SECTION 009113
ADDENDUM NUMBER 3

PARTICULARS

1.01 DATE: JUNE 25, 2025

1.02 PROJECT: PHA SMOKE & CARBON MONOXIDE DETECTORS

1.03 OWNER: PAWTUCKET HOUSING AUTHORITY

1.04 ARCHITECT: ED WOJCIK ARCHITECT, LTD.

TO: PROSPECTIVE BIDDERS:

2.01 THIS ADDENDUM FORMS A PART OF THE CONTRACT DOCUMENTS AND MODIFIES THE ORIGINALPROCUREMENT DOCUMENTS DATED MAY 7, 2025, AND ADDENDUM NUMBERS 1 AND 2 ISSUED MAY 19, 2025 AND JUNE 6, 2025 RESPECITVELY, WITH AMENDMENTS AND ADDITIONS NOTED BELOW.

2.02 ACKNOWLEDGE RECEIPT OF THIS ADDENDUM IN THE SPACE PROVIDED IN THE BID FORM. FAILURE TO DO SO MAY DISQUALIFY THE BIDDER.

2.03 THIS ADDENDUM CONSISTS OF 1 PAGE AND THE FOLLOWING ATTACHMENTS::

A. Fire Alarm Drawings: FA-00, FA-20, FA-21, FA-B10, FA-F10, FA-G10, FA-K10

CHANGES TO THE PROJECT MANUAL - INTRODUCTORY REQUIREMENTS, PROCUREMENT REQUIREMENTS AND CONTRACTING REQUIREMENTS:

3.01 SECTION 002113 - INSTRUCTIONS TO BIDDERS

A. Replace 1.01.A. Bids signed and under seal, executed, and dated will be received at the office of the Owner at 214 Roosevelt Avenue, Pawtucket, RI before 10:00 am local standard time on the **10th day of July 2025**.

CHANGES TO DRAWINGS:

4.01 DRAWING FA-00, FA-20, FA-21, FA-B10, FA-F10, FA-G10, FA-K10

A. Replace existing drawings with attached.

END OF SECTION

FIRE ALARM SHEET NOTES

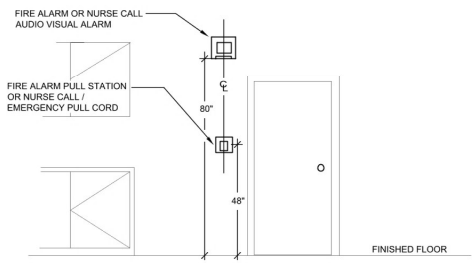
1. PROVIDE & INSTALL NEW LOCAL, 120 VOLT COMBINATION SMOKE / CARBON MONOXIDE DETECTORS AS SHOWN. NEW DEVICES SHALL BE WIRED AS INDICATED ON THIS PLAN IN "TYPICAL DWELLING UNIT (F.A.) NOTES".
2. EXISTING SYSTEM COMBINATION SMOKE DETECTORS WITH SOUNDER BASES TO REMAIN AS IS. NO WORK REQUIRED.
3. EXISTING LOCAL, 120 VOLT COMBINATION SMOKE / CARBON MONOXIDE DETECTOR TO BE REMOVED AND REPLACED WITH NEW LOCAL, 120 VOLT COMBINATION SMOKE / CARBON MONOXIDE DETECTOR AS SHOWN. NEW DEVICES SHALL BE WIRED AS INDICATED ON THIS PLAN IN "TYPICAL DWELLING UNIT (F.A.) NOTES".
4. ALL NEW WIRING AS REQUIRED SHALL BE MOUNTED ON SURFACE OF CEILING USING METALLIC WIREMOLD AND ALL REQUIRED ACCESSORIES. NEW WIREMOLD SHALL BE PAINTED TO MATCH CEILING.
5. PROVIDE 20 AMP BRANCH CIRCUIT WIRING CONSISTING OF: (2#12 + 1#12 GND.) FOR NEW LOCAL, 120 VOLT DEVICES.
6. EXISTING SYSTEM WALL MOUNTED "LOW FREQUENCY" HORNS TO REMAIN AS IS. NO WORK REQUIRED.

FIRE ALARM LEGEND

TYPICAL INDUSTRY SYMBOL	DESCRIPTION / REMARKS
(S) CO	(NEW), FIRE ALARM SYSTEM LOCAL, 120 VOLT, COMBINATION SMOKE / CARBON MONOXIDE DETECTOR.
(S) CO	(EXISTING), FIRE ALARM LOCAL, 120 VOLT COMBINATION SMOKE / CARBON MONOXIDE DETECTOR. TO BE REMOVED AND REPLACED IN SAME LOCATION.
LF F	(EXISTING), FIRE ALARM SYSTEM, LOW FREQUENCY HORN.
FACP	(EXISTING), FIRE ALARM SYSTEM CONTROL PANEL.
(S) SB CO	(EXISTING), FIRE ALARM SYSTEM, COMBINATION SMOKE / CARBON MONOXIDE DETECTOR WITH SOUNDER BASE.
ERN	SUB-SCRIPT INDICATES "EXISTING DEVICE TO REMAIN", NO WORK REQUIRED.
ER	SUB-SCRIPT INDICATES "EXISTING DEVICE TO BE REMOVED AND REPLACED".
NEW	SUB-SCRIPT INDICATES "NEW", DEVICE TO BE PROVIDED & INSTALLED.

TYPICAL DWELLING UNIT (F.A.) NOTES

1. WHERE THERE ARE TWO (2) OR MORE SMOKE DETECTORS INSTALLED IN ONE (1) LIVING UNIT, THEY SHALL BE WIRED SO THAT THE ACTIVATION OF ANY DETECTOR SHALL CAUSE THE AUDIBLE ALARM IN ALL OF THE DETECTORS WITHIN THE LIVING UNIT TO BE ACTIVATED WITH A MINIMUM RATING OF EIGHTY-FIVE (85) dBA AT TEN FEET (10'). (TYPICAL)
2. ALL COMBINATION SINGLE STATION SMOKE & CARBON MONOXIDE DETECTORS SHALL BE MOUNTED ON THE CEILING AND UL LISTED FOR CEILING MOUNTING AND LOCATED NOT LESS THAN 12-INCHES FROM ANY WALL. (TYPICAL)
3. THE WIRING FOR THE COMBINATION SINGLE STATION SMOKE & CARBON MONOXIDE DETECTORS SHALL BE TAKEN FROM A BRANCH LIGHTING CIRCUIT SERVING THE LOCAL AREA. THE POWER SOURCE FOR CARBON MONOXIDE DETCTORS SHALL BE ON THE SUPPLY SIDE AHEAD OF ANY SWITCHES AND NOT ON CIRCUITS PROTECTED BY A GROUND FAULT CIRCUIT INTERRUPTER.
4. ALL CARBON MONOXIDE DETECTORS SHALL BE PROVIDED WITH A VISIBLE INTERMITTENT OR STEADY "POWER ON" INDICATOR AND BE PROVIDED WITH BATTERY BACK-UP.



NOTE:

THIS DETAIL INDICATES CENTERLINE FOR FIRE ALARM/PULL STATION. HOWEVER THIS SAME CENTERLINE PRINCIPLE SHALL BE FOR ALL GROUP MTD. ELECTRICAL DEVICES. IF FIRE ALARM IS ON SAME SIDE OF DOOR AS SWITCHES, PULL STATION SHALL BE HORIZONTALLY SEPARATED BY A MINIMUM OF 18". THIS ELEVATION IS A GENERAL ARRANGEMENT OF OF DEVICES. ARCHITECT PLANS TAKE PRECEDENCE FOR EXACT LOCATIONS.

MOUNTING HEIGHT DETAIL

NOT TO SCALE

FIRE ALARM NOTES

1. E.C. SHALL PROVIDE CIRCUIT BREAKER LOCK-ON DEVICES FOR FACP AND NAC CIRCUIT.
2. E.C. SHALL FURNISH AND INSTALL REMOTE INDICATING LIGHTS/TEST SWITCHES FOR DUCT SMOKE DETECTORS.
3. REFER TO FLOOR PLANS FOR EXACT NUMBER OF DEVICES AND CANDELA RATINGS.
4. COLOR CODE WIRING PER THE LATEST EDITION OF THE STATE FIRE CODE.
5. SPLICES WILL NOT BE ALLOWED. WIRENUTS WILL NOT BE ALLOWED.
6. RED PAINTED TERMINAL CABINETS & BOXES WITH LOCKABLE COVERS SHALL BE PROVIDED AT ALL JUNCTION POINTS.
7. AFC FIRE ALARM / CONTROL CABLE TYPE MC (UL LISTED) MAY BE USED ABOVE CEILINGS AND IN CONCEALED AREAS WHERE ACCEPTABLE TO THE LOCAL AUTHORITY HAVING JURISDICTION. EXPOSED AREAS SHALL BE EMT, PAINTED PER ARCHITECTS DIRECTION. ALL CONDUCTORS SHALL BE A MINIMUM OF #16AWG SOLID COPPER, TYPE THHN, THWN OR TFN. ALL WIRING SHALL RUN CONTINUOUSLY FROM DEVICE TO DEVICE.
8. THE CONTRACTOR AT COMPLETETION OF THE FIRE ALARM SYSTEM SHALL TEST THE ENTIRE SYSTEM PER THE LOCAL FIRE DEPARTMENTS REQUIREMENTS. THE CONTRACTOR SHALL REPLACE OR FIX ANY PART OF THE SYSTEM NOT PROPERLY WORKING.
9. THE MINIMUM SEPARATION BETWEEN THE OUTGOING AND RETURN FIRE ALARM CIRCUITS SHALL BE A MINIMUM OF 1-FOOT VERTICALLY AND 4-FEET HORIZONTALLY IN ACCORDANCE WITH THE PROVISIONS OF NFPA-72.
10. ALL FIRE ALARM SYSTEM COMPONENTS & MOUNTING HEIGHTS SHALL COMPLY WITH ADA REQUIREMENTS.
11. E.C. SHALL PROVIDE ANY AND ALL AUXILARY EQUIPMENT IN ORDER TO PROVIDE A COMPLETE, PROPERLY FUNCTIONING SYSTEM. COORDINATE REQUIREMENTS WITH LOCAL MANUFACTURERS REP.
12. ALL FIRE ALARM STROBE SIGNAL DEVICES SHALL BE SYNCHRONIZED TYPE DEVICES AND COMPLY WITH ADA REQUIREMENTS.
13. NO T-TAPPING OF FIRE ALARM WIRING SHALL BE ALLOWED. (TYPICAL)
14. ALL FIRE ALARM WIRING & RACEWAY SHALL BE SUPPORTED BY THE BUILDING STRUCTURE AND SHALL NOT BE LOCATED AS TO BE DAMAGED BY BUILDING USE.
15. PROVIDE A WEATHER-PROOF KNOX-BOX 3200 SERIES ON THE EXTERIOR OF THE BUILDING. COORDINATE EXACT LOCATION WITH LOCAL FIRE DEPARTMENT.
16. ALL SMOKE DETECTORS SHALL BE MOUNTED ON THE CEILING AND UL LISTED FOR CEILING MOUNTING AND LOCATED NOT LESS THAN 12-INCHES FROM ANY WALL. DETECTORS SHALL NOT BE IN A DIRECT AIR FLOW NOR CLOSER THAN 3-FEET FROM ANY AIR SUPPLY DIFFUSER. (TYPICAL)
17. UL LISTED INSULATED THROAT, SET SCREW CONNECTORS SHALL BE USED WITH MC CABLE INSTALLATIONS, (CLAMP CONNECTORS ARE NOT ALLOWED). A CABLE CUTTING TOOL WITH CONTROLLED DEPTH OF CUT SHALL BE USED IN ALL MC CABLE INSTALLATIONS.
18. FAULT ISOLATION MODULES SHALL BE INSTALLED FOR EVERY 25 DEVICES AND IN NO CASE SHALL THE LENGTH OF AN AREA BE DISABLED BY A WIRE-TO-WIRE SHORT CIRCUIT FAULT EXCEED 200' IN ANY ONE DIRECTION. WHERE A SINGLE CIRCUIT SERVES MORE THAN ONE FLOOR; FAULT ISOLATION MODULES SHALL BE INSTALLED TO PREVENT A WIRE-TO-WIRE SHORT CIRCUIT FAULT ON ONE FLOOR TO DISABLE THE CIRCUIT ON ANOTHER FLOOR.
19. WIRING FOR THE FIRE ALARM SYSTEM SHALL BE CLASS "A".
20. REFER TO THE SPECIFICATIONS FOR THE "SEQUENCE OF OPERATION" AND ADDITIONAL INFORMATION.
21. E.C. SHALL PRODUCE A MANUFACTURER'S COMPLETE FIRE ALARM SYSTEM ONE-LINE DIAGRAM AND ADDRESS PLAN DURING THE SHOP DRAWING SUBMITTAL PROCESS.
22. E.C. SHALL PROVIDE ALARM INDICATORS AND HVAC EQUIPMENT OVERRIDE SWITCHES MOUNTED IN UTILITY ROOMS WITH FIRE ALARM PANEL. ALL SWITCHES AND HEATING UNITS SHALL BE CLEARLY LABELED BY NUMBERS AS PER PLANS.
23. E.C. SHALL OBTAIN FROM THE LOCAL FIRE DEPARTMENT, A LIST OF FIRE ALARM ZONE CODES AND DESCRIPTIONS AND PROGRAM INTO FIRE ALARM SYSTEM AS REQUIRED.
24. DUCT SMOKE DETECTORS AND TAMPER SWITCHES SHALL ANNUNCIATE SUPERVISORY TROUBLE.
25. TWO INDICATIONS OF ALARM ARE REQUIRED FOR SPRINKLER SYSTEM: MAIN FLOW & ZONE.
26. EXISTING FIRE ALARM SYSTEM: MAINTAIN THE EXISTING SYSTEM IN SERVICE UNTIL THE NEW SYSTEM IS TESTED AND ACCEPTED BY THE FIRE DEPARTMENT. DISABLE SYSTEM ONLY TO MAKE SWITCHOVERS AND CONNECTIONS. NOTIFY OWNER, ARCHITECT/ENGINEER AND LOCAL FIRE DEPARTMENT AT LEAST TEN DAYS BEFORE PARTIALLY OR COMPLETELY DISABLING SYSTEM. MINIMIZE OUTAGE DURATION. MAKE TEMPORARY CONNECTIONS TO MAINTAIN SERVICE IN AREAS ADJACENT TO WORK AREA AS REQUIRED OR PROVIDE A "FIRE-WATCH" SYSTEM COORDINATED WITH THE LOCAL FIRE DEPARTMENT.

