ADA) Accessibility Guidelines for Buildings and Facilities; Architectural Barriers Act (ABA) Accessibility Guidelines; current edition.
- B. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.
- C. IEEE C62.41.2 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits; 2002 (Corrigendum 2012).
- D. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. NFPA 72 - National Fire Alarm and Signaling Code; Most Recent Edition Cited by Referring Code or Reference Standard.

1.04 SUBMITTALS

- A. See Section 01 3000 - Administrative Requirements, for submittal procedures.
- B. Proposal Documents: Submit the following with cost/time proposal:
 - 1. NFPA 72 "Record of Completion", filled out to the extent known at the time.
 - 2. Manufacturer's detailed data sheet for each control unit, initiating device, and notification appliance.
 - 3. Certification by Contractor that the system design will comply with Contract Documents.
 - 4. Proposed maintenance contract.
- C. Drawings must be prepared using AutoCAD Release ____.
 - 1. Owner will provide floor plan drawings for Contractor's use; verify all dimensions on Owner-provided drawings.
- D. Evidence of designer qualifications.
- E. Design Documents: Submit all information required for plan review and permitting by authorities having jurisdiction, including but not limited to floor plans, riser diagrams, and description of operation:
 - 1. Copy (if any) of list of data required by authority having jurisdiction.
 - 2. NFPA 72 "Record of Completion", filled out to the extent known at the time.
 - 3. Clear and concise description of operation, with input/output matrix similar to that shown in NFPA 72 Appendix A-7-5-2.2(9), and complete listing of software required.
 - 4. System zone boundaries and interfaces to fire safety systems.
 - 5. Location of all components, circuits, and raceways; mark components with identifiers used in control unit programming.
 - 6. Circuit layouts; number, size, and type of raceways and conductors; conduit fill calculations; spare capacity calculations; notification appliance circuit voltage drop calculations.
 - 7. List of all devices on each signaling line circuit, with spare capacity indicated.
 - 8. Manufacturer's detailed data sheet for each component, including wiring diagrams, installation instructions, and circuit length limitations.

9. Description of power supplies; if secondary power is by battery include calculations demonstrating adequate battery power.
 10. Certification by either the manufacturer of the control unit or by the manufacturer of each other component that the components are compatible with the control unit.
 11. Certification by the manufacturer of the control unit that the system design complies with Contract Documents.
 12. Certification by Contractor that the system design complies with Contract Documents.
- F. Evidence of installer qualifications.
- G. Inspection and Test Reports:
1. Submit inspection and test plan prior to closeout demonstration.
 2. Submit documentation of satisfactory inspections and tests.
 3. Submit NFPA 72 "Inspection and Test Form," filled out.
- H. Operating and Maintenance Data: See Section 01 7800 for add; have one set available during closeout demonstration:
1. Complete set of specified design documents, as approved by authority having jurisdiction.
 2. Additional printed set of project record documents and closeout documents, bound or filed in same manuals.
 3. Contact information for firm that will be providing contract maintenance and trouble call-back service.
 4. List of recommended spare parts, tools, and instruments for testing.
 5. Replacement parts list with current prices, and source of supply.
 6. Detailed troubleshooting guide and large scale input/output matrix.
 7. Preventive maintenance, inspection, and testing schedule complying with NFPA 72; provide printed copy and computer format acceptable to Owner.
 8. Detailed but easy to read explanation of procedures to be taken by non-technical administrative personnel in the event of system trouble, when routine testing is being conducted, for fire drills, and when entering into contracts for remodeling.
- I. Project Record Documents: See Section 01 7800 for add:
1. Complete set of floor plans showing actual installed locations of components, conduit, and zones.
 2. "As installed" wiring and schematic diagrams, with final terminal identifications.
 3. "As programmed" operating sequences, including control events by device, updated input/output chart, and voice messages by event.
- J. Closeout Documents:
1. Certification by manufacturer that the system has been installed in compliance with manufacturer's installation requirements, is complete, and is in satisfactory operating condition.
 2. NFPA 72 "Record of Completion", filled out completely and signed by installer and authorized representative of authority having jurisdiction.

1.05 QUALITY ASSURANCE

- A. Designer Qualifications: NICET Level III or IV (3 or 4) certified fire alarm technician or registered fire protection engineer, employed by fire alarm control panel manufacturer, Contractor, or installer, with experience designing fire alarm systems in the jurisdictional area of the authorities having jurisdiction.
- B. Installer Qualifications: Firm with minimum 3 years documented experience installing fire alarm systems of the specified type and providing contract maintenance service as a regular part of their business.
1. Authorized representative of control unit manufacturer; submit manufacturer's certification that installer is authorized; include name and title of manufacturer's representative making certification.
 2. Installer Personnel: At least 2 years of experience installing fire alarm systems.
 3. Supervisor: NICET level III or IV (3 or 4) certified fire alarm technician; furnish name and address.

1.06 WARRANTY

- A. Provide control panel manufacturer's warranty that system components other than wire and conduit are free from defects and will remain so for 1 year after date of Substantial Completion.
- B. Provide installer's warranty that the installation is free from defects and will remain so for 1 year after date of Substantial Completion.

PART 2 PRODUCTS**2.01 FIRE ALARM SYSTEM**

- A. Fire Alarm System: Provide a new automatic fire detection and alarm system:
 - 1. Provide all components necessary, regardless of whether shown in Contract Documents or not.
 - 2. Protected Premises: Entire building shown on drawings.
 - 3. Comply with the following; where requirements conflict, order of precedence of requirements is as listed:
 - a. ADA Standards.
 - b. The requirements of the local authority having jurisdiction , which is _____.
 - c. Applicable local codes.
 - d. Contract Documents (drawings and specifications).
 - e. NFPA 72; where the word "should" is used consider that provision mandatory; where conflicts between requirements require deviation from NFPA 72, identify deviations clearly on design documents.
 - 4. Evacuation Alarm: Multiple smoke zones; allow for evacuation notification of any individual zone or combination of zones, in addition to general evacuation of entire premises.
 - 5. Voice Notification: Provide emergency voice/alarm communications with multichannel capability; digital.
 - 6. General Evacuation Zones: Each smoke zone is considered a general evacuation zone unless otherwise indicated, with alarm notification in all zones on the same floor, on the floor above, and the floor below.
 - 7. Program notification zones and voice messages as directed by Owner.
 - 8. Fire Command Center: Location indicated on drawings.
 - 9. Fire Alarm Control Unit: New, located at fire command center.
- B. Supervising Stations and Fire Department Connections:
 - 1. Public Fire Department Notification: By on-premises supervising station.
 - 2. On-Premises Supervising Station: Existing proprietary station operated by Owner, located at _____.
 - 3. Means of Transmission to On-Premises Supervising Station: Directly connected noncoded system.
- C. Circuits:
 - 1. Initiating Device Circuits (IDC): Class B, Style A.
 - 2. Signaling Line Circuits (SLC) Within Single Building: Class B, Style 0.5.
 - 3. Notification Appliance Circuits (NAC): Class B, Style W.
- D. Power Sources:
 - 1. Primary: Dedicated branch circuits of the facility power distribution system.
 - 2. Secondary: Storage batteries.
 - 3. Capacity: Sufficient to operate entire system for period specified by NFPA 72.
 - 4. Each Computer System: Provide uninterruptible power supply (UPS).

