



OAKLAND UNIFIED SCHOOL DISTRICT

Fire and Intrusion Alarm Systems Standards

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FIRE ALARM SYSTEM STANDARDS

PART 1 – GENERAL

1.01 General and Special Conditions

This fire alarm standard is intended to be used by the architect and architect's sub-consultant(s) for the development of detailed fire alarm drawings, product data sheets with California State Fire Marshal (CSFM) listing sheets, and specifications. This standard shall also be followed by the installing contractor, as applicable during the submittal, construction, testing, closeout and warranty and maintenance phases of the project. The standard shall be used by the DSA inspector of record (IOR) during installation inspections and testing of the fire alarm system.

- A. The fire alarm drawings shall be prepared by the architect's fire alarm sub-consultant (fire alarm designer). The fire alarm drawings shall be submitted to the Division of the State Architect (DSA). The fire alarm designer shall provide all required elements on the fire alarm drawings. Required design responsibilities shall not be delegated to the fire alarm contractor through the preparation of contractor shop drawings. The fire alarm drawings shall be sufficiently detailed for installation and shall provide all elements described in this Standard and by governing code(s).
- B. The fire alarm designer's drawings shall be the only drawings developed and used for the fire alarm system installation through the entire duration of the project. Architects shall utilize a Fire Alarm Consultant, approved by OUSD, to produce the fire alarm drawings.
- C. Prior to the initial design of the fire alarm system by the architect/fire alarm designer, a pre-design meeting shall be scheduled with the OUSD project team. The project team may consist of OUSD's fire alarm consultant, OUSD's architect, OUSD's fire alarm coordinator, OUSD's Buildings and Grounds (B&G) fire alarm technicians, OUSD's Project Manager, and OUSD's fire alarm vendor, Johnson Controls (JCI). Note: Simplex is a brand of JCI.
- D. A mandatory job-walk with the architect/fire alarm designer and the OUSD project team shall be required prior to the start of the design to review the site conditions. It is the intent of the mandatory job walk that device locations be thoroughly examined for access, such as smoke detector locations over stairs, in mechanical rooms or classroom heater rooms. Devices are to be located in a manner where they can be readily accessed for maintenance purposes. Devices shall be installed in a manner that permits testing with a Solo smoke, heat and CO tester. Devices shall not be installed in locations where they may be obstructed by storage or furnishings, or accessible to vandalism and tampering.
- E. The architect shall verify existing sprinkler components for completeness. Sprinkler system shut off valves shall have valve position monitoring devices (tamper switches) added as part of the fire alarm system upgrade if none exist. The added tamper switches shall be connected to the fire alarm system to report a supervisory condition to the system in the event the valve is closed. Sprinkler riser waterflow switches shall have waterflow monitoring devices added to report a waterflow event to the FACU as part of the fire alarm system update if none exist. If a tamper switch or flow switch need to be added, provisions should be made by the architect to show this installation requirement under the mechanical (plumbing) work as it is work of a different trade.
- F. On all school repaving projects of playgrounds, drive ways, etc., prior to the paving activity the fire alarm control unit status shall be verified with an OUSD fire alarm representative before the paving starts. If there is evidence of a problem (underground conduit and wire damaged during the demolition of the existing pavement), corrections shall be made and verified prior

to starting the paving activity. Existing structures without fire/security alarm protection connected to the main building fire/security alarm system shall have 2-inch underground conduit installed as part of the repaving project. This is to be coordinated with the OUSD Project Manager and OUSD alarm technician.