TYPICAL FIRE STOPPING NOTES

A. GENERAL: FIRE STOPPING SHALL BE PROVIDED BY THIS CONTRACTOR FOR ALL FLOOR, CEILING AND FIRE RATED WALL PENETRATIONS FOR CONDUIT, SLEEVES AND/OR CABLING AS REQUIRED BY JOB CONDITIONS.

B. THE CONTRACTOR SHALL PROVIDE A FIRE STOP SYSTEM IN ACCORDANCE WITH THE FOLLOWING:

1. THE SYSTEM SHALL CONSIST OF A WATERBASED SEALANT AND SUITABLE DAMMING MATERIALS (WHERE REQUIRED) AND BE INSTALLED PER MANUFACTURER'S REQUIREMENTS.
2. THE SEALANT SUPPLIED SHALL BE A TWO STAGED INTUMESCENT AND CAPABLE OF EXPANDING UP TO 8 TIMES ITS ORIGINAL VOLUME.
3. THE SEALANT SUPPLIED SHALL CONTAIN NO ASBESTOS, NO FIBERGLASS, AND NO SOLVENTS NOT CORROSIVE MINERAL SALTS OF ANY KIND.
4. THE SEALANT SHALL FORM A SURFACE CAPABLE OF BEING SANDED AND PAINTED TO MATCH SURROUNDING SURFACES AND SHALL BE IMPERVIOUS TO WATER WHEN DRY.
5. THE FIRE STOP SYSTEM SHALL BE TESTED TO THE TIME/TEMPERATURE REQUIREMENTS OF ASTM E119 AND SHALL BE UL1479 (ASTM E814) AND CLASSIFIED FOR UP TO 3 HOURS.
6. THE FIRE STOP SEALANT SHALL BE SPECSEAL SEALANT AS MANUFACTURED BY SPECIFIED TECHNOLOGIES, INC. OR APPROVED EQUAL.
7. SPECIAL CARE SHALL BE TAKEN WITH ELECTRICAL SYSTEMS NOT TO COMPROMISE ANY OF THE BUILDING FIRE PARTITIONS, FLOORS, WALLS OR MEMBRANES. PROVIDE ALL FIRESTOPPING REQUIRED TO COMPLY WITH THE BUILDING CODE, THE ELECTRICAL CODE AND THE UL LISTING OF EACH ASSEMBLY. COORDINATE LOCATIONS AND TYPES OF MEMBRANES WITH ARCHITECT.

ISSUED FOR CONSTRUCTION - MAY 7, 2025

Smoke/Carbon Monoxide Detectors for:

PR

DA
RE
06

ON 16 00 00 ELECTRICAL REQUIREMENTS

1 - GENERAL

RELATED SECTIONS

wings and General Provisions of Contract, including General and Supplementary Conditions and Division 1 cification Sections, apply to work of this section.

Contractor shall also include allowances for startup and for making the systems fully operational, and for pe and design contingencies. Future changes in price for items not shown on these drawings will not be ved if the system itself is shown on these Drawings.

e notices, file plans, obtain permits and licenses, pay fees and back charges, and obtain necessary rovals from authorities that have jurisdiction as required to perform work in accordance with all legal irements and with Specifications, Drawings, Addenda and Change Orders, all of which are part of tract Documents.

drawings show the layout of the electrical systems and indicate the approximate locations of outlets, aratus, and equipment. The runs of feeders and branches as shown on the drawings are schematic only. e exact routing of branch circuits and feeders shall be determined by the structural conditions and possible ructions. This shall not be construed to mean that the design of the systems may be changed but refers to exact runs between given points. The Engineer reserves the right to revise the drawings from time to to indicate changes in the work.

Contractor shall consult and review all contract and reference drawings which may affect the location of outlets, apparatus and equipment to avoid any possible interference and permit full location of outlets, aratus and equipment up to the time of rough-in is reserved by the Engineer and such change shall be e without additional expense to the Owner.

all be the responsibility of this Contractor to see that all electrical equipment such as junction and pull es, panelboards switches, controls and such other apparatus as may require maintenance and operation time to time is made accessible. Although the equipment may be shown on the drawings in certain tions, the construction may disclose the fact that such locations do make its position accessible. In such es this Contractor shall call the attention of the Engineer to the condition before advancing the construction state where a change will reflect additional expense to the Owner.

SUMMARY

Section specifies the basic requirements for electrical installations and includes requirements common to e than one section of Division 26. It expands and supplements the requirements specified in sections of sion 1.

se documents have been prepared with the intention that they call for finished, tested work, in full rating condition and complete with necessary accessories.

contract drawings are generally diagrammatic and convey the scope of work and general arrangement of aratus and equipment. The locations of all items shown on the drawings or called for in the specifications are not definitely fixed by dimensions are approximate only. The exact locations necessary to secure the conditions and results must be determined at the project and shall have the approval of the itect/Engineer before being installed. The Contractor shall follow the drawings in laying out work and shall ck drawings of the other trades to verify spaces in which work will be installed. Maintain maximum droom and space conditions at all points. If directed by the General Contractor, Engineer and/or Architect, Contractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent lict with work of other trades or for proper execution of the work.

se contract documents are complementary. What is called for by one shall be as binding as if called for by Materials or work described in words, which have well-known technical, or trade meaning shall be held to to such recognized standards. Incidental devices and accessories needed for complete, operational ems shall be provided even though they may not be indicated or identified in the documents.

paratus have been omitted, notify the Architects/Engineers of such belief. It is understood that bidder has ded all required items and work in his bid, and will not if bid is successful, claim extra compensation for ishing a complete and satisfactory system. If a particular item is called for or specified more than once in e contract documents, the higher grade shall be considered specified.

uld it appear that the character of the work is not sufficiently explained in these specifications or on the wings, apply to the A/E for further information. Conform to the A/E's decision and directions as shall ome part of these contract documents. The A/E reserves the right to be sole interpreter of the drawings specifications, and all decisions shall be conclusive, final and binding on the parties.

erials called for in these documents shall be new, unused equipment and of the latest recognized dards.

work to be done under Division 16 is shown on the electrical drawings.

OUTLINE SCOPE OF WORK

work under this contract, without limiting the generality thereof, includes all materials, labor, equipment, ices, and transportation, unless otherwise specified, necessary to complete all systems of electrical wiring equipment required by the drawings and/or as specified herein. It is the intent of this section and ompanying electrical drawings that these systems be furnished complete in every respect. The Electrical tractor shall furnish all wiring, equipment and labor needed for a complete operating installation.

Electrical Contractor shall fully indemnify the Owner against any damages, removals and alteration work. is in addition to the requirements of the General Conditions of the Specifications.

Electrical Contractor shall review architectural, interior design and all other trades plans, elevations and ils prior to any work and identify any conflicts between furnishings, furniture, art-work, molding, casework, visions, signage, awnings, canopies, diffusers, fixtures, etc.. and electrical, fire alarm, audio/visual and munications devices shown on the electrical plans and details. The Electrical Contractor shall prepare 8.5" " sketches showing the conflicts and submit to the Architect for resolution prior to any work. Failure of the trical contractor to coordinate, identify and obtain a field-directive on any conflict herein noted, that results stalled electrical work to be relocated to the Owner/Architects liking shall be the sole-responsibility of the trical Contractor. The Electrical Contractor shall assume and cover all costs associated with conflicts not rdinated, identified and submitted to the Architect, inclusive of material, labor, overtime pay, etc.. and shall affect the project schedule.

ROUGH-IN

fy final locations for rough-ins with field measurements and with the requirements of the actual equipment e connected.

er to equipment specifications in Divisions 2 through 25 for rough-in requirements.

SURVEYS AND MEASUREMENTS

e measurements, both horizontal and vertical, on established bench marks. Work shall agree with these blished lines and levels. Verify measurements at site and check the corrections of same as related to the k.

uld the Contractor discover any discrepancy between actual measurements and those indicated, which ents following good practice or the intent of the drawings and specifications, he shall notify the A/E.

EXAMINATION OF SITE

r to submitting bid, visit the site where the work is to be performed and the materials are to be delivered. ure in this respect shall not excuse the Contractor from his obligation to supply and install the work in ordance with the plans and specifications and under all conditions, as they exist.

submitting a bid, this Contractor warrants that all specification sections and drawings showing equipment plumbing, heating, ventilation, air conditioning, electrical, and architectural, have been examined and is liar with the conditions and extent of work affecting this contract.

EQUIPMENT AND MATERIALS

quipment and materials for permanent installation shall be the products of recognized manufacturer's and l be new, unless noted for re-use, without damaged, functional or aesthetic components.

equipment and materials shall:

Be Underwriters Laboratories, Inc. (UL) labeled and/or listed where specifically called for, or where normally subject to such UL labeling and/or listing services

. Be without blemish or defect.

. Be in accordance with the latest applicable NEMA standards.

. Be products, which will meet with the acceptance of the agency inspecting the electrical work. Where such acceptance is contingent upon having the products examined, tested and certified by UL or other recognized testing laboratory, the product shall be so examined, tested and certified.

all equipment, which is to be installed but not purchased as part of the electrical work, the electrical work l include:

. The coordination of their delivery.

. Their unloading from delivery trucks driven in to any point on the property line at grade level.

. Their safe handling and field storage up to the time of permanent placement in the project.

. The correction of any damage, defacement or corrosion to which they may have been subjected.

. Their field make-up and internal wiring as may be necessary for their proper operation.

. Their mounting in place, including the purchase and installation of all dunnage, supporting members and fastenings necessary to adapt them to architectural and structural conditions.

ipment, which is to be installed but not purchased as part of the electrical work, shall be carefully examined n delivery to the project. Claims that any of these items have been received in such condition that their allation will require procedures beyond the reasonable scope of the electric work will be considered only if ented in writing within one week of the date of delivery to the project of the items in question. The electric k includes all procedures, regardless of how extensive, necessary to put into satisfactory operation, all s for which no claims have been submitted as outlined above.

ELECTRICAL INSTALLATIONS

materials and labor called for, specified in Division 16 of the specifications, and or shown on the electrical wings furnished under this contract shall be provided under Division 16 unless called for otherwise in the sion 16 documents. The word "provide" as used in the Division 16 documents, shall mean to furnish, install, nect up, complete with all accessories ready for operation and warranted.

rdinate electrical equipment and materials installation with other building components. Fully coordinate k with that of other trades. Furnish information in writing that is needed for the coordination of clearances, with the work of others, and such information shall be given in a timely fashion so as not to impede the gress of two or more trades. Confer and resolve the conflict immediately. If so directed by the A/E, prepare posite drawings to resolve any space or clearance conflict.

fy all dimensions by field measurements.

nge for chases, slots, and openings in other building components to allow for electrical installations.

rdinate the installation of required supporting devices and sleeves to be set in poured in place concrete other structural components, as they are constructed.

uence, coordinate, and integrate installations of electrical materials and equipment for efficient flow of the k. Give particular attention to large equipment requiring positioning prior to closing-in the building.

rdinate the cutting and patching of building components to accommodate the installation of electrical pment and materials.

ere mounting heights are not detailed or dimensioned, the exact location shall be determined by the A/E, all electrical services and overhead equipment to provide the code and/or utility requirements.

all electrical equipment to facilitate maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.

J. Coordinate the installation of electrical materials and equipment above ceilings with suspension systems, mechanical equipment and systems, and structural components.

K. Coordinate connection of electrical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.

L. Attention is directed to areas and items indicated on the drawings by the notations "HOLD", "N.I.C.", "BY OTHERS" and words of similar intent. The work indicated in these areas is shown for information and continuity only. Work or items furnished and installed in these areas solely for the convenience of this Contractor or others, without prior written approval of the Owner, shall be removed at the option of the Owner and at the Contractor's expense.

M. Provide all required staging and scaffolding for all the work under this section.

1.9 ALTERATION WORK

A. Maintain continuity of service in areas where occupancy is to be maintained during alterations. If it becomes necessary to disconnect or interrupt service, obtain written consent of the Owner, and only disconnect service at the convenience of, and with the consent of the Owner. A copy of the written request for a shutdown shall be forwarded to the A/E.

1.10 CUTTING AND PATCHING

A. Cutting and patching of electrical equipment, components, and materials specified under Division 16 (conduit, sleeves, equipment, etc.) shall be performed by Electrical Contractor.

B. Refer to the Conditions of the Contract (General and Supplementary) and Division 1 Section: "Cutting and Patching" for definitions, requirements, and procedures.