2.02 FIRE SAFETY SYSTEMS INTERFACES

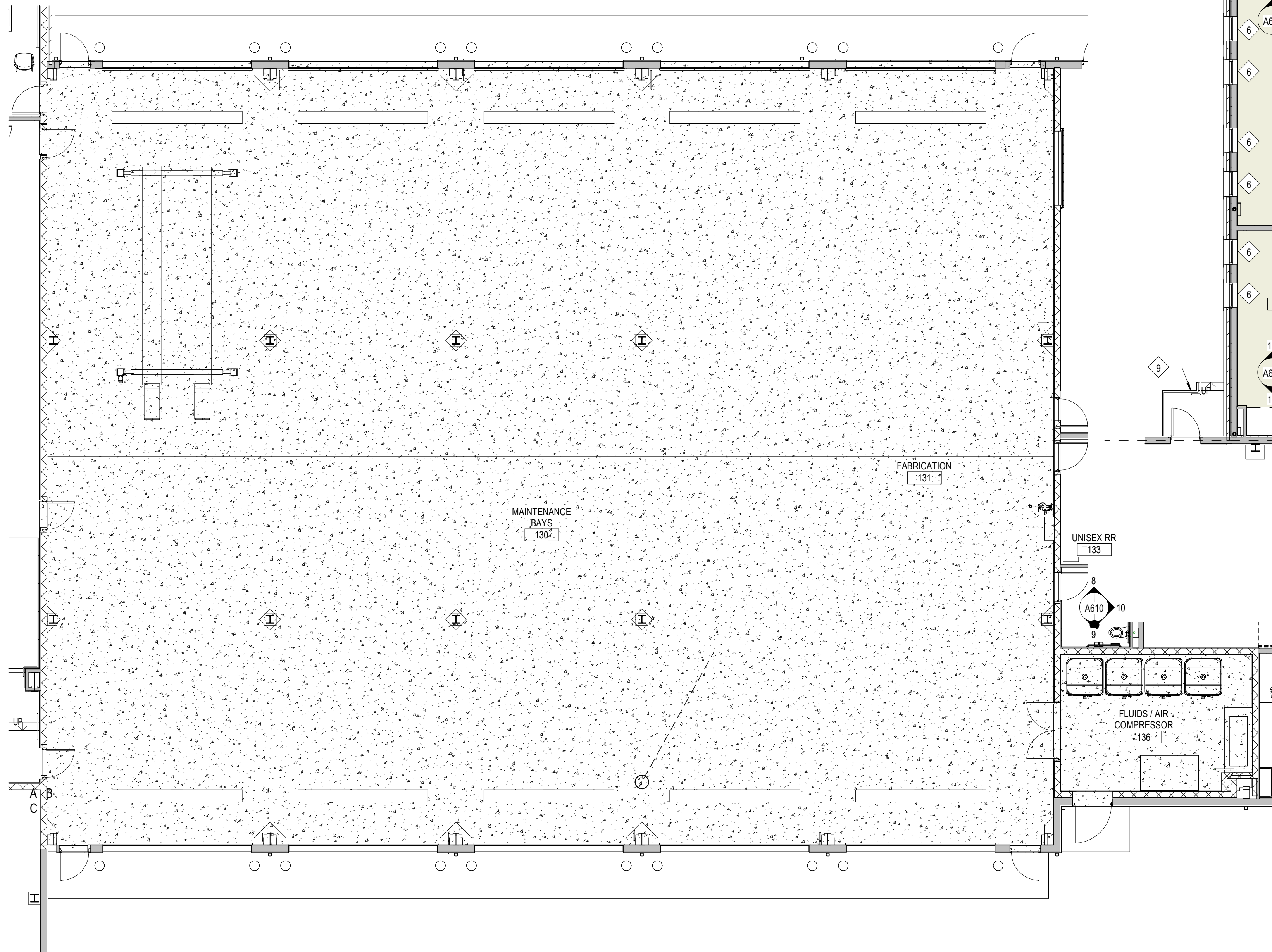
- A. Supervision: Provide supervisory signals in accordance with NFPA 72 for the following:
- B. Alarm: Provide alarm initiation in accordance with NFPA 72 for the following:

2.03 COMPONENTS

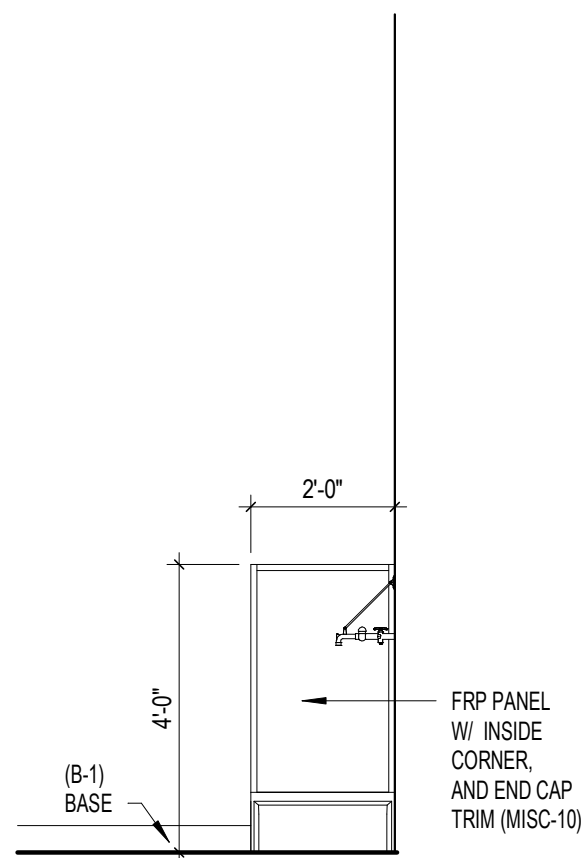
- A. General:
 - 1. Provide flush mounted units where installed in finish areas; in unfinished areas, surface mounted unit are acceptable.
 - 2. Provide legible, permanent labels for each control device, using identification used in operation and maintenance data.
- B. Fire Alarm Control Units: Analog, addressable type; listed, classified, and labeled as suitable for the purpose intended.
- C. Initiating Devices:
 - 1. Addressable Systems:
 - a. Addressable Devices: Individually identifiable by addressable fire alarm control unit.
 - b. Provide suitable addressable interface modules as indicated or as required for connection to conventional (non-addressable) devices and other components that provide a dry closure output.
- D. Notification Appliances:
- E. Circuit Conductors: Copper or optical fiber; provide 200 feet extra; color code and label.
- F. Surge Protection: In accordance with IEEE C62.41.2 category B combination waveform and NFPA 70; except for optical fiber conductors.
- G. Locks and Keys: Deliver keys to Owner.
- H. Instruction Charts: Printed instruction chart for operators, showing steps to be taken when a signal is received (normal, alarm, supervisory, and trouble); easily readable from normal operator's station.
 - 1. Frame: Stainless steel or aluminum with polycarbonate or glass cover.
 - 2. Provide one for each control unit where operations are to be performed.
 - 3. Obtain approval of Owner prior to mounting; mount in location acceptable to Owner.
 - 4. Provide extra copy with operation and maintenance data submittal.