- G. Prior to the final design package being submitted to DSA, OUSD requires the final design documents to be reviewed by the OUSD's project team. If the project is new construction, the entire submittal package shall be provided for review, including but not limited to, architectural, mechanical, electrical, plumbing, fire protection and fire alarm drawings. Any comments generated by the OUSD project team shall be addressed by the architect/designer and if requested, the drawings shall be resubmitted to OUSD project team for back check, prior to submitting to DSA. Any comments made by DSA shall be reviewed by OUSD's project team prior to back-check to DSA.
- H. No fire suppression systems are to be installed without certification and testing in accordance with NFPA, DSA, and Oakland Fire Department (OFD) requirements.
- I. Architect and Designer shall review the fire alarm drawings with OUSD. Submit the 100 percent fire alarm drawings to the JCI (Simplex) Livermore office for technical review. Then Architect and Designer are to obtain OUSD/DSA approvals prior to bid.
- J. The project architect shall prepare a specification and drawing for a two-way communication system (emergency communication system), when such system is required by building or fire code. Reference part 1.02 for drawing requirements. Reference part 2.16 for equipment.
- ~~K.~~ The project architect shall prepare a specification and drawing for an Emergency Responder Radio Communication System (ERRCS), when such system is required by the building or fire code official. Reference part 1.02 for drawing requirements.
- ~~K.L.~~ Where a new system replaces an existing fire alarm system, all existing unused fire alarm devices, conduit, and wiring shall be removed following final acceptance of the new fire alarm system.
- ~~L.M.~~ These Standards may exceed DSA requirements, but the contractor shall comply with these Standards for all fire alarm installations in the District.

1.02 Submittals

- A. General
 - 1. OUSD's project team shall review all submittals for conformance with this Standard. If submittals, upon review by the OUSD project team, are found to not conform to the requirements of this fire alarm standard; the architect/designer shall be required to resubmit with modifications.
 - 2. All equipment shall be installed in accordance with the manufacturer's recommendations and the UL listing limitations. The architect/designer shall provide evidence with the submittal of listings of all proposed equipment and combinations of equipment.
 - 3. The OUSD fire alarm vendor shall be consulted to confirm all model numbers of proposed equipment are still valid.

B. Equipment List/Product Data

1. Prior to DSA submittal, the architect/designer shall submit a minimum of three (3) copies to the OUSD project team of a detailed equipment list, identifying types, models, and quantities of all materials, devices, and equipment proposed. This submittal shall include manufacturer's data sheets showing the types and models of all equipment, devices, material, and wire proposed. Evidence of UL listings and CSFM listings shall be submitted with the data sheets.
2. Submit full sets of product submittals bound in protective binders. A Bill of Materials shall be provided listing the part number and quantity of all components and devices. All data sheets shall be original manufacturer's literature or shall be clearly legible. When a data sheet shows more than one product, the proposed product shall be clearly indicated by arrows or other suitable means.

C. Fire Alarm Drawings

1. Prior to DSA submittal, the architect/designer/electrical consultant shall prepare and submit a minimum of three copies of the fire alarm drawings to the OUSD Project Manager for review and acceptance by OUSD.
2. The fire alarm drawings shall comply with NFPA 72 and include all applicable elements listed in 1) NFPA 72 chapter 7 for Shop Drawings, 2) California Building Code Section 907.1.2, and 3) DSA project submittal Guidelines including but not limited to the following information:
 - a. A legend sheet detailing all equipment model numbers and descriptions, device quantities and device CSFM listing numbers.
 - b. All plans and shop drawings shall use the symbols identified in NFPA 170, Standard for Fire Safety and Emergency Symbols.
 - c. A wire legend detailing the type and quantity of cables and conductors for each circuit.
 - d. Sequence of Operation for each type of device on the fire alarm system.
 - e. School Site Plan – To include:
 - 1) All structures on site.
 - 2) Each system's connection(s) and show the interconnection(s) of structures on the site (clearly labeled).
 - 3) Locations of all FACU and all sub-panels or power supplies.
 - 4) Locations of all "exterior audible" appliances including fire sprinkler bells or horns as applicable.
 - 5) Locations of all post indicator valves (PIVs), waterflow indicators, and other devices with supervisory capability.
 - 6) All fire alarm pathways between buildings.
 - f. Fire alarm device point list. The list shall provide the point number, device type, and location description. The location description shall be in the format of building name, floor, and room number. The location description for devices located in corridors shall reference a nearby room name/number. The description for input or output modules shall include the device monitored or controlled. The point list shall be coordinated with floor plan device annotations.
 - g. Building floor plans drawn to scale, showing device locations; complete wiring and schematic diagrams, including quantity, size and type of conductors and conduit for both existing and new, wire color codes, and field terminations; manufacturer-provided detailed device wiring diagrams for all devices, control panel layouts, including all modules, circuit terminals and interconnections, overall cabinet dimensions, and panel