C. Cutting and patching of existing structures (thru walls, floors, ceilings, etc.) to accommodate equipment, components, and materials of all Contractors, including Mechanical and Electrical Contractors, shall be performed by General Contractor and/or his designated Subcontractor.

D. Cutting and patching of new structures (thru walls, floors, ceilings, etc.) to accommodate installation of ill-timed work or removal and replacement of defective work or work not conforming to requirements of Contract Documents, shall be performed by General Contractor and/or his designated Subcontractor and costs shall be back charged to appropriate trade Contractor.

E. Do not endanger or damage installed work through procedures and processes of cutting and patching.

F. Arrange for repairs required to restore other work, because of damage caused as a result of electrical installations.

G. Arrange to have ducts, raceways, conduit, panelboards, boxes, and such other pertinent parts, set in place ahead of construction work so that they will be built-in with structures and eliminate need for cutting and patching. Failure to conform to this paragraph will require that this Contractor perform any cutting and patching required for his work at his expense. Cutting shall be neatly finished to match adjoining work in a manner acceptable to the A/E. Cutting and patching shall not affect the fire rating of walls or structural parts. Cutting and patching required to correct work, due to error or negligence of the Contractor, or to defects in his material or workmanship, shall be corrected at no additional cost to the Owner. Patching shall meet or exceed quality of adjacent surfaces. Cutting must be accomplished as not to weaken adjacent structural members and must be approved by the Structural Engineer before proceeding.

H. Perform cutting, fitting, and patching of electrical equipment and material required to:

1. Uncover work to provide for installation of ill-timed work.
2. Remove and replace defective work.
3. Remove and replace work not conforming to requirements of the contract documents.
4. Remove samples of installed work as specified for testing.
5. Install equipment and materials in existing structures.
6. Upon written instructions from the A/E, uncover and restore work to provide for A/E observation of concealed work.

I. Cut, remove and legally dispose of selected electrical equipment, components and materials as indicated, including, but not limited to, removal of electrical items indicated to be removed and items made obsolete by the work.

J. Protect the structure, furnishing, finishes, and adjacent materials not indicated or scheduled to be removed. Protect the electrical work and the work of others in a manner best suited to the particular case. Correct any damage done to any work at no additional cost.

K. Provide and maintain temporary partitions or dust barriers adequate to prevent the spread of dust and dirt to adjacent areas.

L. Locate, identify, and protect electrical services passing through areas that are to under-go remodeling or demolition. Electrical services serving other areas required to be maintained, and transit services must be interrupted, provide temporary services for the affected areas and notify the Owner prior to changeover.

1.11 SUBMITTALS

A. Within fifteen (15) business days after the date of notice to proceed and before purchasing any materials or equipment, submit for approval a complete list, in six (6) copies, of all materials to be incorporated in the work.

B. Shop drawings/manufacturer's cuts are required for:

1. Wire & Cable.
2. Disconnect Switches.
3. Fire Alarm System.
4. Wiring Devices and Plates.
5. Fire Stopping Materials.
6. Seismic Restraint Components.

C. After the list has been processed, submit complete shop drawings of all equipment. These shop drawings submittals shall be submitted within thirty days after the processing date of the original submittal.

D. All submittals shall be complete and submitted electronically to all applicable parties. No consideration will be given to partial submittals except with prior approval. No consideration will be given to faxed submittals.

E. Explanation of Shop Drawing Stamp:

1. Approved: indicates that we have not found any reason why this item should not be acceptable within the intent of the documents.
2. Approved with Comments: indicates that we have found questionable components which, if corrected or otherwise explained, make the product acceptable.
3. Resubmit for Final Review: indicates that this item should be resubmitted for approval before further processing.
4. Does Not Conform: indicates that the item will not meet the intent of the Contract.

F. No shop drawing stamp or note shall constitute an order to fabricate or ship. Such notification can only be performed by the Project Manager for construction, the Contractor scheduling his own work, or the Owner.

G. Submittal of shop drawings, product data, will be reviewed only when submitted by the Contractor. Data submitted from Sub-contractors and material suppliers directly to the A/E will not be processed.

H. If shop drawing is not in compliance after two submissions, a third submission for the same manufacturer will not be considered for review.

I. Check shop drawings and other submittals to assure compliance with contract documents before submittal to A/E.

J. Review of shop drawings is final and no further changes shall be considered without written application. Shop drawing review does not apply to quantities, dimensions, nor relieve this Contractor of his responsibility for furnishing materials or performing his work in full compliance with these contract drawings and specifications. Review of these shop drawings shall not be considered a guarantee of the measurements of this building or the conditions encountered.

K. General requirements for the substitution of equipment and submittal of shop drawings as follows. If apparatus, systems or materials are substituted for those specified, and such substitution necessitates changes in, or additional connections, wiring, supports, or construction, it shall be provided by this Contractor at no additional cost to the Owner. This Contractor shall assume all cost and entire responsibility thereof. The approval of substituted equipment does not relieve the contractor of his/her responsibility of shop drawing errors related to details, sizes, quantities, wiring diagram arrangements and dimensions which deviate from the Specifications, and/or job conditions as they exist. It is the contractor's responsibility to submit only those items that meet the specified apparatus, systems and material. Should any non-conformance code items be installed, they shall be replaced by this Contractor at no additional cost to the Owner. The construction means and methods used in the project shall be reviewed and approved through the local building department or a deputy inspector to insure compliance with the current codes, project specifications and general building practices.

L. Coordination drawings shall be submitted and shall show all HVAC, Electrical, Plumbing and Fire Protection systems superimposed in order to identify conflicts and ensure inter-coordination of all trades. Coordination drawings shall be initiated under this Section of the Specifications. It is this Contractors responsibility for preparation of project coordination drawings showing the installation of all electrical equipment, switchgear, motor control centers, panelboards, transformers, transfer switches, disconnect switches, enclosed circuit breakers, conduits, outlets, switches and accessories to be provided under this Section of the Specifications. These drawings shall be prepared at not less than 3/8 in. = 1 ft. scale, and shall show building room layouts, structural elements, ductwork and lighting layouts of function. A reproducible copy of each drawing prepared shall then be submitted to the Mechanical, Plumbing and Sprinkler Contractors, who shall be responsible to coordinate his equipment and systems and shall show these on the drawings submitted. After this Contractor has fulfilled his obligation, he shall notify all other Contractors. After each drawing has been coordinated between trades, each trade shall sign each drawing, indicating acceptance of the installation. This Contractor shall then print the coordination original and these prints submitted through the General Contractor to the architect for review and comment, similar to shop drawings. Comments made on these drawings shall result in a correction and re-submittal of the drawings. A Subcontractor who fails to promptly review and incorporate his work on the drawings shall assume full responsibility of any installation conflicts affecting his work and of any schedule ramifications. Review of coordination drawings shall not diminish responsibility under this Contract for final coordination of installation and maintenance clearances of all systems and equipment with Architectural, Structural, Mechanical, and Electrical Contractors.

1.12 PRODUCT OPTIONS AND SUBSTITUTIONS

A. Refer to the Conditions of the Contract (General and Supplementary) and Division 1 for definitions, requirements, and procedures.

B. If materials of equipment are substituted for specified items that alter the systems shown or its physical characteristics, or which have different operating characteristics, clearly note the alterations or differences and call it to the attention of the A/E. Under no circumstances shall substitutions be made unless identical material or equipment has been successfully operated for at least three consecutive years.

C. All substitution made by the Contractor shall require the Contractor to fully coordinate the substitution with other trades. The Contractor must make any modifications required by the substitution at no additional cost to the Owner. In addition the Contractor must notify the A/E of any changes required and obtain approval for the changes. The review of the shop drawings by the A/E shall not relieve the Contractor from his responsibility as set forth in this specification.

1.13 NAMEPLATE DATA

A. Provide permanent operational data nameplate on each item of power operated equipment, conduits with pull string, indicating manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances, and similar essential data. Locate nameplates in a readily accessible location.

1.14 DELIVERY STORAGE AND HANDLING

A. Deliver products to project properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for distinct identifications; adequately packaged and protected to prevent damage during shipment, storage, and handling.

B. Store equipment and materials at the site, unless off-site storage is authorized in writing. Protect stored equipment and materials from damage. All devices shall be stored in a locked room. Assume responsibility for the devices until the date of final inspection.

C. Coordinate deliveries of electrical materials and equipment to minimize construction site congestion. Limit each shipment of materials and equipment to the items and quantities needed for the smooth and efficient flow of installations.

1.15 RECORD DOCUMENTS

A. As work progresses and for the duration of Contract, maintain a complete and separate set of prints of Contract Drawings at job site at all times. Record work completed and all changes from original Contract Drawings clearly and accurately including work installed as a modification or addition to the original design. Work shall be updated on a weekly basis and shall be made available for review by Architect. Failure to perform this work shall be reason for withholding requisition payments. In addition, take photographs of all concealed equipment in gypsum board ceilings, shafts, and other concealed, inaccessible work. At completion of work, make copies of photographs with written explanation on back. These shall become part of Record Documents.

B. At completion of work prepare a complete set of Record As-Built Drawings in AutoCAD, Computer Aided Drafting (CAD) software, showing all systems as actually installed, including all fire alarm and electrical circuitry. The Record As-Built Drawings computer files shall be made available to the Architect, Engineer and Owner prior to final payment.

C. The Architect will not certify the accuracy of the Record Drawings. This is the sole responsibility of the Electrical Contractor.

D. This trade shall submit the record set for approval by the Fire and Building Departments in a form acceptable to the departments, when required by the jurisdiction.

E. Drawings shall show record condition of details, sections, riser diagrams, control changes and corrections to schedules. Schedules shall show actual manufacturer and make and model numbers of final equipment installation.

1.16 WARRANTIES

A. Refer to the Conditions of the Contract (General and Supplementary) and Division 1 for definitions, requirements, and procedures.

B. All work and equipment furnished under this Section shall be guaranteed free from defects in workmanship or materials for a period of one (1) year, unless specifically noted otherwise for a particular system, from the date of final acceptance of the systems as set forth in this Contract. The Subcontractor shall replace any defective work developing during this period, unless such defects are clearly the result of misuse of equipment by persons not under the control of the Subcontractor, without cost to the Owner. Where such defective work results in damage to work of other Sections, all such work shall be restored to its original condition by mechanics skilled in the affected trade, at the expense of the Subcontractor. The Subcontractor shall submit a separate written guarantee stipulating the aforesaid conditions.

C. Prior to or at the time of Substantial Completion for the work and during administrative close-out of the project, submit one (1) copy of all specified warranties and guarantees to the Architect for review, approval and subsequent transmittal to the Owner.

D. Warranties and guarantees, including those specified in excess of the general one (1) year guarantee, shall be complete for all specific materials, systems, sub-systems, equipment, appliances and products specified and required by the Contract Document.

E. Warranties and guarantees shall clearly define what is to be guaranteed; the extent, terms, conditions, time and effective dates.

F. Copies of the same warranties and guarantees shall be included in the "Operating and Maintenance Manual" as specified herein.

1.17 CLEANING

A. Refer to the Conditions of the Contract (General and Supplementary) and Division 1 for definitions, requirements, and procedures.

B. Upon completion of work, the Contractor shall clean, polish and leave bright, fixtures and lamps, and shall remove dust, dirt, debris and loose plaster from panelboards, controls, and switchboards. Unused openings in pull boxes, junction boxes, equipment and raceways shall be capped or closed by an approved means. Replace all inoperative lamps.

1.18 DEFINITION OF TERMS

A. "This Contractor" or "E.C." specifically means, the Electrical Contractor working under this section of the specifications.

B. "Concealed" means hidden, in chases, furred spaces, walls, above ceilings or enclosed in construction.

C. "Exposed" means visible in sight or not installed "concealed" as defined above.

D. "Approved Equal" means any equipment or material which is approved by the Engineer and equal in quality, durability, appearance, strength, design and performance to the equipment or material originally specified.

E. "Conduit" shall mean all conduit including fittings, joints, hangers and supports.

F. "Furnish" shall mean to purchase and deliver to the project site complete with every necessary appurtenance and support, all as part of the electrical work.

G. "Install" shall mean to perform every operation necessary to establish secure mounting and correct operation at the proper location in the project, all as part of the electrical work.

H. "Provide" shall mean to furnish and install.

1.19 QUALITY ASSURANCE

A. Obtain services of manufacturer's representatives of electrical equipment, during erection and construction of their respective equipment to insure proper installation of same.

B. A letter is required from each system manufacturer's representative certifying to the A/E that requirements have been checked and are properly installed and operating.

1.20 PERFORMANCE TESTS - ELECTRICAL

A. Test and adjust the electrical systems and equipment during the progress of the work.

B. Upon completion of work and after preliminary tests to assure that all systems are complete and in proper working order, arrange with the A/E to conduct performance tests of the electrical systems. These tests may be witnessed by the A/E prior to acceptance of systems and shall be arranged for the purpose of demonstrating compliance with contract documents. During this period, visually inspect all electrical equipment. Lighting fixtures shall be tested with specified lamps in place for not less than six (6) hours. Check voltages to assure that all transformer taps are properly set.

C. General operating tests shall be performed under as near design conditions as possible, for a period of not less than one (1) hour for each system, and shall demonstrate that all equipment is functioning in accordance with specifications. Furnish all instruments, ladders, test equipment and personnel required for tests. Any equipment or systems found by test to be deficient or unsatisfactory shall be replaced and tests repeated as often as necessary to assure compliance with contract documents.