END OF SECTION

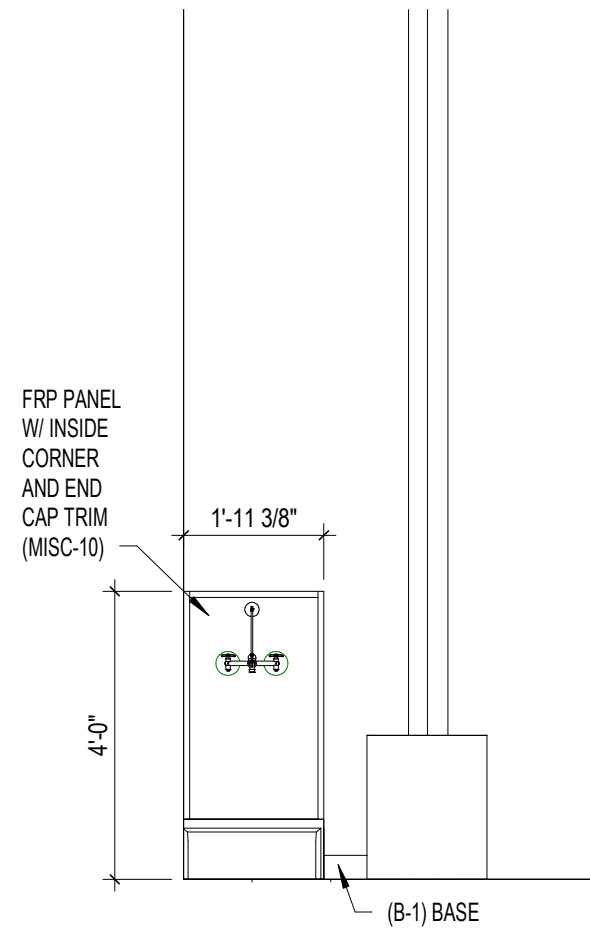
F22146 - Porter County Highway
Central Facility
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2 Maintenance Facility Floor Plan
1/8" = 1'-0"



4 Mech 115 Mop Sink -East
3/8" = 1'-0"



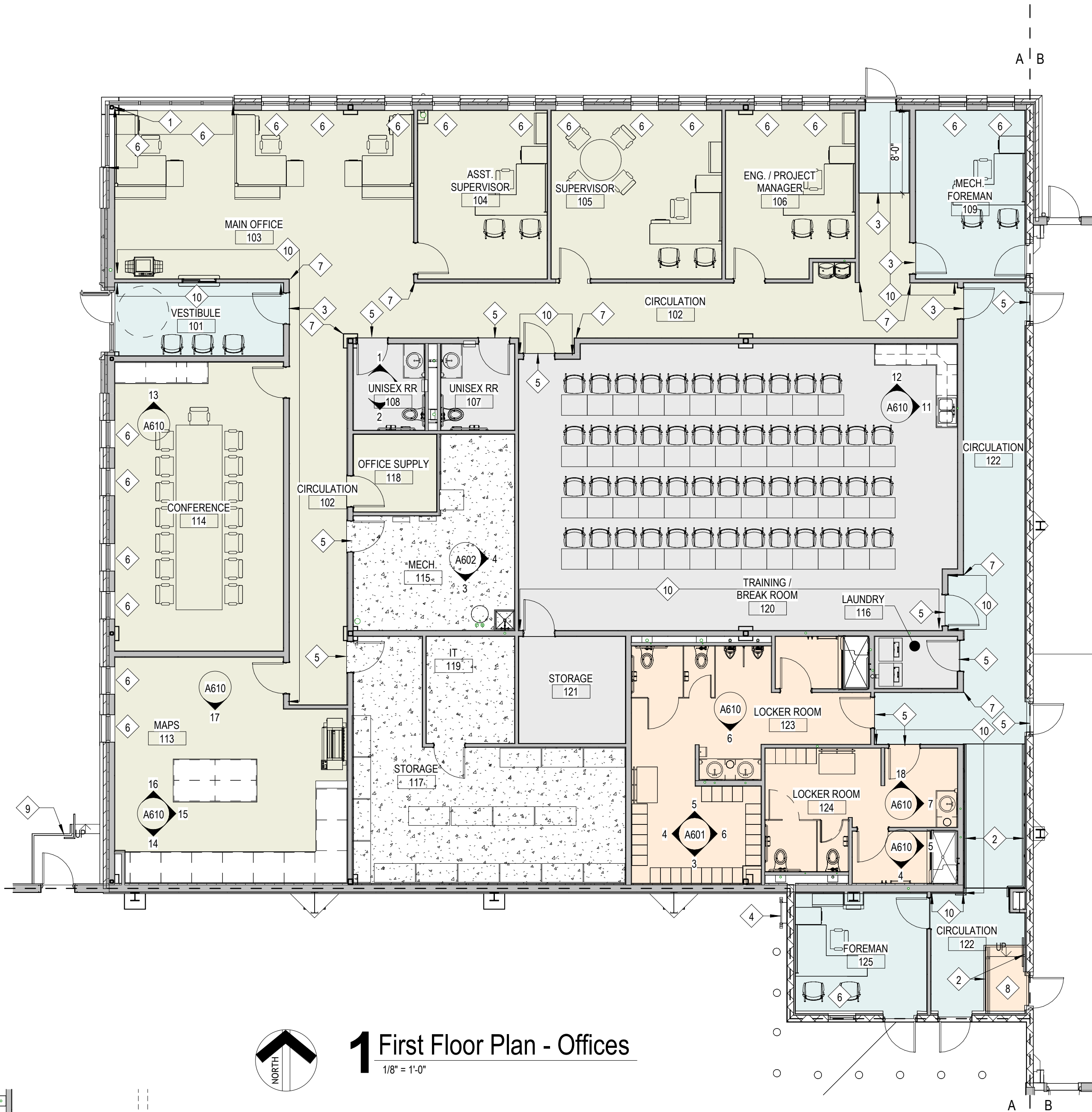
3 Mech 115 Mop Sink-South
3/8" = 1'-0"

Work Description Notes

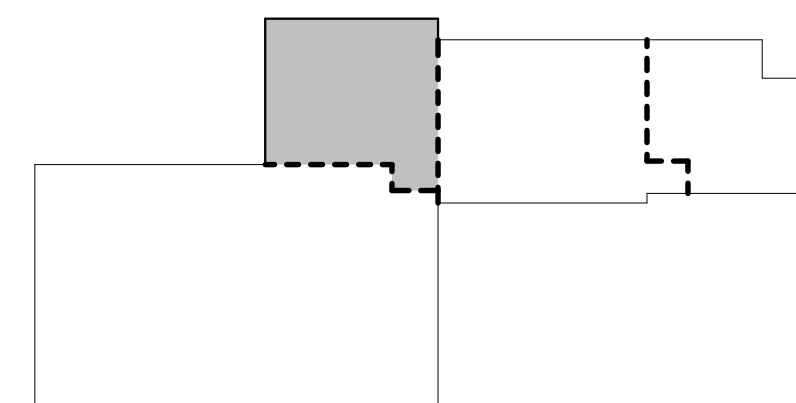
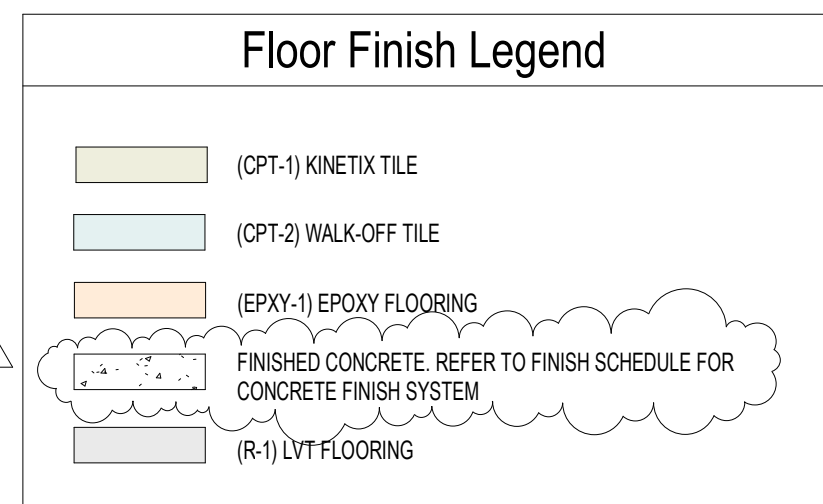
- 1 PAINT COLUMN (PNT-7)
- 2 PAINT RAILING (PNT-7)
- 3 PROVIDE SHEETROCK FIBERGLASS SCRM OR DUCT TAPE TO BUILD UP LOWER IN HEIGHT FLOOR FINISH SO THAT THE 2 FORMATS ARE FLUSH
- 4 PAINT MOST OF LADDER (PNT-7), PAINT TOP 3'-0" SECTION OF LADDER SAFETY YELLOW (PNT-8)
- 5 PROVIDE FLOORING TRANSITION/REDUCER BETWEEN TWO DIFFERENT FLOORING MATERIALS/HEIGHT (MISC-6)
- 6 PROVIDE WINDOW BLINDS (MISC-3)
- 7 PROVIDE CORNER GUARD (MISC-9)
- 8 PREP CONCRETE TO RECEIVE EPOXY FINISH (EPX7-1) ON ENTIRE CONCRETE LANDING AND STEPS
- 9 PAINT GUARD RAIL. SEE EXTERIOR PAINT SCHEDULE
- 10 ACCENT WALL (PNT-3)