- front layouts; complete riser diagrams indicating wiring sequence for all devices and control equipment, including all required wiring between the digital alarm communicator transmitter and the fire alarm control unit. Drawings shall show proposed layout and anchorage of equipment and appurtenances and equipment relationship to other parts of the work, including clearances for maintenance and operation. Prepare fire alarm drawings at a minimum scale of 1/8 inch equals 1 foot per plans. All fire alarm drawings are to be provided with the manufacturer's logo clearly printed on each drawing.
- h. Floor plan device annotations: A valid point address shall be assigned to each addressable device. The format of the point address shall include the system node (where applicable), loop, and sequential number. For example, N1M1-001.
 - i. Device annotations, including strobe candela ratings, and speaker wattage taps shall be provided near the associated devices on the drawings.
 - j. The verbiage of the EVAC pre-recorded message for all emergencies shall be provided on the plans.
 - k. Smoke detectors installed over stairways shall be side-wall mounted for accessibility with a ladder placed at the stairway intermediate landing.
 - l. The following verbatim note shall be indicated on the fire alarm floor plan near the FACU:
 - 1) Provide one Cat 6 cable (orange jacket) in 3/4" conduit from the IDF to the FACU for ethernet connection. Provide RJ45 jack in a biscuit block inside the FACU. Provide patch cable between biscuit block and the Safelinc Internet Interface Card. Contractor shall coordinate termination with OUSD.
 - m. The following verbatim note shall be indicated on the drawings:
 - 1) Upon final programming, notification appliances shall be field labeled as directed by JCI.
- D. Provide substantiating calculations, including calculations for determining secondary power supply requirements and voltage drop calculations. The battery and voltage drop calculations shall be performed using worksheets obtained from JCI (Simplex). Battery calculations shall list the type of devices and modules, quantities, unit, and extended amperage draw for quiescent and alarm conditions for required time period, total amperage draw, and battery amp/hour rating. Furnish battery calculations de-rated by 20 percent for all components in each fire alarm control unit, sub-panel, and remote power supply.
- E. The voltage drop calculations shall list the distance and current draw of each notification appliance and the formula used. Each notification appliance circuit shall be depicted on the drawings and the total voltage drop for each notification appliance circuit shall not exceed the manufacturer's recommendations. All existing devices and circuits to be re-used must be included on the floor plans and in the voltage drop calculations.

- F. Submittals at the start of construction.
1. The contractor shall submit spare parts in accordance with this standard.
 2. The contractor shall submit a sample of typical initiating device and typical notification appliance installation for review by the project team. Samples shall include all accessories (as applicable) including standard or deep electrical box, extension ring, fire alarm device including dress skirts or trim plates, wire guard, and ceiling-tile bridge.
- G. Where required, the locations of components for a two-way communication system (emergency communication system) shall be shown on the project architect's code analysis plans, and other subconsultant drawings (electrical, technology or fire alarm) as delegated by the project architect.
- H. Where an Emergency Responder Radio Communication System is provided, the system shall be installed and monitored in accordance with NFPA 1221.
1. System supervisory signals shall include the following:
 - a. Donor antenna malfunction
 - b. Active RF emitting device failure
 - c. Low-battery capacity
 - d. System component failure
 2. Power supply supervisory signals shall include the following for each RF emitting device and system component:
 - a. Loss of normal ac power
 - b. Failure of battery charger
 - 4-3. The communications link between the fire alarm system and the two-way radio communications enhancement system must be monitored for integrity.

1.03 Applicable Codes and Standards

Comply with the following codes and standards (currently adopted by the State of California):

- A. NFPA 72 – National Fire Alarm and Signaling Code.
- B. NFPA 720 – Standard for Installation of Carbon Monoxide Detection and Warning Equipment.
- C. Americans with Disabilities Act (ADA).
- D. California Fire (CFC), California Building Codes (CBC), California Electrical Code (CEC), and California Mechanical Code (CMC).
- E. Division of the State Architect (DSA) guidelines, interpretations, and check list.