D. Test all feeders, sub-feeders and all branch wiring for amperage, voltage, phase balance, phase sequence of A,B,C and insulation resistance, then submit the results of this test to the A/E neatly typed in triplicate for review. This test may be conducted at any time up to, through and including, the guarantee period if requested by the A/E, at no additional cost to the Owner.

E. Phase balance the complete electrical system, phase balance all panels as near as loads will permit under normal working conditions.

F. Test all ground conductors for current flow, as near design operating conditions as possible. If any measured current exceeds one (1) ampere, determine and correct the cause. Also, if measured resistance is greater than 5 ohms indoor or 10 ohms outdoor, determine and correct the cause.

G. During the progress or completion of the work it shall be subject to the inspection of the Owner and to such other inspectors, as may have jurisdiction, including those of the Electric Company, Fire Department and the Telephone Company.

H. The Contractor shall be responsible for correct voltages, tap settings, trip settings and correct phasing on all equipment. Secondary voltages shall be measured at the line side of the main breakers with the breakers in an open position, at panelboards, and at such other location on the distribution systems and branch circuits as directed by the Engineer.

I. At completion of the work, Contractor shall submit to the Owner's representative in writing a statement stating: (1) that the work is complete; (2) that the entire installation is in accordance with the drawings and specifications; (3) that preliminary tests have been made; and (4) that the work is ready for final inspection and test.

J. A final inspection of the installation to determine compliance with the drawings and specifications will be made by the Owner's representative. Work will be checked for quality of materials, quality of workmanship, proper installation and finished appearance. The electrical contractor shall provide the services of the project electrical foreman for inspection purposes. The foreman shall remove and reinstall wiring devices, junction box covers, panelboard trims, switchboard covers, terminal box covers, ceiling tiles, lighting fixtures, etc. as required to facilitate any inspections required by the Owner's representative.

K. The Contractor shall arrange and conduct operating tests on all equipment in the presence of the Owner's representative. The components parts of systems and the various systems shall be demonstrated to operate in accordance with the requirements and intent of this specification. Any non-complying or defective materials or workmanship disclosed as a result of the inspection and tests shall be corrected promptly by the Contractor, and the tests repeated as often as necessary until approved and accepted by the Owner's representative.

L. The Contractor shall visit the site to acquaint himself with existing conditions. No extra compensation will be paid for failure to comply with this paragraph.

M. The Electrical Contractor shall provide supervision, labor, materials, tools, test equipment, and all other equipment or services and expenses required to test, adjust, set, calibrate, and operationally check work and components of the electrical systems and circuitry throughout this section.

N. The electrical contractor shall pay for all tests including expences incident to retests occasioned by defects and failures of equipment to meet specifications at no additional cost to the owner.

O. Any defects or deficiencies discovered in any of the electrical work shall be corrected at no cost to the owner.

P. All testing shall be compatible with the manufacturer's installation instructions.

1.21 SEISMIC RESTRAINT

A. It is the intent of this seismic specification to keep all electrical building system components in place during a seismic event.

B. All electrical systems must be installed in strict accordance with seismic codes, component manufacturer's and building construction standards. Whenever a Conflict occurs between the manufacturer's or construction standards, the most stringent shall apply.

C. This contractor shall engage a professional structural engineer registered in the jurisdiction of this project to review the entire installation to determine all seismic restraint requirements and methods. Contractor shall submit a report outlining the structural engineer's review as well as seismic restraint shop drawings and supporting calculations prepared by the professional structural engineer for review by the Architect.

D. Seismic restraints shall be designed in accordance with seismic force levels as detailed in the applicable building code.

1.22 TEMPORARY LIGHT AND POWER

A. Under this Section of the specifications, this Contractor shall provide temporary electric service, sized suitable for construction for each trade. This contractor shall provide all material and labor for temporary electrical service per the local power company's requirements and standards with all necessary panelboards, disconnect switches, transformers, conduit, wiring, etc. as required. This contractor shall pay all associated costs, up front.

B. Where temporary electrical service cannot be obtained from the local power company, this contractor shall provide a temporary, on-site, electric generator with all necessary panelboards, disconnect switches, transformers, conduit, wiring, etc. as required. The fuel used for the generator shall be provided and paid for by this Contractor.

C. This contractor shall provide a distribution system with circuits for receptacles and lighting as required for construction. This contractor shall maintain the temporary electrical system during construction and remove the system when construction is complete.

D. Under this section of the specifications, this Contractor shall provide and maintain temporary lighting based on using not less than one 100-watt lamp for each 100 square feet of building floor area and one duplex GFCI receptacle for each 200 square feet of building floor area. Where higher lighting intensities are required by Federal or State laws or otherwise specified, the above specified wattage shall be increased to provide the increase intensities.

E. This contactor shall provide temporary power and telephone services from the local telephone company for site trailers, fax machines, computers, etc., per the general contractor's direction.

F. The service shall incorporate ground fault protection and comply with NEC Article 527 and OSHA requirements.

1.23 PERMITS

A. Obtain all required electrical permits and pay all fees for same.

B. Provide to Engineer, in duplicate, a certificate of final inspection from the authority having jurisdiction for the electrical and systems.

1.24 OPERATING, INSTRUCTION, AND MAINTAINANCE MANUALS

A. Refer to Section 01700 - CONTRACT CLOSEOUT for submittal procedures pertaining to operating and maintenance manuals.

B. Each copy of the approved operating and maintenance manual shall contain copies of approved shop drawings, equipment literature, cuts, bulletins, details, equipment and engineering data sheets and typewritten instructions relative to the care and maintenance for the operation of the equipment, all properly indexed.

1.25 BIDDERS REPRESENTATION

A. By the act of submitting a bid for the proposed contract, the Bidder represents that:

1. The Bidder and all subcontractors the Bidder intends to use have carefully and thoroughly reviewed the drawings, specifications and other construction contract documents and have found them complete and free from ambiguities and sufficient for the purpose intended; further that,
2. The Bidder and workmen, employees and subcontractors the Bidder intends to use are skilled and experienced in the type of construction represented by the construction contract documents bid upon; further that,
3. Neither the Bidder nor any of the Bidder's employees, agents, intended suppliers or subcontractors have relied upon any verbal representations, allegedly authorized or unauthorized from the Owner, or the Owner's employees or agents including architects, engineers or consultants, in assembling the bid figure; and further that,
4. The bid figure is based solely upon the construction contract documents and properly issued written addenda and not upon any other written representation.

1.26 UTILITY COMPANY & AGENCY COORDINATION

A. This section includes, but is not limited to coordination with the following utilities, agencies and authorities having jurisdiction:

1. Local Fire Marshal: This contractor shall verify with the local fire alarm official, the type of master-box or municipal connection required for this project. This contractor shall provide all material & labor to comply with the local municipality. Notify Engineer of discrepancies between the plans and the municipality's standards. No extra compensation will be given for corrections required for failure to coordinate with the municipality, but corrections shall be made.
2. Electrical Inspector: Review plans and specifications with the local electrical and/or wiring inspector(s). Obtain and pay for all permits.
3. Building Inspector: Review plans and specifications with the local building inspector, if not done so by the General Contractor.
4. OSHA Representative: Review plans and specifications with the local OSHA representative, if not done so by the General Contractor.
5. Dig Safe: This contractor shall notify and coordinate with Dig Safe prior to any excavation; digging; trenching; grading; tunneling; augering; boring; drilling; pile driving; plowing-in or pulling-in pipe, cable, wire, conduit, or other sub-structure; backfilling; demolition; and blasting related to this Contractor.

B. The Electrical Contractor shall pay for all permits, inspections, labor, material and fees associated with the various Utility Companies coordination requirements mentioned in this section and for this Contractor's work under this project.

C. VAC, Plumbing, Fire Protection, and Electrical Drawings are diagrammatic. They indicate general arrangements of mechanical and electrical systems and other work. They do not show all offsets required for coordination nor do they show the exact routings and locations needed to coordinate with structural and other trades and to meet Architectural requirements.

D. In all spaces, prior to installation of visible material and equipment, including access panels, review Architectural Drawings for exact locations and where not definitely indicated, request information from Architect. Where the electrical work shall interfere with the work of other trades, assist in working out the space conditions to make satisfactory adjustments before installation. Without extra cost to the Owners, make reasonable modifications to the work as required by normal structural interferences. Pay the General Contractor for additional openings, or relocating and/or enlarging existing openings through concrete floors, walls, beams and roof required for any work which was not properly coordinated. Maintain maximum headroom at all locations. All piping, duct, conduit, and associated components to be as tight to underside of structure as possible.

E. If any electrical work has been installed before coordination with other trades so as to cause interference with the work of such trades, all necessary adjustments and corrections shall be made by the trades involved without extra cost to the Owners.

F. Where conflicts or potential conflicts exist and engineering guidance is desired, submit sketch of proposed resolution to Architect and Engineer for review and approval.

PART 2 - PRODUCTS

2.1 CONDUIT

A. Minimum Size: ¾-inch, unless otherwise specified.

B. Underground Installations:

1. More than Five Feet from Foundation Wall: Use thick wall nonmetallic conduit concrete encased.
2. Within Five Feet from Foundation Wall: Use rigid steel conduit concrete encased.
3. In or Under Slab on Grade: Use plastic coated conduit.
4. Minimum Size: 1-inch.

C. Outdoor Locations, Above Grade: Use rigid steel conduit.

D. In Slab Above Grade:

1. Use rigid steel conduit.
2. Maximum Size Conduit in Slab: ¾ inch (19 mm); ½ inch (13 mm) for conduits crossing each other.

E. Wet and Damp Locations: Use rigid aluminum conduit.

F. Dry Locations:

1. Concealed and in Cable-Tray: Use metal clad (MC) cable (see Division 1)
2. Exposed: (Unfinished or utility spaces) Use electrical metallic tubing.

G. Metal conduit: Rigid Steel Conduit shall comply with ANSI C80.1 and be heavy wall zinc coated steel. Rigid Aluminum Conduit shall comply with ANSI C80.5. Intermediate Metal Conduit (IMC) shall be rigid steel. Fittings and Conduit Bodies shall comply with ANSI/NEMA FB 1 and material to match conduit. Acceptable manufacturers are Western Tube and Conduit Company, Allied Tube and Conduit Company and Triangle Wire and Cable, Inc.

H. Flexible metal conduit shall be interlocked aluminum contruction. Fittings shall comply with ANSI/NEMA FB 1. Acceptable manufacturers are AFC Cable Systems, Electri-Flex Company and Eastern Flexible Conduit Technologies. All flexible conduits shall include a grounding conductor.

I. Electrical metallic tubing (EMT) shall comply with ANSI C80.3; galvanized zinc coated steel tubing. Fittings and Conduit Bodies shall comply with ANSI/NEMA FB 1; steel, compression or set screw type. Acceptable manufacturers are Western Tube and Conduit Company, Allied Tube and Conduit Company and Triangle Wire and Cable, Inc.

J. Nonmetal conduit shall comply with NEMA TC 2; Schedule 40 PVC, or as indicated on plans. Fittings and Conduit Bodies shall comply with NEMA TC 3. Acceptable manufacturers are Carlon or approved equal.

K. Flexible nonmetallic conduit (Sealtite) shall be UL and CSA listed for purpose specified and shown. Acceptable manufacturers are Carlon or approved equal.

L. Install conduit in accordance with NECA "Standard of Installation." Install nonmetallic conduit in accordance with manufacturer's instructions.

M. Arrange supports to prevent misalignment during wiring installation. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits. Fasten conduit supports to building structure and surfaces under provisions of Division 1. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports. Do not attach conduit to ceiling support wires.

N. Arrange conduit to maintain headroom and present neat appearance. Route exposed conduit parallel and perpendicular to walls. Route conduit installed above accessible ceilings parallel and perpendicular to walls. Route conduit in and under slab from point-to-point. Do not cross conduits in slab.

O. Maintain adequate clearance between conduit and piping. Maintain 12-inch (300 mm) clearance between conduit and surfaces with temperatures exceeding 104 degrees F (40 degrees C).

P. Cut conduit square using saw or pipe cutter; de-burr cut ends. Bring conduit to shoulder of fittings; fasten securely. Join nonmetallic conduit using cement as recommended by manufacturer. Wipe nonmetallic conduit dry and clean before joining. Apply full even coat of cement to entire area inserted in fitting. Allow joint to cure for 20 minutes, minimum. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.

Q. Install no more than equivalent of three 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one-shot bender to fabricate or factory elbows for bends in metal conduit larger than 2 inch (50 mm) size.

R. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system. Provide suitable fittings to accommodate expansion and deflection where conduit crosses seismic, control and expansion joints. All expansion and deflection fittings shall have a ground strap. Provide suitable pull string in each empty conduit except sleeves and nipples. Use suitable caps to protect installed conduit against entrance of dirt and moisture.

S. Ground and bond conduit under provisions of NEC 250.

2.2 BUILDING WIRE & CABLE

A. Building Wire and Cable shall be copper with 600V insulation rated at 75°C minimum, Type XHHW insulation for feeders and branch circuits larger than #3 AWG; Type THHN/THWN insulation for feeders and branch circuits #4 AWG and smaller.

B. Conductors shall be of soft drawn 98% minimum conductivity properly refined copper, solid construction where No. 10 AWG and smaller, stranded construction where No. 8 AWG and larger.

C. Exterior of wires shall bear repetitive markings along their entire length indicating conductor size, insulation type and voltage rating.