General Finish Notes

1. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL OR OTHER GOVERNING BODIES' CODES. ADDITIONALLY, WORK SHALL BE COMPLETED IN ACCORDANCE WITH APPLICABLE INDUSTRY STANDARDS OR GUIDELINES.
2. ALL DIMENSIONS ARE TO THE FACE OF MASONRY, FACE OF EXISTING WALL AND/OR FACE OF NEW FRAMING UNLESS NOTED OTHERWISE.
3. FURNITURE AND OFFICE EQUIPMENT BY OWNER.
4. ALL DRYWALLED WALL SURFACES SHALL BE MADE SMOOTH PRIOR TO RECEIVING PAINTED FINISH.
5. PRIME AND PAINT HOLLOW METAL DOOR FRAMES (PNT-7).
6. FLOOR COVERING TRANSITIONS (MISC-6) SHALL BE CENTERED BELOW DOORS IN THE CLOSED POSITION UNLESS NOTED OTHERWISE.



1 First Floor Plan - Offices
1/8" = 1'-0"



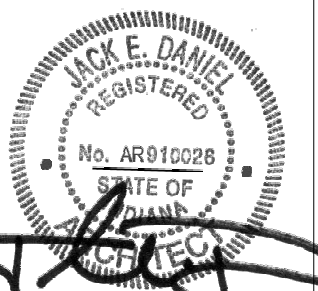
KEY PLAN

New Construction Work for :
**Porter County Highway Department -
Central Facility**

1955 IN-2
Valparaiso, IN 46385



221 West Baker Street
Fort Wayne, Indiana 46802
pho 260.422.7994
fax 260.426.2067



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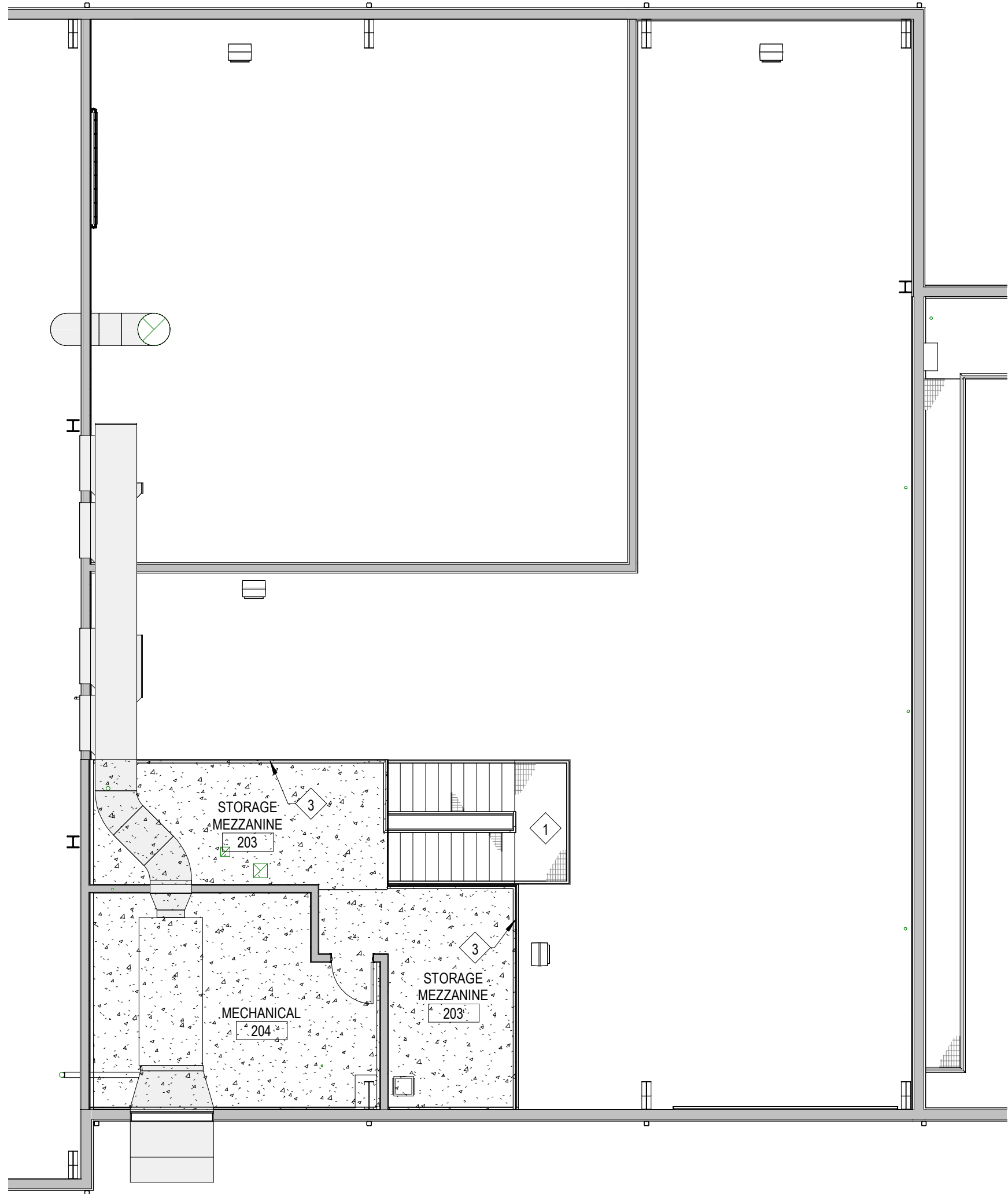
REVISION	DATE
1 ADDENDUM 1	2024-06-12
2 ADDENDUM 2	2024-06-17