1.04 Definitions

- A. Alarm Consultant Jensen Hughes.
- B. ADA: Americans with Disabilities Act.

C.	Approved:	Unless otherwise stated, materials, equipment or submittals approved by the Owner, Owner's Representative, or IOR.
D.	B&G	Oakland Unified School District, Department of Buildings and Grounds
E.	CO	Carbon monoxide.
F.	Concealed:	Where used in connection with installation of piping or conduit and accessories, shall mean "hidden from sight" as in shafts, furred spaces, soffits or above suspended ceilings.
G.	Contractor:	The company awarded the prime contract for this work and any of its subcontractors, vendors, suppliers or fabricators.
H.	CSFM:	California State Fire Marshal.
I.	DSA:	Division of the State Architect.
J.	EVAC	Emergency voice alarm communication.
K.	FACU:	Fire alarm control unit.
L.	FATC:	Fire alarm terminal cabinet.
M.	IOR:	Inspector of Record.
N.	Listed:	Materials or equipment included in a list published by a nationally recognized laboratory that maintains periodic inspection of production of listed equipment and material, and whose listing states either that the equipment or materials meets nationally-recognized standards or has been tested and found suitable for use in a specified manner.
O.	NAC	Notification appliance circuit.
P.	NFPA:	National Fire Protection Association.
Q.	PBSD	Projected beam smoke detector.
R.	Remove:	Remove material and equipment and restore surface.
S.	SLC	Signaling line circuit as defined in NFPA 72. A circuit between addressable appliances or devices over which multiple system signals are carried.
T.	Style B:	As defined in NFPA 72. Applies to wiring from the device to the panel. A trouble signal will be transmitted to the panel upon a single fault condition.
U.	UL:	Underwriters' Laboratories, Inc.
V.	UL Listed:	Materials or equipment listed by Underwriters' Laboratories and included in the most recent edition of the UL Fire Protection Equipment Directory.

PART 2 – PRODUCTS**2.01 Fire Alarm System Configuration**

- A. The OUSD Standard for the fire alarm equipment is as follows:
1. The new fire alarm control system(s) shall be a Simplex 4100ES with compatible addressable initiating devices and addressable notification appliance circuit devices. The 4100ES is provided with a standard 2x40 LCD display. No other display option is acceptable. Capacity for expansion:

All new fire alarm systems shall have capacity for future expansion. The control panels, and component modules shall have sufficient capability and enclosure space to handle the following:
 - a. Each addressable loop shall have 10 percent spare capacity in the number of addresses assigned.
 - b. Each notification appliance device circuits shall have 10 percent spare capacity.
- B. The fire alarm system(s) shall automatically transmit the following distinct signals to OUSD's supervising station, Bay Alarm Company: common fire alarm, common trouble, and where provided, common supervisory and common carbon monoxide alarm. These signals shall be annunciated separately for each building on the campus to the supervising station.
1. A Bosch DACT (B9512G), shall be provided with one cellular (primary) and one telephone line (alternate) transmission pathway. It must be determined at the pre-design meeting if an existing DACT is to be re-used, upgraded or replaced entirely. Refer to part 2.11 of this standard for further clarification.
 2. The Simplex fire alarm panel shall be interfaced with the Bosch DACT (B9512G). The Simplex panel shall use eight-point relay boards (Model 4100-3206) programmed to provide separate annunciation per building for alarm, trouble supervisory, and carbon monoxide signals on a multiple building campus. There shall be a piped connection to a minimum 12- by 12- by 4-inch box (hinged with a standard CH 751 or L 001 lock) mounted immediately next to the FACU. Refer to Appendix A, FACU/DACT Interconnection Block Diagram and POPIT/Relay Board Typical Wiring Diagram.
 - 2.3. Where an Emergency Responder Radio Communication System is installed in a building, additional Simplex eight-point relay card(s), and additional Bosch D9127U Popit modules shall be provided in sufficient quantity to provide a signal to Bay Alarm Company for each ERRCS supervisory point. See part 1.02H for a list of typical ERRCS supervisory points.