D. Exterior of wires shall be color coded, so as to indicate a clear differentiation between each phase and between each phase and neutral. In all cases, grounded neutral wires and cables shall be identified by the colors "white" or "gray". In sizes and insulation types where factory applied colors are not available, wires and cables shall be color coded by the application of colored plastic tapes in overlapping turns at all terminal points, and in all boxes in which splices are made. Colored tape shall be applied for a distance of 6 inches along the wires and cables, or along their entire extensions beyond raceway ends, whichever is less.

E. Final connections to motors shall be made with 18" of neoprene sheathed flexible conduit.

F. Minimum branch circuit conductor size shall be No. 12 AWG installed in conduit. Motor control circuit wiring shall be minimum No. 14 AWG installed in conduit.

G. Fire alarm and security system wiring shall be No. 16 twisted non-shielded pairs for alarm and trouble circuits and a minimum of #14 AWG for device power, control and alarm annunciation circuits. Fire alarm system riser circuits shall be 2-hour rated, CI type (circuit integrity) cable per NFPA 72 and NEC 760.

H. Other wires and cables required for the various systems described elsewhere in this section of the Specifications shall be as specified herein, as shown on the Contract Drawings, or as recommended by the manufacturer of the specific equipment for which they are used, all installed in conduit.

I. Metal clad sheathed cable NFPA 70, type MC may be used for branch circuitry where shown and where run concealed and not subject to physical damage. All branch circuits shall be run in conduit from the panelboard to the first outlet. All type MC cable used shall contain a full size insulated ground conductor. All conductors shall be copper. All type MC cable insulation used shall have voltage rating of 600 volts, shall have a temperature rating of 75° C, and shall be thermoplastic material. Armor material shall be steel and armor design shall be interlocked metal tape. Fire alarm rated MC cable may be used for fire alarm work where concealed and approved by the Authority Having Jurisdiction.

J. Metal-Clad cable (Type MC) for circuits supplying computer equipment, electronic discharge lighting and other sensitive electronic equipment shall consist of 90°C THHN copper conductors with insulated ground and oversized neutral conductor (or one full size neutral conductor for each phase conductor). Cable shall be U.L. listed/labeled, and shall meet the requirements of NEC Art. 334 and 675.

K. Wiring materials except MI cable shall be manufactured by Triangle, Essex, General Cable, AFC, Southwire or equal.

L. Concealed Dry Interior Locations: Use only building wire Type THHN/THWN or XHHW insulation in raceway, or metal clad cable where concealed and code acceptable.

M. Exposed Dry Interior Locations: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.

N. Above Accessible Ceilings: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway or metal clad cable where code acceptable.

O. Wet or Damp Interior Locations: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.

P. Exterior Locations: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.

Q. Underground Installations: Use only building wire, Type THHN/THWN or XHHW insulation, in raceway.

R. Wiring methods, in general, are as follows:

1. Galvanized rigid steel conduit shall be used for telephone system sleeves for main cable runs between floors, closets, etc. and for sweeps, bends, etc. in ductbanks and as specifically noted on the plans. EMT shall be used generally for exposed circuiting in unfinished spaces. Metal clad cable (type MC) may be used for branch circuiting and fire alarm rated MC cable for fire alarm circuiting where run concealed and where code acceptable.
2. To prevent transmittal of vibration to conduit, connections to any vibration producing equipment (i.e. transformers, motors, etc.) shall be terminated by 18 inches of flexible metal conduit. Where flexible connections are exposed to grease and oil, liquid-tight flexible metal conduit shall be used.
3. In general, no splices or joints shall be permitted in either feeders or branches except at outlets or accessible junction boxes. Splices in wire #8 AWG and smaller shall be pigtail type, made mechanically tight. All conduit systems shall be complete.
4. Raceway, boxes, etc., run on walls in wet areas which are subject to being washed down, shall be mounted on the walls with 1/4" stand-offs. All boxes shall be cast type.

S. Route wire and cable as required to meet the Project Conditions. Install cable in accordance with the NECA "Standard of Installation." Use solid conductor for feeders and branch circuits 10 AWG and smaller. Use stranded conductors for control circuits. Use conductor not smaller than 12 AWG for power and lighting circuits. Use conductor not smaller than 16 AWG for control circuits. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 75 feet (25 m). Use 10 AWG conductors for 20 ampere, 277 volt branch circuits longer than 200 feet (160 m). Pull all conductors into raceway at same time. Use suitable wire pulling lubricant for building wire 4 AWG and larger. Protect exposed cable from damage.

T. Support cables above accessible ceiling, using spring metal clips or metal cable ties to support cables from structure or ceiling suspension system, cables that are not part of the ceiling system cannot be supported from ceiling supports. Do not rest cable on ceiling panels. Use suitable cable fittings and connectors. Neatly train and lace wiring inside boxes, equipment, and panelboards.

U. Clean conductor surfaces before installing lugs and connectors. Make splices, taps, and terminations to carry full ampacities of conductors with no perceptible temperature rise. Use suitable reducing connectors or mechanical connector adapters for connecting aluminum conductors to copper conductors. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape un-insulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller. Identify and color code wire and cable. Identify each conductor with its circuit number or other designation indicated.

2.3 BOXES

A. Outlet Boxes:

1. Each outlet in wiring or raceway systems shall be provided with an outlet box to suit conditions encountered. Boxes installed in normally wet locations shall be of cast-metal type having hubs. Concealed boxes shall be cadmium plated or zinc coated sheet metal type. Old work boxes with Madison clamps are not allowed in new construction.
2. Each box shall have sufficient volume to accommodate number of conductors in accordance with requirements of NFPA 70. Boxes shall not be less than 1-1/2" deep unless shallower boxes are required by structural conditions and are specifically approved by Architect. Ceiling and bracket outlet boxes shall not be less than 4" octagonal except that smaller boxes may be used where required by particular fixture to be installed. Flush or recessed fixtures shall be provided with separate junction boxes when required by fixture terminal temperature requirements. Switch and receptacle boxes shall be 4" square or of comparable volume. Luminaire and equipment supporting boxes shall be rated for weight of equipment supported; include 1/2 inch (13 mm) male fixture studs where required.
3. Provide metallic boxes rated for 2-hour, fire-rated walls with gasket to reduce noise-transmission in all fire-rated walls. A minimum horizontal distance of 24-inches shall separate metallic boxes located on opposite sides of walls. This minimum horizontal spacing may be reduced using UL classified wall opening protective materials, commonly known as "putty pads" or "insert pads" pending written approval from the local authority having jurisdiction (AHJ). Refer to Architect's plans for all wall types prior to bid and any related work.
4. All boxes installed in demising walls separating tenants, electrical room walls, mechanical room walls, conference room walls, nurse's office walls, and other room walls deemed private by the Owner shall be provided with gasket to reduce noise-transmission.
5. All boxes installed in exterior walls shall be provided with appropriate caulking and gaskets to seal off and prevent air leakage. Follow caulking and gasket manufacturer's installation guidelines to ensure correct and effective installation.
6. Acceptable Manufacturers:
   a. Appleton
   b. Crouse Hinds
   c. Steel City
   d. RACO

B. Pull and Junction Boxes: Where necessary to terminate, tap off, or redirect multiple raceway runs or to facilitate conductor installation, furnish and install appropriately designed boxes. Boxes shall be fabricated from code gauge steel assembled with corrosion resistant machine screws. Box size shall be as required by Code. Where intermediate cable supports are necessary because of box dimensions, provide insulated removable core brackets to support conductors. Junction boxes are to be equipped with barriers to separate circuits. Where splices are to be made, boxes shall be large enough to provide ample work space. All conductors in boxes are to be clearly tagged to indicate characteristics. Boxes shall be supported independently of raceways. Junction boxes in moist or wet areas shall be galvanized type. Boxes larger than 4-inches square shall have hinged covers. Boxes larger than 12-inches in one dimension will be allowed to have screw fastened covers, if a hinged cover would not be capable of being opened a full 90 degrees due to installation location.

C. Fiberglass Handholes shall be die molded glass fiber. Cable Entrance shall be pre-cut 6-inch x 6-inch (150 mm x 150 mm) cable entrance at center bottom of each side. Cover shall be glass fiber weatherproof cover with nonskid finish.

D. Install boxes in accordance with NECA "Standard of Installation." Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.

E. Set wall mounted boxes at elevations to accommodate mounting heights indicated or specified in section for outlet device. Electrical boxes are shown on drawings in approximate locations unless dimensioned. Adjust box location up to 10-feet (3m) if required to accommodate intended purpose. Orient boxes to accommodate wiring devices. Maintain headroom and present neat mechanical appearance.

F. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches (150 mm) from ceiling access panel or from removable recessed luminaire. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Division 7.

G. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.

H. Use flush mounting outlet box in finished areas. Locate flush mounting box in masonry wall to require cutting

ISSUED FOR CONSTRUCTION - MAY 7, 2025

Smoke/Carbon Monoxide Detectors for:

er only. Coordinate masonry cutting to achieve neat opening. Do not install flush back in walls; provide minimum 6-inches (150 mm) separation. Provide minimum 24 ration in acoustic rated walls. Secure flush mounting box to interior wall and partition tion to allow for surface finish thickness. Use stamped steel bridges to fasten flush tween studs. Install flush mounting box without damaging wall insulation or reducing its

hannel fasteners for hung ceiling outlet box. Do not fasten boxes to ceiling support independently of conduit. Use gang box where more than one device is mounted sectional box. Use gang box with plaster ring for single device outlets. Use cast outlet exposed to the weather and wet locations. Use cast floor boxes for installations in slab boxes are acceptable for other installations. Set floor boxes level.

e hinged enclosure in interior dry locations, surface-mounted cast metal box in other

with finish flooring material. Adjust flush-mounting outlets to make front flush with nstall knockout closures in unused box openings.

ONDING

d equipment in accordance with best industry practice, the requirements of NFPA 70

g bonds between all metallic conduits of the light and power system which enter and nbers or other non-metallic cable pulling and splicing boxes. Accomplish this by duits with bushings of the grounding type individually cross connected.

duits containing grounding electrode conductors and main bonding conductors to the ce enclosure and/or grounding electrode at both ends of each run utilizing grounding pers.

g bonds for all metallic conduits of the light and power system which terminate in pits for which a ground bus is specified. Accomplish this by equipping the conduits with ounding type connected individually to the ground bus.

ntary ground bonding where metallic conduits terminate at metal clad equipment (or at of equipment) for which a ground bus is specified. Accomplish this be equipping the hings of the grounding type connected individually by means of jumpers to the ground jumpers where directed. This exclusion will be required where an isolated ground for ent is to be maintained.

pe bushing shall have the maximum ground wire accommodation available in standard he particular conduit size. Connection to bushing shall be with wire of this maximum

rs on the load size of the service device and equipment grounding conductors shall be n the fuses or trip size of the overcurrent device supplying the circuit.

ment for the fire protective alarm system and telephone system shall have its grounding d to the grounding electrode by means of a No. 6 green coded insulated conductor, run tilize a ground clamp of a type specifically manufactured for the purpose.

ns and tests listed in NETA ATS, Section 7.13. Document test results in Record

shall never exceed 10 ohms when located outdoors, or 5 ohms when located indoors.

NG SYSTEMS

facturers: Hubbel, Pass & Seymour or Arrow Hart. Attachment Plug Construction: 0-1. Configuration: NEMA WD 6; match receptacle configuration at outlet provided for nstruction: ANSI/NFPA 70, Type SO multiconductor flexible cord with identified onductor, suitable for use in damp locations. Size: Suitable for connected load of rd, and rating of branch circuit overcurrent protection.

al requirements for motor control equipment wiring and connections, the following e performed:

nnection of motor controls which will be furnished under the heating, ventilating and air on and the plumbing section.

rter shall have a 1.0" x 2.5" hot stamped nameplate identifying the unit and panel it is shall be white 1/2" high in a black background.

ms: Make electrical connections in accordance with equipment manufacturer's dult connections to equipment using flexible conduit. Use liquid-tight flexible conduit in damp or wet locations. Make wiring connections using wire and cable with mperatures encountered in heat producing equipment. Provide receptacle outlet where ment plug is indicated. Provide cord and cap where field-supplied attachment plug is ble strain-relief clamps and fittings for cord connections at outlet boxes and equipment all disconnect switches, controllers, control stations, and control devices as indicated. rol wiring with terminal block jumpers as indicated. Provide interconnecting conduit and and equipment where indicated.

VICES

s: Provide adequate corrosion resistance. Provide materials, sizes, and types of d supports to carry the loads of equipment and conduit. Consider weight of wire in products. Steel channel shall be galvanized.

:

al Elements: Use precast insert system, expansion anchors.

ements: Use beam clamps, or welded fasteners.

s: Use self-drilling anchors or expansion anchors.

Plaster, and Gypsum Board Partitions: Use toggle bolts or hollow wall fasteners.

alls: Use expansion anchors or preset inserts.

sheet metal screws.

Use wood screws.

ducts in accordance with manufacturer's instructions. Provide anchors, fasteners, and e with NECA "Standard of Installation". Do not fasten supports to pipes, ducts, and conduit. Do not use spring steel clips and clamps. Do not use powder-actuated r cut structural members. Fabricate supports from structural steel or steel channel. Use hexagon head bolts to present neat appearance with adequate strength and ck washers under all nuts. Install surface-mounted cabinets and panelboards with ors. In wet and damp locations use steel channel supports to stand cabinets and off wall. Use sheet metal channel to bridge studs above and below cabinets and n hollow partitions.