DRAWN BY: SAG
COMMISSION NUMBER: F22146
REVIEWED BY: MEK
DATE: 2024-05-24

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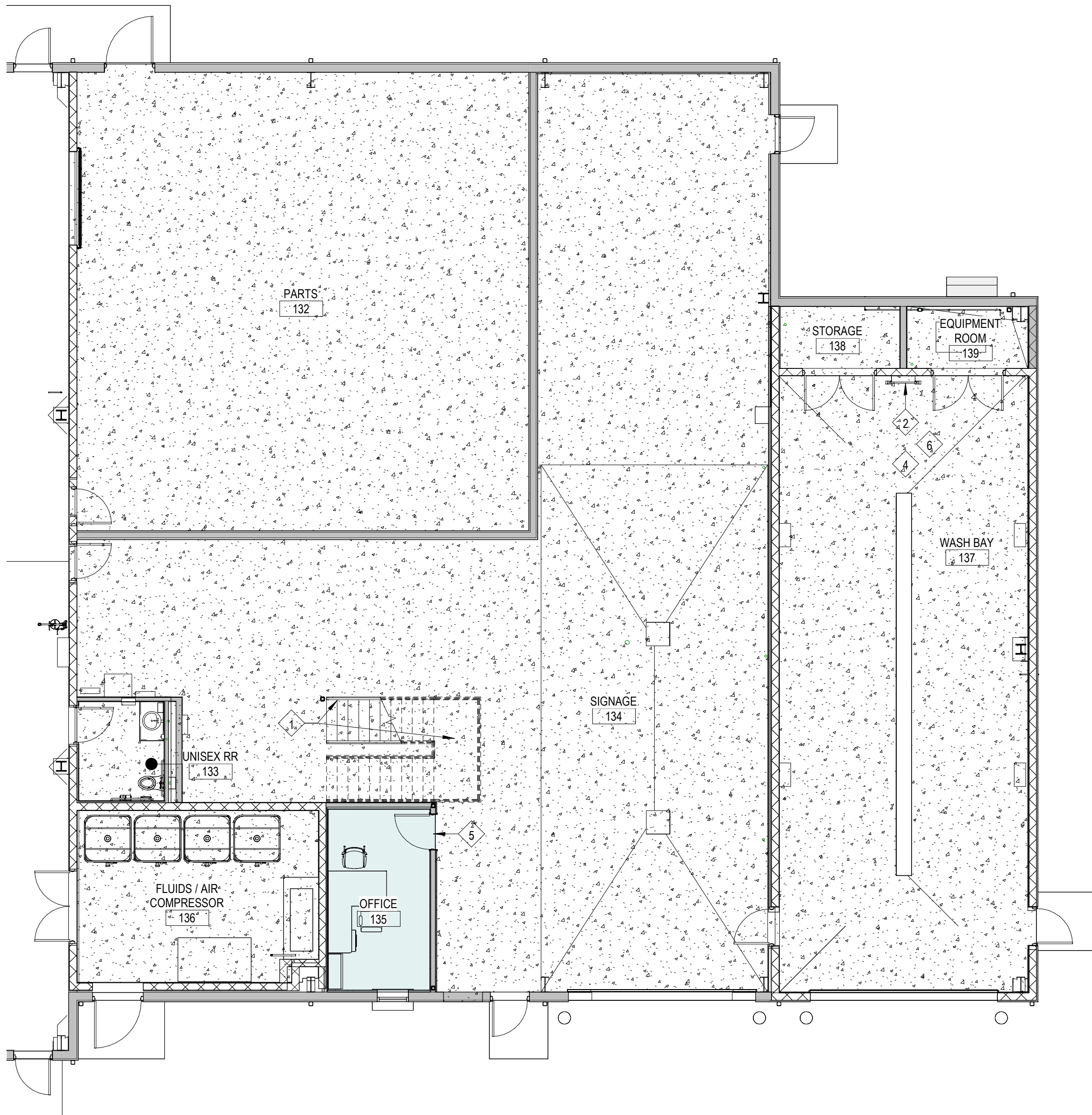
FINISH PLANS

F22146 - Porter County Highway Department -
Central Facility
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3 Mezzanine Floor Plan

1/8" = 1'-0"



2 Parts & Signage Floor Plan

1/8" = 1'-0"

General Finish Notes

1. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL OR OTHER GOVERNING BODIES' CODES. ADDITIONALLY, WORK SHALL BE COMPLETED IN ACCORDANCE WITH APPLICABLE INDUSTRY STANDARDS OR GUIDELINES.
2. ALL DIMENSIONS ARE TO THE FACE OF MASONRY, FACE OF EXISTING WALL AND/OR FACE OF NEW FRAMING UNLESS NOTED OTHERWISE.
3. FURNITURE AND OFFICE EQUIPMENT BY OWNER.
4. ALL DRYWALLED WALL SURFACES SHALL BE MADE SMOOTH PRIOR TO RECEIVING PAINTED FINISH.
5. PRIME AND PAINT HOLLOW METAL DOOR FRAMES (PNT-7).
6. FLOOR COVERING TRANSITIONS (MISC-6) SHALL BE CENTERED BELOW DOORS IN THE CLOSED POSITION UNLESS NOTED OTHERWISE.

Work Description Notes

1. COMPLETELY PAINT METAL STAIRS AND RAILINGS (PNT-7)
2. PAINT MOST OF LADDER (PNT-9). PAINT TOP 3'-0" SECTION OF LADDER SAFETY YELLOW
3. PAINT RAILING (PNT-7)
4. PAINT RAILING ON MEZZANINE (PNT-9)
5. PROVIDE FLOORING TRANSITION/REDUCER BETWEEN TWO DIFFERENT FLOORING MATERIALS/HEIGHT (MISC-6)
6. PAINT METAL DOORS AND FRAME (PNT-9)

Floor Finish Legend

- (CPT-1) KINETIX TILE
- (CPT-2) WALK-OFF TILE
- EPXY-1) EPOXY FLOORING
- FINISHED CONCRETE. REFER TO FINISH SCHEDULE FOR CONCRETE FINISH SYSTEM
- (R-1) LVT FLOORING