3.4. The following are the minimum required components for a DACT:

<u>Units</u>	<u>Model #</u>	<u>Description</u>
1	B9512G	B9512G Fire and Burglar Control Panel, Version 1 ONLY
1	D8109	Fire Enclosure
1	D8004	Transformer Enclosure
1	<u>B925F</u>	Fire <u>and Intrusion</u> Keypad, <u>SDI2</u>
1	ICP-SD1-9114	Isolator Keypad Module, see Note 1
<u>see Note 4</u>	<u>B299</u>	<u>Expansion module, SDI2</u>
1	B430	Plug-in Communicator, Telephone
1	B445	Conettix Plug-in Cellular Communicator
1	B40-MB50	Multiband Antenna, see Note 3
see Note 2	D9127U	POPIT Modules
2	<u>D1218</u>	12V 18AH Batteries
1	D101	Lock and Key Set

Note 1 – Keypad isolator module is required where the DACT also provides intrusion alarm functions.

Note 2 – The specific quantity of POPIT modules required for fire alarm supervising station signaling shall be determined by the number of separate buildings served by the system.

Note 3 – The B40-MB50 antenna cable shall be routed in dedicated EMT conduit (1/2-inch minimum). The antenna shall be exterior wall mounted at the roof level.

Note 4 – Provide one B299 at a minimum. Where combined with intrusion detection, provide additional expansion modules as required for the application. See OUSD Intrusion Alarm Standards for additional information.

4.5. The four standard signals per building to be sent to the supervising station shall be as follows (refer to Appendix):

- a. FIRE ALARM.
- b. TROUBLE.
- c. SUPERVISORY.
- d. CARBON MONOXIDE ALARM (where applicable).

- 1) Note: Each separate building shall be provided with a point for fire alarm, fire trouble, fire supervisory and carbon monoxide off-site signaling.

2.02 Manufacturers

- A. Acceptable manufacturers for this project shall be JCI (Simplex). This is a proprietary item to match existing OUSD fire alarm standard equipment requirements. No equal shall be accepted. JCI (Simplex) contact: Stacey Marchuk, 925-273-1232.
- B. Products shall be of the latest design; obsolete or discontinued products will not be accepted. All equipment supplied shall be UL and CSFM listed for the required function.

2.03 Fire Alarm Control Equipment

- A. The main FACU shall be located in the Administration area. The exact location to be determined at the pre-design meeting. The main FACU shall contain all the firefighter controls necessary for full control of alarm annunciation, acknowledge, audible silence, and reset.
1. The top of the FACU or transponder shall be installed at an elevation of 6 feet above the finished floor.
- B. The control unit shall be Simplex, Model 4100ES, and shall provide power, annunciation, supervision and control for the detection and alarm system. This is a proprietary item. No equal shall be accepted. The panel shall be modular in construction and contain all modules necessary to operate according to this specification and the drawings. The panel shall be provided with IDNet addressable modules and shall be provided with 10 percent spare capacity for each addressable circuit, initiating circuit, and addressable notification circuits for future expansion. The enclosure shall be sized to accommodate the 10 percent space capacity for any additional modules.
1. FACU modules (IDNet, power supplies, amplifiers etc.) shall be specified according to the design parameters with assistance from the system manufacturer (JCI).
- C. Multi-building campuses shall be permitted to use Miniplex transponders as required by the design parameters to provide SLC, speaker circuits, and addressable strobe circuits remote from the primary FACU.
1. Miniplex transponder modules (IDNet, power supplies, amplifiers, etc.) shall be specified according to the design parameters with assistance from the system manufacturer (JCI).
- D. The control equipment (i.e., FACU and/or remote power supplies) shall operate from a three-wire 120 VAC supply fed from a single dedicated circuit breaker. The circuit breaker shall be clearly labeled Fire Alarm System and shall be fitted with a clip to prevent it from being turned off. No other (non-fire alarm) equipment shall be fed by this circuit breaker. All power connections whether AC or DC shall be separately fused within the control panel. Where there is an emergency 120 VAC systems available, the fire alarm and fire alarm auxiliary equipment shall be on the emergency power. The location of the dedicated circuit shall be permanently identified at the FACU. The location and route of the dedicated circuit should be shown on the fire alarm as-built drawings.
- E. Battery backup for 24 hours of standby and the alarm duration per NFPA 72 (5 minutes for tone systems or 15 minutes for EVAC systems) shall be provided for all fire alarm control equipment, including the Bosch dialer. An automatic battery charger, integral to the FACUs shall be provided. If the batteries required are 50 AH, a 4100ES battery shelf is required in the panel (4100-0650). If the battery is larger than 50 AH, a separate battery cabinet shall be provided (4081-9306). 120 VAC power will also be required at the battery cabinet. Batteries shall be 12V and approved for use in fire alarm systems. Batteries shall be labeled with the date of original installation. No battery shall be installed that has a manufacture date or more than one year prior to the installation date. Any existing batteries older than 5 years shall be replaced as part of the project to ensure system backup performance in the event of a power loss as designed.
- F. A single "silence" switch, located in the main FACU, shall silence all audible and visual notification appliances without resetting the fire alarm system.