NTIFICATION

d three-layer laminated plastic, black letters on white background. Locations: Each nd control equipment enclosure, communication cabinets. Letter Size: Use 1/8 inch dividual equipment and loads. Use 1/4 inch letters for identifying grouped equipment

nesive tape, with 3/16 inch white letters on black background. Use for identification of tacle faceplates indicating panel & circuit number the outlet is fed from and control tion to nameplates as described above, use labels on all panelboards, disconnect circuit breakers to identify where the equipment is fed from, voltage & phase.

or tubing type wire markers. Locations: Each conductor at panelboard gutters, pull on boxes, and each load connection. Power and Lighting Circuits shall be marked with ut or feeder number as indicated on drawings. Control Circuits shall be marked with icated on schematic and interconnection diagrams on drawings

osion and abrasion resistant. Location: Furnish markers for each conduit longer than 6 foot on center. Indicate voltage and phase.

e provided with a typed (hand written is not allowed) circuit directory indicating the load ker and it's location in the building.

TEM

all submit complete documentation for the Fire Alarm/Life Safety System Data Sheets ure compliance with these specifications. Copies of this information shall be submitted Architect award of this work and shall be subject to the approval of the architect.

all submit, as part of the complete bid documentation package, certification that the n distributor is a fully authorized factory trained and certified distributor of the system specification.

d material shall be new and unused, and listed by Underwriter's Laboratories for the purpose. All control panel components, field peripherals and interactive computer be designed for continuous duty operation without degradation of function or

ered by this specification or noted on installation drawings shall be the best equipment ication and shall be provided by a single manufacturer.

ment and accessories and compatible devices for a complete and fully functioning system. The fire alarm system shall be coordinated with and inspected by the ent, and any inconsistency mentioned during any inspection shall be corrected by ditional cost to owner.

shall contain a microprocessor with 10/100 ethernet media access controller (MAC). be designed specifically for fire detection, and notification applications. Specify evacuation

ractor shall coordinate master-box, radio-box, and/or dialer requirements with local fire

FETY SYSTEM SEQUENCE OF OPERATION

a manual station or activation of any automatic alarm initiating device (system smoke, hall automatically:

ransmission of the alarm to the Municipal Fire Station or approved Central Station via ergy or Radio Master-box.

e 3 temporal evacuation signal over all audio (notification) circuits, except in designated embly. In designated areas of assembly (sound a pre-recorded voice message) and/or ual voice evacuation from the system microphone(s) located at the FACP or remote accordance with the local requirements.

al signals throughout the building in a synchronized manner.

rm LED and sound an audible signal at the FACP. Upon acknowledgement, the alarm ght steadily and the audible shall silence. Subsequent alarms shall re-initiate this

initiation by an elevator lobby smoke detector or other designated recall device, recall that serve the floor of initialization to the main egress level. If the alarm initiates on the level, return the elevator to the alternate floor as directed by the local authority having jurisdiction.

f. Visually indicate the alarm initiating device type and location via the LCD display located at the FACP (and at any remote annunciators) and (illuminate the appropriate alarm zone LED at the remote annunciator).

g. Automatically shut down or control HVAC equipment to initiate smoke control functions as required. Manual override controls and programmable relay interface shall serve as an interface to the Building Automation System.

h. Operate prioritized outputs to release all magnetically held smoke doors and magnetically locked doors throughout the building.

i. Activate the exterior weatherproof beacon.

C. WIRING

1. Provide in accordance with manufacturer's instructions all wiring, conduit and outlet boxes required for the installation of complete system as described herein and as shown on the drawings. Wiring shall be Class A.
2. Installation and fire alarm system wiring shall be installed in metal raceway. An equipment bonding conductor shall be provided in all flexible metallic raceways.
3. Color code for fire alarm systems shall be per the State Fire Alarm code.
4. DC supply to the main fire alarm panel shall be white and black. Fire alarm primary power source shall be on dedicated branch circuit. Circuit breaker locks shall be used. If a separate feed is required for the battery charger it shall be black and white unless the main fire alarm panel required only AC feed. In this case the conductors to the battery charger shall be red and white and shall be on a circuit breaker of fits own.
5. Conductors shall be minimum #14-gauge solid copper type THHN/THWN. Conductor's size shall be increased as required to maintain voltage drop to a maximum of 3%. All AC and DC portions of the system shall be installed in separate raceway. Addressable loop wiring may be #16 providing manufacturer's recommended distance is observed. Systems requiring shielded wiring for addressable loops shall not be acceptable.
6. Red painted terminal cabinets with hinged local covers shall be provided at all junction points. All conductor splices shall be made on screw type terminal blocks, wire nuts shall not be used. All terminals within terminal cabinet shall be properly labeled. Provide terminal cabinet at each building cable entrance and at other locations as required.
7. All fire alarm initiating zone and signal wiring shall be wired Class A.
8. Final connections between the equipment and the wiring system shall be made under the direct supervision of a representative of the manufacturer.
9. Upon completion of the installation of fire alarm equipment, the electrical contractor shall provide to the engineer a signed statement substantially in the form as follows:
   a. The undersigned having been engaged as the electrical contractor on this project confirms the fire alarm equipment was installed in accordance with the specifications and in accordance with wiring diagrams, instructions, and directions provided to us by the manufacturer.

D. GUARANTEE AND FINAL TEST

1. All testing (pre-testing, final testing, quarterly testing and program change testing) to be coordinated with the owner and scheduled in advance so that owners and personnel can be present during testing. Contractor to certify that all tests comply with the "State Fire Code", latest edition.
2. Before this installation shall be considered complete and acceptable to the awarding authorities, a complete test on the system shall be performed as follows:
   a. A pre-test will be held by the electrical contractor with the manufacturer's authorized representative present. After certification of a complete pre-test, the installing contractor shall inform the authority having jurisdiction of the outcome of the test and will re-inspect in the presence of the authority having jurisdiction and the manufacturer's authorized representative.
   b. Final test: The electrical contractor in the presence of authorized representative of the manufacturer and the fire department shall operate every manual station, smoke detector, and thermodetector. Each station/detector circuit and horn circuit shall be opened in at least two locations to check for the presence of correct supervisory circuitry. When this testing ats been completed to the satisfaction of both the electrical contractor's job foreman and the representative of the manufacturer, a letter from the contractor cosigned by the manufacturer attesting t the satisfactory completion of said testing, shall be forwarded to the owner.
3. The electrical contractor shall guarantee all equipment and wiring to be free from inherent mechanical and electrical defects for a period of one year from the date of final acceptance.
4. The contractor shall provide the Owner with a formal written equipment guarantee upon completion of the installation and testing of the system. The guarantee period shall begin on the day of acceptance of the system by the Owner and shall provide for a period of one year. This guarantee shall be indicated in the manufacturer's submission prior to approval. This guarantee shall be as normal policy by the equipment manufacturer.
5. The manufacturer shall maintain a full-time service and parts facility, with seven days per week, 24 hour per day service available.
6. All service technicians shall be licensed by the State Fire Code covering service and maintenance of systems.
7. Include as part of the contract, the four quarterly tests following the final acceptance test. Provide quarterly testing in conformance with the State Fire Code latest addition.

PART 3 - EXECUTION

3.1 BASIC REQUIREMENTS

A. Adhere to best industry practice and the following:

1. All work shall be concealed.
2. Route circuitry runs embedded in concrete to coordinate with structural requirements.
3. Equip each raceway intended for the future installation of wire or cable with a nylon pulling cord 3/16" in diameter and clearly identify both ends of the raceway.
4. Provide all outlet boxes, junction boxes, and pull boxes for proper wire pulling and device installation. Include those omitted from the drawings due to symbolic methods of notation.
5. Utilize lugs of the limited type to make connections at both ends of cables installed on the line side of main service overcurrent and switching devices. Provide cable limiters for each end of each service entrance cable.
6. Beyond the termination of raceways, fireproof the following:
   a. All wires and cables within pad-mounted transformer enclosure.
   b. All service feeder cables ahead of main service overcurrent protection devices, and elsewhere where not in raceways.
7. Fireproofing of wires and cables shall be by means of a half-lapped layer of arcproof or by means of sleeving of a type specifically manufactured for the purpose. Ends of tape or sleeving shall be severed with twine. Fireproofing shall be extended up into raceways. After conductors have been finally shaped into their permanent configuration, fireproofing tape or sleeving shall be coated with silicate of soda (water glass). Fireproofing shall be applied in an overall manner to raceway groupings of conductors.
8. Provide all sleeves through fireproof and waterproof slabs, walls, etc., required for electric work.
9. Provide waterproof sealing for the sleeves through waterproof slabs, walls, etc.
10. Provide fireproof sealing for the sleeves through fireproof walls, slabs, etc.
11. Provide fireproof sealing for the openings in fireproof walls, slabs, etc., resulting from removal of existing electrical sleeves, conduits, poke-thru's etc.
12. No splicing of wires will be permitted in the Fire Alarm System.
13. Bundle wiring passing through pull boxes and panelboards in a neat and orderly manner with plastic cable ties. Cable ties shall be by Ty-Raps as manufactured by Thomas & Betts, Holub Industries Inc., Quick Wrap, Bundy Unirap, or equal.
14. Turn branch circuits and auxiliary system wiring out of wiring gutters at 90 degrees to circuit breakers and terminal lugs.

3.2 TESTING REQUIREMENTS & INSTRUCTIONS

A. Where any repairs, modifications, adjustments, tests or checks are to be made, the Contractor shall contact the Engineer to determine if the work should be performed by or with the Manufacturer's Representative.

B. Tests are to:

1. Provide initial equipment/system acceptance.
2. Provide recorded data for future routine maintenance and trouble-shooting.
3. Provide assurance that each system component is installed satisfactorily and can be expected to perform, and continue to perform its specified function with reasonable reliability throughout the life of the facility.

C. At any stage of construction and when observed, any electrical equipment or system determined to be damaged, or faulty, is to be reported to the Engineer. Corrective action by the Contractor requires prior Engineer approval, retesting, and inspection.

D. When the electrical tests and inspections specified or required within Division 16 are completed and results reported, reviewed, and approved by the Engineer, the Contractor may consider that portion of the electrical equipment system or installation electrically complete. The Contractor will then affix appropriate, approved, and dated completion or calibration labels to the tested equipment and notify the Engineer of electrical completion. If the Engineer finds completed work unacceptable, he will notify the Contractor in writing of the unfinished or deficient work, with the reason for his rejection, to be corrected by the Contractor. The Contractor will notify the Engineer in writing when exceptions have been corrected. The Contractor will prepare a "Notification or Substantial Electrical Completion" for approval by the Engineer following Engineer's acceptance of electrical completion. If later in-service operation or further testing identified problems attributable to the Contractor, these will be corrected by the Contractor, at no additional cost to the Authority.

3.3 BRANCH CIRCUITRY

A. For all lighting and appliance branch circuitry, raceway sizes shall conform to industry standard maximum permissible occupancy requirements except where these are exceeded by other requirements specified elsewhere.

B. Circuits shall be balanced on phases at their supply as evenly as possible.

C. Feeder connections shall be in the phase rotation which establishes proper operation for all equipment supplied.

D. Reduced size conductors indicated for any feeders shall be taken as their grounding conductors.

E. Feeders consisting of multiple cables and raceways shall be arranged such that each raceway of the feeder contains one (1) cable for each leg and one (1) neutral cable, if any.

F. For circuitry indicated as being protected at 20 Amps or less, abide by the following:

1. All 20 amp, 120/208 volt, 3-phase, 4-wire combined branch circuit homeruns shall be provided with a #8 AWG neutral conductor.
2. Minimum conductor size shall be No. 12 AWG cooper.
3. Conductors operating at 120 volts extending in excess of 100 ft. or at 277 volts extending in excess of 200 ft., or the last outlet or fixture tap shall be No. 10 AWG cooper throughout.
4. Lighting fixtures and receptacles shall not be connected to the same circuit.

G. Type MC Cable Installation:

1. Where cable is permitted under the products section, the installation of same shall be done in accordance with code and the following:
   a. Cable shall be supported in accordance with code. Tie wire is not an acceptable means of support. Cable supports such as Caddy WMX-6, MX-3, and clamps such as Caddy 449 shall be used. Where cables are supported by the structure and only need securing in place, then ty-raps will be acceptable. Ty-raps are not acceptable as a means of support. All fittings, hangers, and clamps for support and termination of cables shall be of type specifically designed for use with cable, i.e., romex connectors not acceptable.
   b. Armor of cable shall be removed with rotary cutter device equal to roto-split by Seatek Co.; not with a hacksaw.
   c. Use split "Insuliner" sleeves at terminations.

3.4 REQUIREMENTS GOVERNING ELECTRICAL WORK IN DAMP OR WET LOCATIONS

A. Outlets and outlet size boxes shall be of galvanized cast ferrous metal only.

B. The finish of threaded steel conduit shall be galvanized only.

C. Wires for pulling into raceways for lighting and appliance branch circuitry shall be limited to "THWN".

D. Wires for pulling into raceways for feeders shall be limited to "THWN".

E. Plates for toggle switches and receptacles shall have gasketed snap shut covers suitable for wet locations while in use.

F. Final connections of flexible conduit shall be neoprene sheathed.

G. Apply one (1) layer of half looped plastic electric insulating tape over wire nuts used for joining the conductors of wires.

H. Enclosures, junction boxes, pull boxes, cabinets, cabinet trims, wiring troughs and the like, shall be fabricated of galvanized sheet metal, shall conform to the following:

1. They shall be constructed with continuously welded joints and seams.
2. Their edges and weld spots shall be factory treated with cold galvanizing compound.
3. Their connection to circuitry shall be by means of watertight hub connectors with sealing rings.