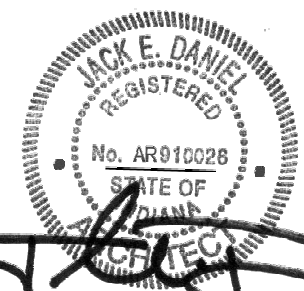
KEY PLAN



MARTIN RILEY
architects+engineers

221 West Baker Street
Fort Wayne, Indiana 46802

pho 260.422.7994
fax 260.426.2067



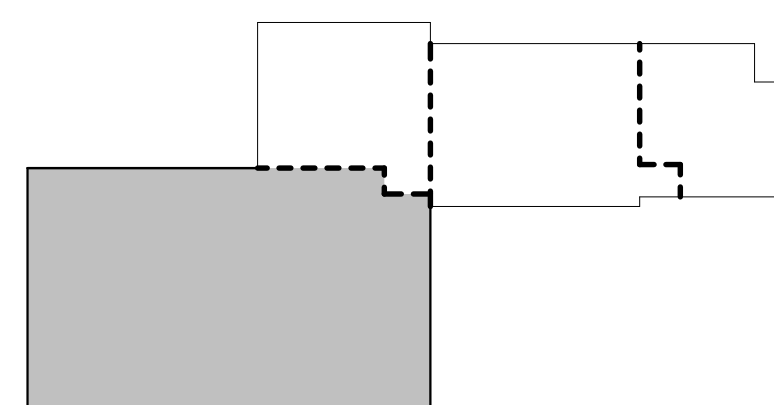
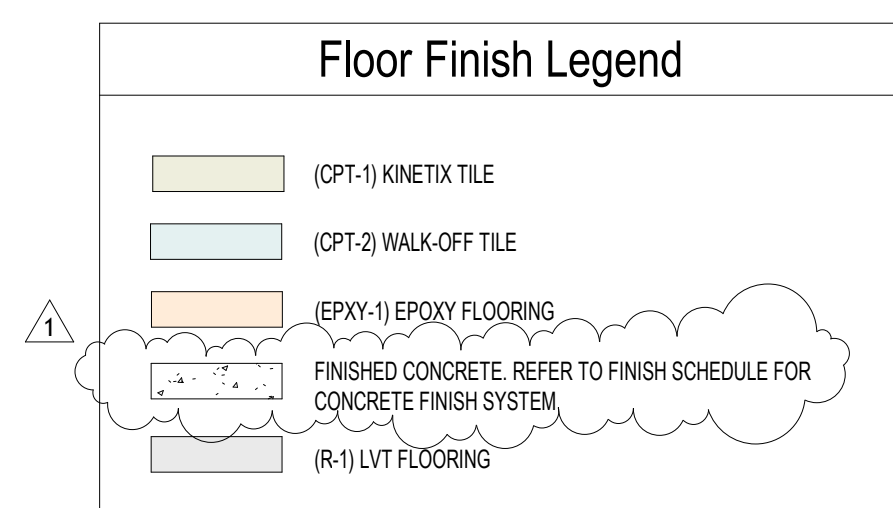
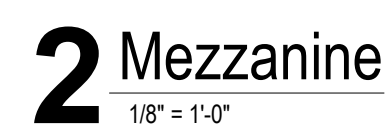
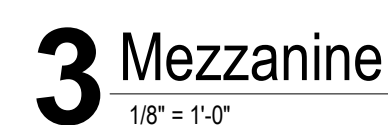
ALL IDEAS, DESIGNS, ARRANGEMENTS, NOTATIONS AND NOTATIONS OR NOTATIONS BY THE DRAWING ARE OWNED BY AND THE PROPERTY OF MARTIN RILEY, INC. AND SHALL REMAIN THE PROPERTY OF MARTIN RILEY, INC. AND SHALL NOT BE REPRODUCED OR TRANSMITTED IN ANY FORM OR BY ANY MEANS, ELECTRONIC OR MECHANICAL, INCLUDING PHOTOCOPYING, RECORDING, OR BY ANY INFORMATION STORAGE AND RETRIEVAL SYSTEM, WITHOUT THE WRITTEN PERMISSION OF MARTIN RILEY, INC. MARTIN RILEY, INC. SHALL BE RESPONSIBLE FOR ALL DESIGN AND CONSTRUCTION OF THE PROJECT AND THIS OFFICE SHALL BE NOTIFIED OF ANY VIOLATION FROM THE CONTRACT DOCUMENTS OF THE PROJECT. ANY VIOLATION SHALL BE REPORTED TO THE APPROPRIATE AUTHORITIES FOR THE PROJECT. ANY VIOLATION SHALL BE REPORTED TO THE APPROPRIATE AUTHORITIES FOR THE PROJECT. ANY VIOLATION SHALL BE REPORTED TO THE APPROPRIATE AUTHORITIES FOR THE PROJECT.

REVISION	DATE
1	ADDENDUM 2
	2024-06-17

DRAWN BY:	SAG	REVIEWED BY:	MEK
COMMISSION NUMBER:	F22146	DATE:	2024-05-24

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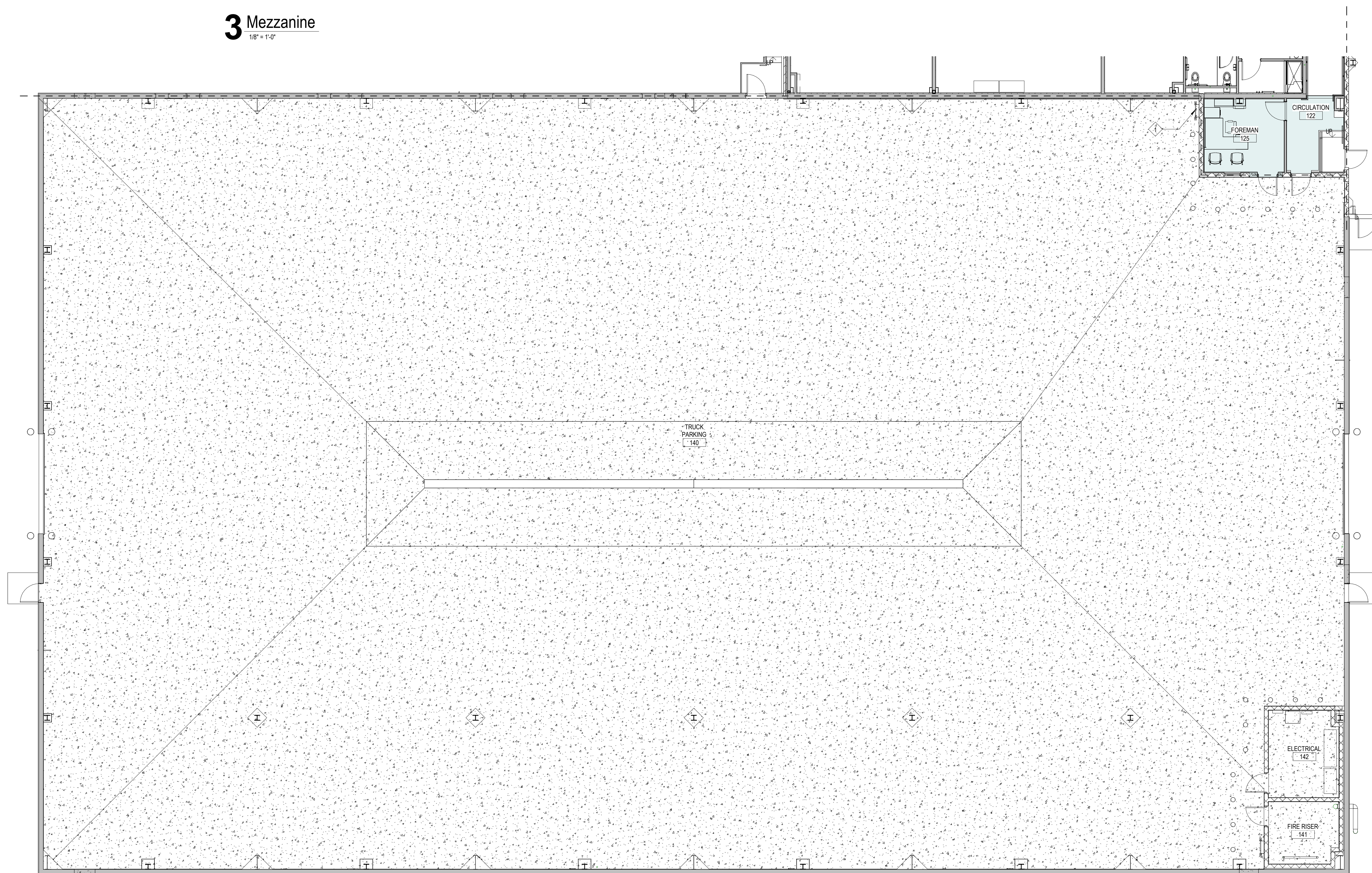
FINISH PLANS



KEY PLAN

- 1 PAINT MOST OF LADDER (PNT-7). PAINT TOP 3'-0" SECTION OF LADDER SAFETY YELLOW (PNT-8)
- 2 PAINT RAILING (PNT-7)
- 3 COMPLETELY PAINT METAL STAIRS AND RAILINGS (PNT-7)

1. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH FEDERAL, STATE AND LOCAL OR OTHER GOVERNING BODIES' CODES. ADDITIONALLY, WORK SHALL BE COMPLETED IN ACCORDANCE WITH APPLICABLE INDUSTRY STANDARDS OR GUIDELINES.
2. ALL DIMENSIONS ARE TO THE FACE OF MASONRY, FACE OF EXISTING WALL AND/OR FACE OF NEW FRAMING UNLESS NOTED OTHERWISE.
3. FURNITURE AND OFFICE EQUIPMENT BY OWNER.
4. ALL DRYWALLED WALL SURFACES SHALL BE MADE SMOOTH PRIOR TO RECEIVING PAINTED FINISH.
5. PRIME AND PAINT HOLLOW METAL DOOR FRAMES (PN7-7).
6. FLOOR COVERING TRANSITIONS (MISC-6) SHALL BE CENTERED BELOW DOORS IN THE CLOSED POSITION UNLESS NOTED OTHERWISE.