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- G. The FACU shall have software-controlled by-pass switches, which are password protected. These switches shall be on the auxiliary function keypad and/or on toggle-on/toggle-off function switches.
1. These supervised bypass switches shall be programmed to survive reset/cold and warm starts and to toggle on-off.
 2. The by-pass switches shall be assigned to perform the following functions (if applicable), one switch per function on Level 3:
 - a. By-pass all audible/visual notification appliances for "Signal By-pass."
 - b. By-pass elevator control points for "ELEVATOR By-pass."
 - c. By-pass off-site monitoring "[Dialer Bypass](#)."
 - d. By-pass all HVAC controls and dampers.
 - e. One by-pass switch to by-pass all fire door controls (magnetic door holders, roll-down fire doors, and accordion doors, if applicable). "Door Holder By-pass."
 - f. By-pass auxiliary activity (kitchen hood suppression system).
 - g. [Projected Beam Smoke Detector Bypass](#).

2.04 EVAC Notification Systems

- A. EVAC notification systems shall be designed to have the following standard announcements for fire alarm and emergency notification. Note: The phrase "Do not use the elevators" shall not apply where the campus does not have an elevator.
1. Fire Emergency Notification
(Alert tone) "There is a fire emergency in the building. You are to leave the building by the nearest exit or exit stairway. Do not use the elevators." *(Alert tone)*
 2. Carbon Monoxide Emergency Notification
(Alert tone) "High levels of carbon monoxide have been detected in the building. You are to leave the building by the nearest exit or exit stairway." *(Alert tone)*
 3. Emergency Condition Clear (Simplex Phrase # C2825A)
"Attention. Your attention, please. The building emergency condition has been cleared. You may return to normal activities. The building emergency condition has been cleared. You may return to normal activities."
 4. Fire Drills
(Alert tone) "There is a fire emergency in the building. You are to leave the building by the nearest exit or exit stairway. Do not use the elevators." *(Alert tone)*
 5. Fire Drill Completed
"Attention. Your attention, please. The building emergency condition has been cleared. You may return to normal activities. The building emergency condition has been cleared. You may return to normal activities."

2.05 Alarm Initiating Devices

- A. Addressable NO-GRIP single action manual fire alarm station (Simplex [4099-9021](#)) shall be provided next to the new FACU in the Administration Area. The manual fire alarm stations

shall be kept to a minimum or eliminated other than in the Administration Office as allowed by the California Building Code and California Fire Codes.