I. Enclosures for individually mounted switching and overcurrent devices shall be NEMA Class IV weatherproof construction.

J. The covers, doors and plates and trims used in conjunction with all enclosures, pull boxes, outlet boxes, junction boxes, cabinets and the like shall be equipped with gaskets.

K. Panels shall be equipped with doors without exception.

L. The following shall be interpreted as damp or wet locations within building confines:

1. Spaces where any designations indicating weatherproof (WP) or vapor proof appear on the drawings.
2. Below waterproofing in slabs applied directly on grade.
3. Spaces defined as wet or damp locations by Article 100 of the National Electric Code.
4. Parking garage.

3.5 LIMITING NOISE PRODUCED BY ELECTRICAL INSTALLATION

A. Perform the following work, in accordance with field instructions issued by the Architect to assure that minimal noise is produced by electrical installations due to equipment furnished as part of the electrical work.

B. Check and tighten the fastenings of sheet metal plates, covers, doors and trims used in the enclosures of electrical equipment.

C. Remove and replace any individual device containing one or more magnetic flux path metallic cores (e.g., discharge lamp ballast, transformer, reactor, dimmer, and solenoid) which is found to have a noise output exceeding that of other identical devices installed at the project.

3.6 SUPPORTS AND FASTENINGS

A. Support work in accordance with best industry standards, and Local Electric Code.

B. Include supporting frames or racks for equipment, intended for vertical surface mounting, which is required in a free standing position.

C. Supporting frames or racks shall be of standard angle, standard channel or specialty support system steel members. They shall be rigidly bolted or welded together and adequately braces to form a substantial structure. Racks shall be of ample size to assure a workmanlike arrangement of all equipment mounted on them.

D. No work intended for exposed installation shall be mounted directly on any building surface. In such locations, flat bar members or spaces shall be used to create a minimum of ½" air space between the building surfaces and the work. Provide ½" thick exterior grade plywood painted with two (2) coats of fire-retardant gray paint for mounting of panelboards.

E. Nothing shall rest on, or depend for support on, suspended ceiling media.

G. Support less than 2" trade size, vertically run, conduits at intervals no greater than 8'. Support such conduits, 2-1/2" trade size or larger, at intervals no greater than they story height, or 15', whichever is smaller.

H. Where they are not embedded in concrete, support less than 1" trade size, horizontally run, conduits at intervals no greater than 7". Support such conduits, 1" trade size or larger, at intervals no greater than 10'.

I. Support all lighting fixtures directly from structural slab, deck or framing member.

J. Where fixtures and ceilings are such as to require fixture support from ceiling openings frames, include in the electric work the members necessary to tie back the ceiling opening frames to ceiling suspension members or slabs so as to provide actual support for the fixtures noted above.

K. As a minimum procedure, in suspended ceilings support smalls runs of circuitry (e.g., conduit not in excess of 1" trade size) from ceiling suspension members as defined above. Support larger runs of circuitry directly from structural slabs, decks or framing members.

L. Fasten electric work to building structure in accordance with the best industry practice.

M. Floor mounted equipment shall not be held in place solely by its own dead weight. Include floor anchor fastenings in all cases.

N. For items which are shown as being ceiling mounted at locations where fastenings to the building construction element above is not possible, provide suitably auxiliary channel or angle iron bridging tying to building structural elements.

O. As a minimum procedure, where weight applied to the attachment points is 100 lbs. or less, fasten to concrete and solid masonry with bolts and expansion shields.

P. As a minimum procedure, where weight applied to building attachment points exceed 100 lbs., but is 300 lbs. or less, conform to the following:

1. At field poured concrete slabs, utilize inserts with 20' minimum length slip-through steel rods, set transverse to reinforcing steel.

3.7 SPLICING AND TERMINATING WIRES AND CABLES

A. Maintain all splices and joints in removable cover boxes or cabinets where they may be easily inspected.

B. Locate each completed conductor splice or joint in the outlet box, junction box, or pull box containing it, so that it is accessible from the removal cover side of the box.

C. Join solid conductors No. 8 AWG and smaller by securely twisting them together and soldering, or by using insulated coiled steel spring "wire nut" type connectors. Exclude "wire nuts" employing non-expandable springs. Terminate conductors No. 8 AWG and smaller by means of a neat and fast holding application of the conductors directly to the binding screws or terminals of the equipment or devices to be connected.

D. Join, tap and terminate standard conductors No. 6 AWG and larger by means of solder sleeves, taps, and lugs with applied solder or by means of bolted saddle type or pressure indent type connectors, taps and lugs. Exclude connectors and lugs of the types which apply set screws directly to conductors. Where equipment or devices are equipped with set screw type terminals which are impossible to change, replace the factory supplied set screws with a type having a ball bearing tip. Apply pressure indent type connectors, taps and lugs utilizing tools manufactured specifically for the purpose and having features preventing their release until the full pressure has been exerted on the lug or connector.

E. Except where wire nuts are used, build up insulation over conductor joints to a value, equal both in thickness and dielectric strength, to that of the factory applied conductor insulation. Insulation of conductor taps and joints shall be by means of half-lapped layers of rubber tape, with an outer layer of friction tape; by means of half-lapped layers of approved plastic electric insulating tape; or by a means of split insulating casings manufactured specifically to insulate the particular connector and conductor, and fastened with stainless steel or non-metallic snaps or clips.

3.8 PULLING WIRES INTO CONDUITS AND RACEWAYS

A. Delay pulling wires or cables in until the project has progressed to a point when general construction procedures are not liable to injure wires and cables, and when moisture is excluded from raceways.

B. Utilize nylon snakes or metallic fish tapes with ball type heads to set up for pulling. In raceways 2" trade size and larger, utilize a pulling assembly ahead of wires consisting of a suitable brush followed by a 3-1/2" diameter ball mandrel.

C. Leave sufficient slack on all runs of wire and cable to permit the secure connection of devices and equipment.

D. Include circular wedge-type cable supports for wires and cables at the top of any vertical raceway longer than 20 feet. Also include additional supports spaced at intervals which are no greater than 10'. Supports shall be located in accessible pull boxes. Supports shall be of a non-deteriorating insulating material manufactured specifically for the purpose.

E. Pulling lubricants shall be used. They shall be products manufactured specifically for the purpose.

3.9 REQUIREMENTS FOR THE INSTALLATION OF JUNCTION BOXES, OUTLET BOXES AND PULL BOXES

A. Flush wall-mounted outlet boxes shall not be set back to back but shall be offset at least 12" horizontally regardless of any indication on the drawings.

B. Locate all boxes so that their removable covers are accessible without necessitating the removal of parts of permanent building structure, including piping, ductwork, and other permanent mechanical elements.

C. In conjunction with concealed circuitry, abide by one of the following instructions (as may be applicable to the conditions) in order to assure the aforementioned accessibility. (Not required for circuitry concealed by removable suspended ceiling tiles.)

D. For a small (outlet size) box on circuitry concealed in a partition or wall, locate box or fitting so that its removable cover side, (or the face of any applied raised cover) penetrates through to within 1/8" of the exposed surface of the building materials concealing the circuitry and apply a blank or device plate to suit the functional requirements.

E. For a large box on circuitry concealed in a partition, suspended ceiling, or wall, locate box totally hidden but with its removable cover directly behind an architectural access door or panel (included for the purpose, separate from the electric work) in the building construction which conceals the circuitry.

F. Include all required junction and pull boxes regardless of indications on the drawings (which, due to symbolic methods of notation, may omit to show some of them).

G. Unless noted below or otherwise specifically indicated, include a separate outlet box for each individual wiring device, lighting fixture and signal or communication system outlet component. Outlet boxes supplied attached to lighting fixtures shall not be used as replacements for the boxes specified herein.

H. Utilize an outlet box no smaller than 5" square by 2-1/2" deep.

I. Allow no fixture to be supplied from an outlet box in another room.

J. Multiple local switches indicated at a single location shall be gang-mounted in a single outlet box.

K. Install junction boxes, pull boxes and outlet boxes in conjunction with concealed circuitry.

L. Close up all unused circuitry openings in outlet boxes. Unused openings in cast boxes shall be closed with approved cast metal threaded plugs. Unused openings in sheet metal boxes shall be closed with sheet metal knock-out plugs.

M. Outlet boxes for switches shall be located at the strike side of doors. Indicate door swings are subject to field change. Outlet boxes shall be located on the basis of final door swing arrangements.

N. Boxes and plaster covers for duplex receptacles shall be arranged for vertical mounting of the receptacle.

O. Equip outlet boxes used for devices which are connected to wires of systems supplied by more than one set of voltage characteristics with barriers to separate the different systems.

P. Barriers in junction and pull boxes of outlet size shall be of the same metal as the box.

Q. Barriers in junction and pull boxes which are larger than outlet size shall be of the polyester resin fiberglass of adequate thickness for mechanical strength, but in no case less than 1/4" thick. Each barrier shall be mounted, without fastenings, between angle iron guides so that they may be readily removed.

3.10 LOCATING AND ROUTING OF CIRCUITRY

A. In general, all circuitry shall be run concealed except that it shall be run exposed where the following conditions occur:

1. Horizontally at the ceiling of permanently unfinished spaces which are not assigned to mechanical or electrical equipment.
2. Horizontally and vertically in mechanical equipment spaces.
3. Horizontally and vertically in electric equipment rooms.

B. Concealed circuitry shall be so located that building construction materials can be applied over its thickest elements without being subject to spalling or cracking.

C. All circuitry and racewaysshall not be run within slabs. If field conditions requires raceways to be embedded in field-poured structural building construction concrete fill or slab shall conform to the following:

1. Where turned up or down into a wall or partition they shall, before entering same, be routed parallel for a long enough distance to assure that no relocation of the wall or partition will be necessary to conceal the required bend.
2. They shall be routed in such a manner as to coordinate with the structural requirements of the building.
3. They shall be routed in accordance with field instructions issued by the Architect where such instructions differ from specifications set forth herein.

D. Circuitry run exposed shall be routed parallel to building walls and column lines.

E. Circuitry shall be routed so as to prevent electric conductors from being subject to high ambient temperature. Minimum clearances from heated lines or surfaces shall be maintained as follows:

1. Crossing where uninsulated: 3".
2. Crossing where insulated: 1"
3. Running parallel where uninsulated: 36".
4. Running parallel where insulated: 6".

F. Circuitry shall not be run in elevator shafts, hoistways, and the like. Where outlets for trail cables, pit lights, run be level lights, and the like, are involved, only the "final connection" outlet boxes themselves shall be located within or open into, the confines of the shaft.

3.11 INSTALLING CIRCUITRY

A. The outside surface of circuitry, which is to be embedded in cinder concrete, shall be coated with asphaltum paint.

B. In runs of conduit or raceway including flexible limit the number of bends between cable access points to a total which does not exceed the maximum specified for the particular system. Where no such maximum is specified, limit the number to four (4) right angle bends or the equivalent thereof.

C. In each conduit or raceway assigned for the future pulling in of wires, include a nylon drag cord. In raceways 2" trade size and larger, the cord shall be pulled in utilizing a suitable brush, followed by an 85% diameter ball mandrel ahead of the cord in the pulling assembly. In the event that obstructions are encountered, which will not permit the drag cord to be installed, the blocked section of raceway shall be replaced and any cutting and patching of the structure involved in such replacement shall be included as part of the electric work.

D. Circuitry shall be arranged such that conductors of one feeder or circuitry carrying "going" current are not separated from conductors of the same feeder or circuitry carrying "return" current by any ferrous or other metal. Where not within raceways, all "going" and "return" current conductors of one feeder or circuit shall be laced together so as to minimize induction heating of adjacent metal components.

E. Sleeves used where circuitry is to penetrate waterproof slabs, decks and walls, shall be of a type selected to suit the water condition encountered in the field.