1 Truck Parking Floor Plan

New Construction Work for :

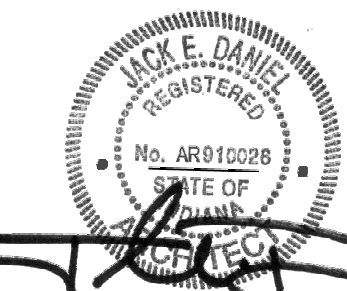
Porter County Highway Department - Central Facility

1955 IN-2
Valparaiso, IN 46385

MARTIN RILEY
architects-engineers

221 West Baker Street
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REVISION:	DATE:
1 ADDENDUM 2	2024-06-17

DRAWN BY: SAG
COMMISSION NUMBER: F22146

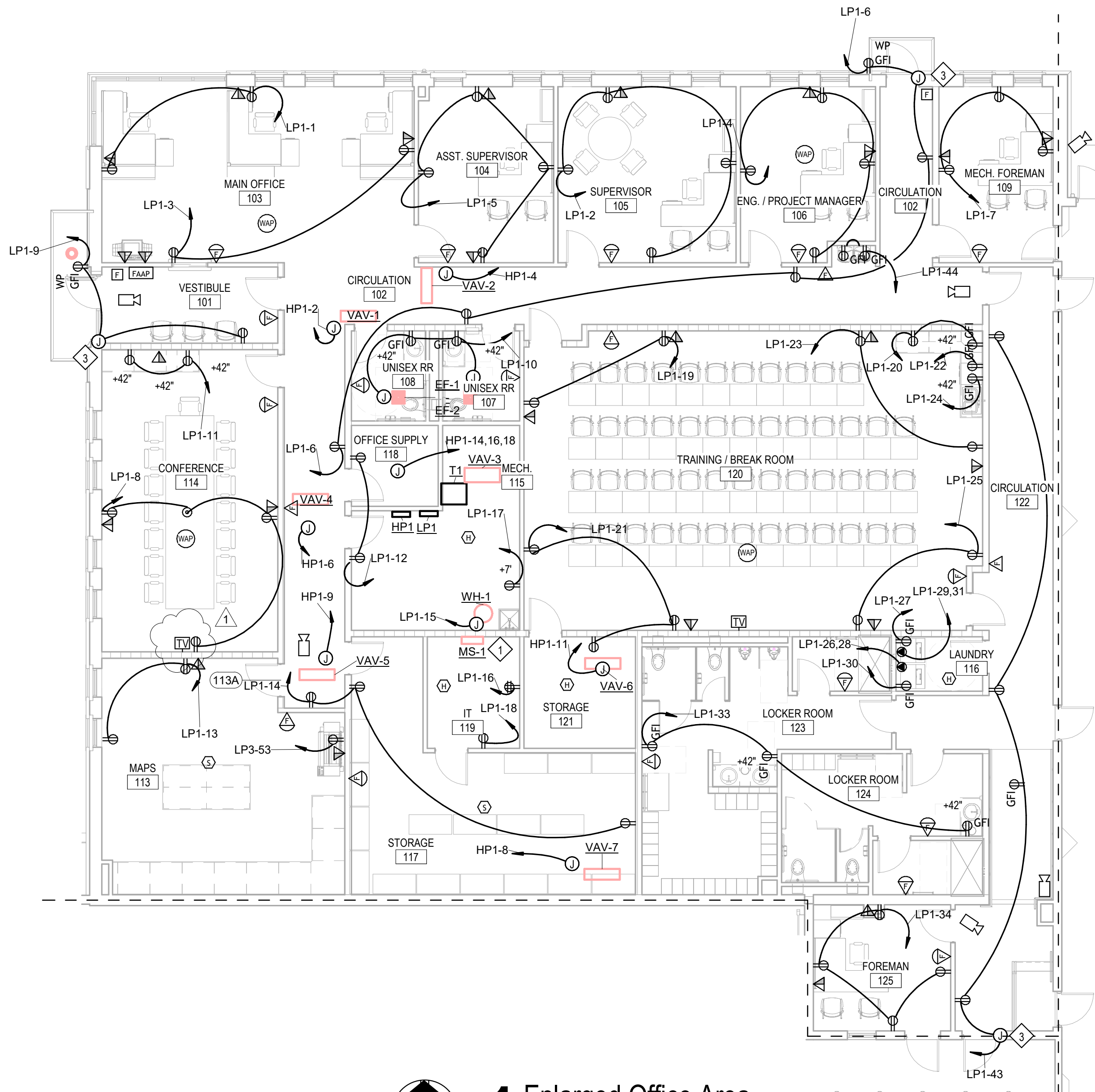
REVIEWED BY: MEK
DATE: 2024-05-24

A604

FINISH PLAN

22146 - Porter County Highway
Department - Central Facility
01/17/2024 1:38:36 PM
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F22146 - Porter County Highway Department - Central Facility
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Project Status



1 Enlarged Office Area
1/8" = 1'-0"

Work Description Notes

- 1 WIRE INDOOR UNIT TO OUTDOOR UNIT WITH 2-#12, 1-#12G IN 3/4" C.
- 2 CAMERA TO BE LOCATED HERE IF COLD STORAGE BLDG ALTERNATE IS NOT TAKEN
- 3 POWER FOR DOOR ACCESS; SEE 7/E501 FOR DETAIL
- 4 RUN 4-#14, 1-#14G IN 3/4" C FORM LOUVER TO STARTER