1. Surface-mounted manual fire alarm stations shall mount on proper back-boxes specifically manufactured for the device (Simplex 2975-9022). Semi-recessed stations shall mount on a standard electrical box. Operation of a manual fire alarm station shall cause its contacts to lock-in until manually reset and visually indicate an actuation (e.g., depressed lever).
 2. Manual fire alarm stations shall be mounted at a height of 48 inches to the top of actuator above the finished floor.
 3. If manual fire alarm stations are to be located in locations other than the Administration or faculty areas, provide a tamperproof, clear Lexan shield and red frame that easily fits over the manual fire alarm stations.
- B. Addressable smoke detectors shall be provided where indicated.
1. Addressable TrueAlarm smoke detectors (Simplex model 4098-9714 with Addressable Sensor Base 4098-9792) shall be provided where required. Mounted concealed detectors shall have a remote indicator light or LED (Simplex detector base 4098-9789 with remote LED indicator 2098-9808).
 - a. Smoke detectors shall be ceiling mounted.
 - b. Any smoke detectors that are to be sidewall mounted shall be clearly identified on the drawings. Sidewall mounting of smoke detectors shall be accepted only with OUSD pre-approval.
 - c. Smoke detectors shall be placed no closer than 3 feet from an air-supply or air-return diffuser, whether or not the grill is connected to an active system or not. The measurement shall be from the edge of the detector to the edge of the diffuser.
 - d. Smoke detectors that are part of the area protection system covering the room, corridor, or enclosed space on each side of the smoke door shall activate door release service.
 - e. Smoke detectors shall be protected from contamination. (This includes existing smoke detectors to be re-used, as well as new detectors.) Dust covers shall remain intact until acceptance testing by the IOR is complete. If detectors are found to be contaminated prior to acceptance, they shall be replaced at the contractors' expense.
 2. Projected beam smoke detectors (PBSD) (Simplex model 4098-9019) shall be provided where ceiling heights exceed 15 feet.
 - a. The detector head and prism reflector shall be installed according to the manufacturer's instructions. The appropriate brackets shall be used for mounting the beam smoke detectors.
 - b. Beam smoke detectors located in Gymnasiums shall be protected with an approved metal guard. For Simplex detectors use 1000-018 or 1000-019 for Simplex Controllers.
 - c. The projected beam smoke detector control station shall receive 24VDC power and IDNet communication from the Simplex FACU or transponder.
 - d. The PBSD control station shall be wall mounted in a location not accessible to students and shall be approved by OUSD.
 - e. The top of the control station shall be installed at an elevation of 6 feet above the finished floor.

3. Duct-mounted smoke detectors (Simplex 4098-9756) shall be provided with approved duct housings mounted on the exterior of the duct and shall have perforated sampling tubes (Simplex 4098-9856) extended across the width of the duct and protrude outside the duct. The protrusion shall be sealed to prevent loss of air from the ductwork. Each mounted concealed detector shall have a remote indicator light (Simplex 2098-9808). Detectors installed outdoors shall be UL listed with the duct detector in the associated UL listed weatherproof enclosures (Simplex 4098-9845) and installed in a location with suitable room for the enclosure.
 - a. Duct smoke detectors are not required if the building has full automatic smoke detector coverage in accordance with CMC requirements.
 - b. Sites that are being upgraded to have full area detection should make provisions for the removal of existing duct smoke detectors based upon the exception in CMC to use area detection in lieu of duct detection coverage. Provisions for control relays for shutdown of the AHU units shall be made if required.
 - c. Control modules shall be provided for fan shutdown. UL listed weatherproof enclosures shall be provided for control modules located on the roof at the units.
 - d. Fan units that have been shut-down upon an alarm activation shall automatically restart when the fire alarm system is reset.
 - e. Dampers that open or close upon an alarm activation shall automatically reset when the fire alarm system is reset.
 4. All fire alarm fan shut down functions shall be via listed fire alarm equipment. Fire alarm conditions shall shut down fans directly, not through a control system such as the Energy Management System.
 5. Access doors shall be provided by the contractor or their sub-contractor in the ductwork of sufficient size and location to allow viewing, cleaning, and replacement of smoke detector sampling tubes. Space must be provided to remove and replace air duct sampling tubes, without removing the duct detector housing.
 6. If standalone duct smoke detectors are provided with the mechanical system, they shall be replaced with Simplex duct smoke detectors or control modules if total area detection is being used for automatic shutdown.
 7. Fire/Smoke Dampers – each fire/smoke damper shall incorporate a keyed remote test switch with indicator light. Access doors shall be provided by contractor or their sub-contractor in the ductwork of sufficient size and location to allow viewing, cleaning, and replacement of fire/smoke dampers and detectors.
- C. Addressable TrueAlarm heat detectors shall be provided in areas where environmental conditions exceed smoke detection parameters, such as bathrooms, and custodial closets with mop sinks, etc. Use Simplex model 4098-9733 with 4098-9792 addressable base.
1. Heat detectors shall be installed in combustible spaces where sprinklers or smoke detectors are not provided.
 2. In concealed combustible areas where sprinklers are not installed, heat detectors, programmed at 150 degrees, shall be provided, including above ceiling, attic, under stage, and basement spaces.
 - a. In all other locations, heat detectors shall be programmed for 135 degrees rate-of-rise.