END OF SECTION

ISSUED FOR CONSTRUCTION - MAY 7, 2025

Smoke/Carbon Monoxide Detectors for

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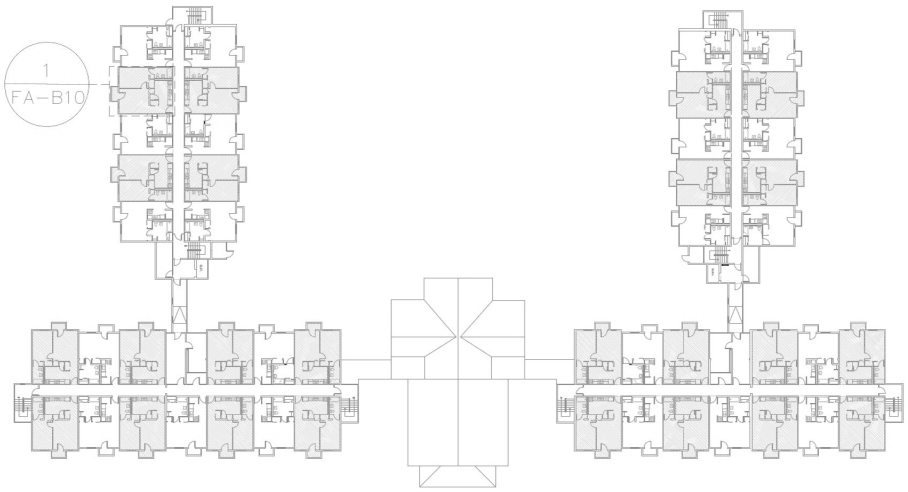
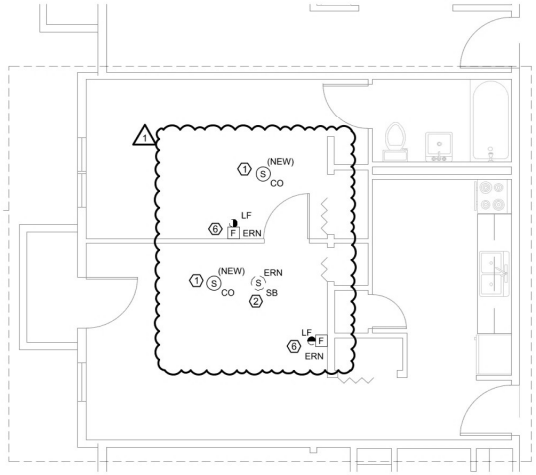


KEY PLAN



1 FIRE ALARM - ENLARGE SINGLE BEDROOM FLOOR PLAN - EXISTING/NEW
1/4" = 1'-0"

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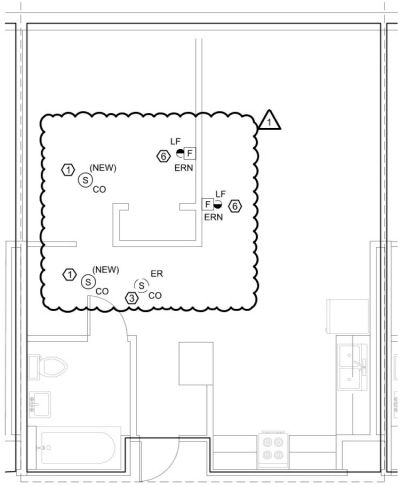
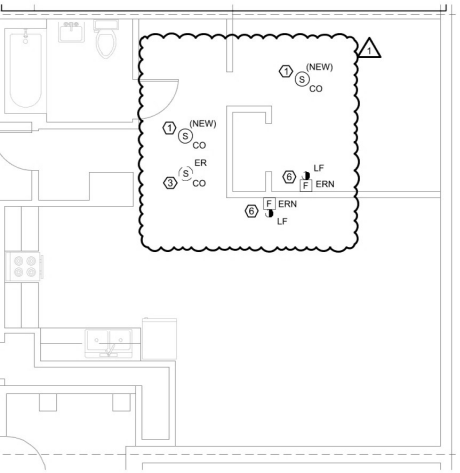
Smoke/Carbon Monoxide Detectors for:

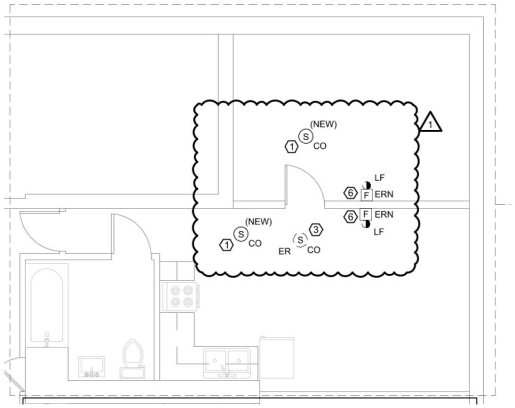


RE ALARM - ENLARGE FLOOR PLAN - UNIT 1 BED - TYPE A - EXISTING/NEW
4" = 1'-0"

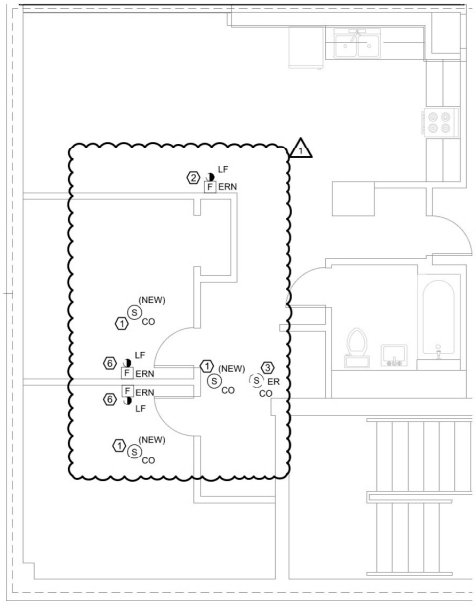
KEY PLANS



ALARM - ENLARGE FLOOR PLAN - UNIT 1 BED - TYPE B - EXISTING/NEW
1'-0"



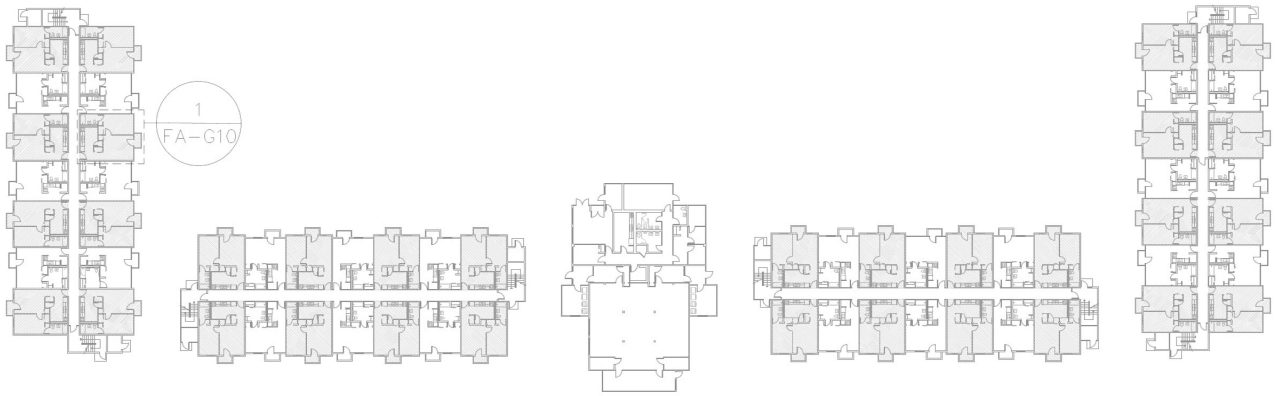
3 FIRE ALARM - ENLARGE FLOOR PLAN - UNIT 1 BED - TYPE C - EXISTING/NEW
1/4" = 1'-0"



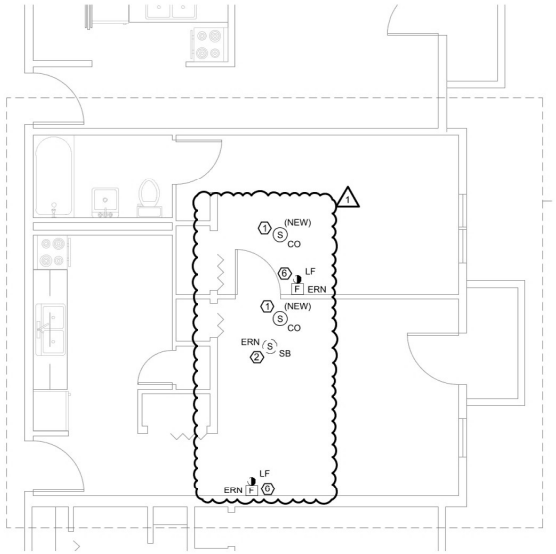
4 FIRE ALARM - ENLARGE FLOOR PLAN - UNIT 2 BED - TYPE A - EXISTING/NEW
1/4" = 1'-0"

ISSUED FOR CONSTRUCTION - MAY 7, 2025

Smoke/Carbon Monoxide Detectors for:



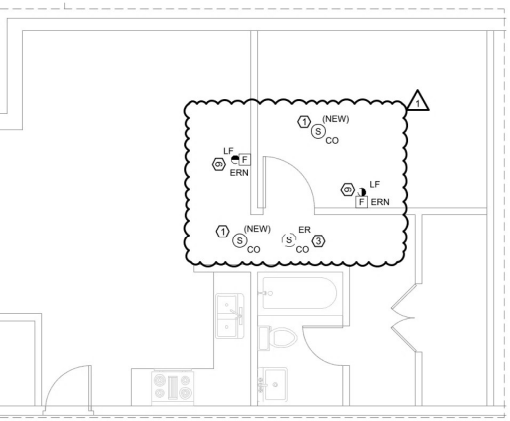
KEY PLAN



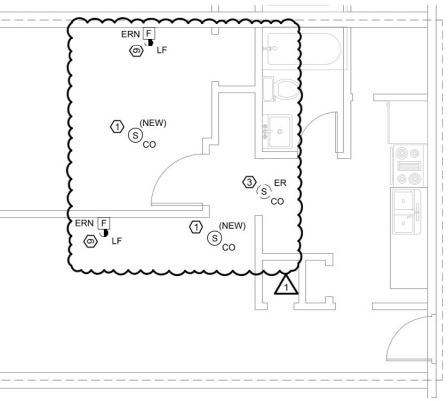
1 FIRE ALARM - ENLARGE SINGLE BEDROOM FLOOR PLAN - EXISTING/NEW
1/4" = 1'-0"

ISSUED FOR CONSTRUCTION - MAY 7, 2025

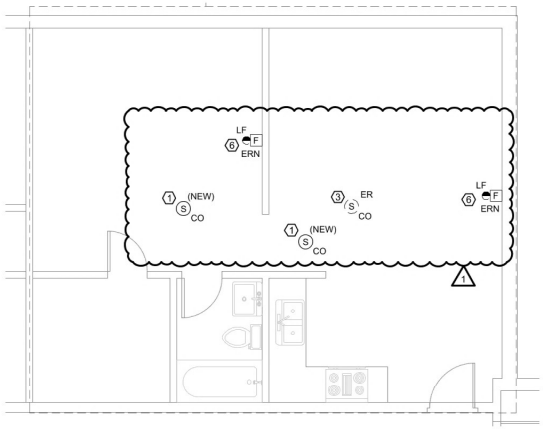
Smoke/Carbon Monoxide Detectors for:



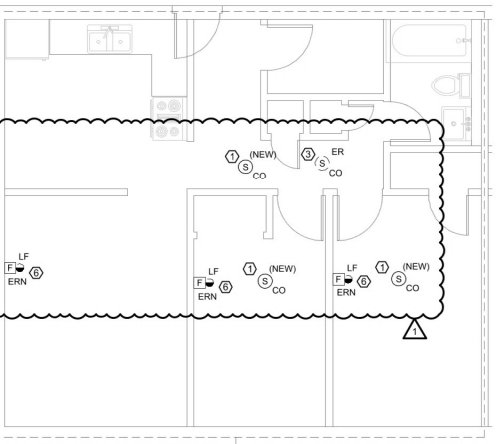
E ALARM - ENLARGE FLOOR PLAN - UNIT 1 BED - TYPE A - EXISTING/NEW
" = 1'-0"



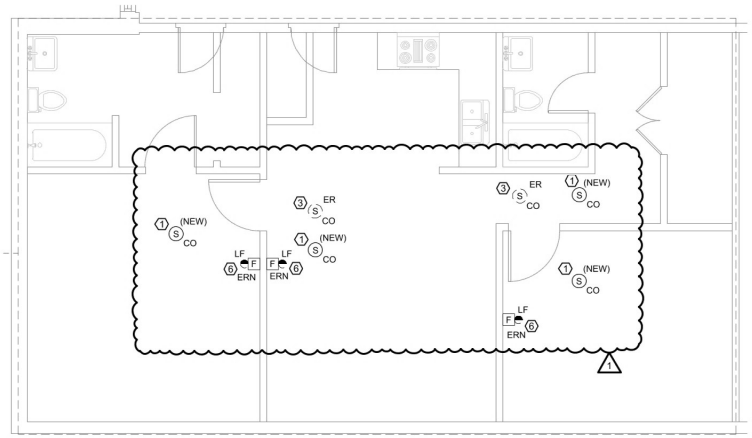
E ALARM - ENLARGE FLOOR PLAN - UNIT 1 BED - TYPE B - EXISTING/NEW
" = 1'-0"



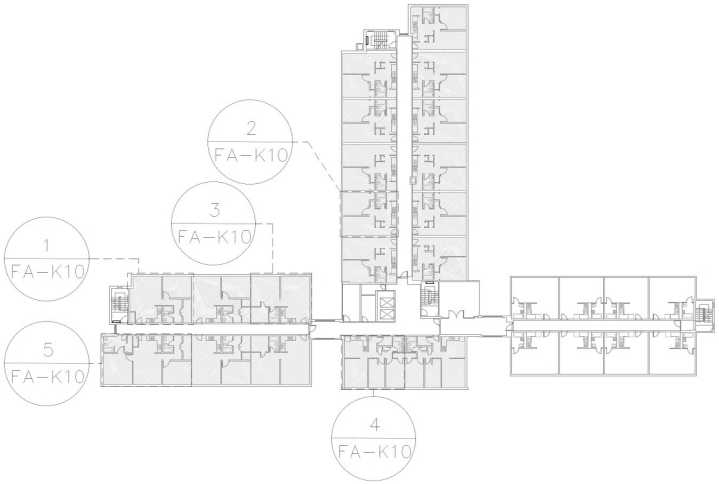
3 FIRE ALARM - ENLARGE FLOOR PLAN - UNIT 1 BED - TYPE C - EXISTING/NEW
1/4" = 1'-0"



E ALARM - ENLARGE FLOOR PLAN - UNIT 2 BED - TYPE A - EXISTING/NEW
" = 1'-0"



5 FIRE ALARM - ENLARGE FLOOR PLAN - UNIT 2 BED - TYPE B - EXISTING/NEW
1/4" = 1'-0"



KEY PLAN

ISSUED FOR CONSTRUCTION - MAY 7, 2025

Smoke/Carbon Monoxide Detectors for:

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