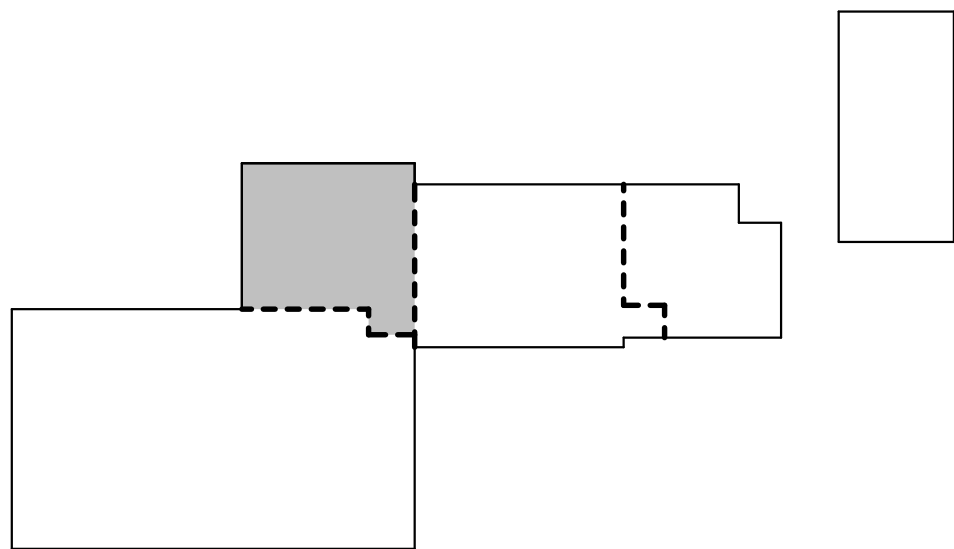
General Electrical Notes

1. ALL WORK TO BE PERFORMED IN ACCORDANCE WITH STATE AND LOCAL CODES & AMENDMENTS.
2. SEE SPECIFICATION BOOK FOR ADDITIONAL REQUIREMENTS.
3. PROVIDE EVERYTHING NECESSARY TO MAKE REQUIRED SYSTEMS AND FEATURES COMPLETE AND FUNCTIONAL; INCLUDING BUT NOT LIMITED TO: FITTINGS, ADAPTERS, WIRE, BOXES, RACEWAY, HARDWARE, TEMPORARY CONNECTIONS AND SUPPORTS.
4. DRAWING ORGANIZATION IS NOT TRADE SPECIFIC AND IS NOT INTENDED FOR DIVISION OF WORK AMONG SUBCONTRACTORS. THE GENERAL CONTRACTOR IS RESPONSIBLE TO PROPERLY DISSEMINATE WORK ON ALL SHEETS AND COORDINATE WITH EVERY SUBCONTRACTOR IN ORDER TO PROVIDE A COMPLETE PROJECT.
5. ELECTRICAL DRAWINGS ARE SCHEMATIC IN NATURE. ALL DEVICES AND EQUIPMENT ARE SHOWN IN APPROXIMATE LOCATIONS. CONTRACTORS TO COORDINATE THEIR WORK WITH ALL OTHER TRADES ON SITE. EXTRAS WILL NOT BE GIVEN FOR FORESEEABLE WORK COORDINATION.
6. PROTECT ALL EQUIPMENT AND FINISHES. NEW AND EXISTING, FROM DUST DEBRIS AND DAMAGE. FINAL CLEAN-UP SHALL BE PERFORMED TO PROVIDE A CLEAN, DUST FREE ENVIRONMENT TO THE OWNER.
7. EXCEPT WHERE NOTED OTHERWISE, SIZE BRANCH CIRCUIT CONDUCTORS WITHIN THE FOLLOWING MAXIMUM LENGTH LIMITS: (MEASURE TO THE CENTER OF THE LOAD FOR LIGHTING AND MOST REMOTE OUTLET FOR RECEPTACLE CIRCUITS). MINIMUM CONDUCTOR SIZE FOR 120V 20A CIRCUIT: 65 FEET - #12, 110 FEET - #10, 165 FEET - #8, 270 FEET - #6
8. PROVIDE ADDITIONAL DERATING PER NEC SECTION 310 FOR ALL HOME RUNS WITH MORE THAN THREE CURRENT CARRYING CONDUCTORS IN A SINGLE RACEWAY.
9. SHARING OF NEUTRALS SHALL NOT BE PERMITTED.
10. PROVIDE BACKBOX AND 3/4" CONDUIT TO ATTIC WITH PULL WIRE FOR ALL TELEPHONE/DATA/AUDIO OUTLETS.

Electrical Legend

SEE TITLE SHEET FOR ADDITIONAL SYMBOLS AND ABBREVIATIONS. SYMBOLS IN THIS LIST ARE NOT DRAWN TO SCALE. SYMBOLS IN THIS LIST, MAY NOT APPLY TO THIS PROJECT. HEIGHTS LISTED HERE APPLY UNLESS NOTED OTHERWISE. HEIGHTS ARE TO THE BOTTOM OF THE DEVICE. COMPONENTS SHOWN IN GRAY ARE EXISTING OR SPECIFIED IN OTHER VIEWS.

- HOME RUN TO PANEL & CIRCUIT NO.
- XX MARK FOR SCHEDULED ITEM
- LIGHT FIXTURE; CEILING MOUNTED
- LIGHT FIXTURE; EMERGENCY/NIGHT
- DOWNLIGHT FIXTURE; CEILING MTD./EXTERIOR
- LIGHT FIXTURE; WALL MOUNTED.
- EMERGENCY LIGHT WALL PACK.
- SINGLE POLE SWITCH; +44" AFF
- THREE-WAY SWITCH; +44" AFF
- MOTION DETECTOR SWITCH; +44" AFF
- OCCUPANCY SENSOR - CEILING MOUNTED
- EXIT LIGHT; CEILING MOUNTED; NO DIRECTION
- EXIT LIGHT; CEILING MOUNTED; DIRECTIONAL
- PANEL BOARD (SURFACE MOUNT); +72" AFF
- SAFETY DISCONNECT SWITCH; NON FUSED; +66" AFF TO TOP XX DENOTES AMPERE RATING
- SAFETY DISCONNECT SWITCH; CIRCUIT BREAKER; +66" AFF TO TOP XX DENOTES AMPERE RATING
- SAFETY DISCONNECT SWITCH; FUSED; +66" AFF TO TOP XX DENOTES AMPERE RATING
- TRANSFORMER
- XX DENOTES KVA RATING
- DUPLEX RECEPTACLE; +16" AFF
- DOUBLE DUPLEX RECEPTACLE; +16"
- DEDICATED RECEPTACLE; +16" AFF
- SPECIAL RECEPTACLE; TYPE INDICATED ON PLAN.
- FLOOR OUTLET; XX DENOTES TYPE
- MOTOR
- JUNCTION BOX
- TELEPHONE/DATA OUTLET +16"
- SECURITY CAMERA +84" AFF
- PHOTOCELL
- PUSHBUTTON
- KEY PAD
- FIRE ALARM HORN/STROBE +80" AFF
- FIRE ALARM STROBE +80" AFF
- MANUAL PULL STATION
- MANUAL PULL STATION WITH HORN/LIGHT
- HEAT DETECTOR
- SMOKE DETECTOR
- SMOKE & CARBON MONOXIDE DETECTOR
- DUCT SMOKE DETECTOR
- MAGNETIC DOOR HOLDER
- MAGNETIC LOCK
- TAMPER SWITCH
- FLOW SWITCH
- FIRE ALARM ANNUNCIATION PANEL
- FIRE ALARM CONTROL PANEL
- SPEAKER
- TELEVISION WALL BOX; SEE DETAIL XXX
- WIRELESS ACCESS POINT; SEE DETAIL 6/E501



KEY PLAN

New Construction Work for :

Porter County Highway Department - Central Facility

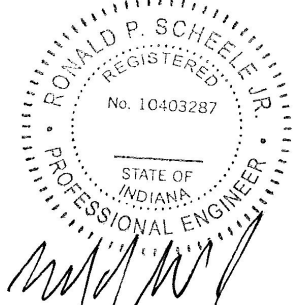
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REVISION	DATE
1	ADDENDUM 2
	2024-6-17

DRAWN BY:	VRK	REVIEWED BY:	RPS
COMMISSION NUMBER:	F22146	DATE:	2024-05-24

E101

ELECTRICAL POWER PLAN