- E. Addressable supervised interface modules (Simplex 4090-9001) shall be provided to monitor existing or new waterflow switches, valve supervisory switches and kitchen hood suppression systems. The wiring from the monitored device to the module shall be a Style B electrically supervised circuit. The point monitoring device shall send an individual address to the FACU. When surface mounting, use 4090-9810 mounting brackets and 4090-9807 surface-mount cover plate.
1. Each valve supervisory switch shall be provided with an individual addressable module.

2.06 Notification Appliances

- A. Notification appliances shall be wall mounted. Ceiling-mounted notification appliances will be considered only under special circumstances. Special circumstances shall be approved in-writing by the OUSD Alarm Shop.
- B. Alarm audible/visual notification appliances shall be provided where required. The units shall be semi-flush mounted. Audible alarms must be heard in all occupied spaces at a level over ambient sound acceptable to the IOR.
- C. Notification appliance housing shall be red in color.
- D. Notification appliance covers shall be not be marked with the word "fire."
- E. Notification zones shall not extend beyond one building or group of portable buildings.
- F. For EVAC systems, combination speaker/visual (S/V) appliances shall be provided where required. Use Simplex 49SV-APPLW with a separately-ordered red, blank cover. S/V appliances combine addressable speaker and addressable visual functions into a common housing. The S/V shall be listed to UL 1971 and UL 1480. Twisted/shielded wire is required for speaker connections. Unshielded-twisted-pair (UTP), having a minimum of three twists per foot is required for addressable strobe connections. The following taps are available: 0.25W, 0.50W, 1.0W, and 2.0W. At the 1.0W tap, the speaker has minimum UL rated sound pressure level of 82 dBA at 10 feet. The S/V installs directly to a 4-inch square, 1-1/2-inch deep electrical box with 1-1/2-inch extension.
- G. For EVAC systems, speaker-only (S/O) appliances shall be provided where required. Use Simplex 49SO-APPLW with a separately-ordered red, blank cover. Twisted/shielded wire is required for speaker connections on a standard 70VRMS NAC and UTP conductors. The following taps are available: 0.25W, 0.50W, 1.0W and 2.0W. At the 1.0W tap, the speaker has minimum UL rated sound pressure level of 82 dBA at 10 feet. The speaker shall have a frequency response of 400 to 4000 Hz for fire alarm and 125 to 12kHz for general signaling. The speaker shall be surface mounted in unfinished areas and semi-flush in finished areas.
- H. For tone systems, audible and visible, multi-candela notification appliances shall be provided so that the fire alarm can be heard and seen in all required areas. Use Simplex TrueAlert ES 4906-9127 or 49AV-WRF as applicable. The sound level shall be consistent with the requirements for audible and visible notification requirements of the CBC. Audible notification shall comply with the temporal three code. The visual notification portion shall have selectable strobe intensity of 15, 30, 75, 110, 135, or 185 candelas. When surface mounted, a 1-1/2-inch deep backbox is required. Provide 4905-9937 surface-mount adapter skirt for all surface-mounted locations.
- I. Visible alarm-only (V/O) appliances shall be provided where required. Use Simplex TrueAlert 4906-9101, or 49VOWRS as applicable. The visual notification appliance shall have strobe intensity programmable from the control unit or jumper selected as 15, 30, 75, 110, 135, or

185 candelas. When surface mounted, a 1-1/2-inch-deep backbox is required. Provide 4905-9937 surface-mount adapter skirt for all surface-mounted locations.

1. Wall-mounted appliances shall be installed such that the entire lens is not less than 80 inches and not greater than 96 inches above the finished floor as required by NFPA 72.
 2. The candela rating of the device shall be able to be confirmed through a panel report.
 3. The candela rating of the device shall be visible after installed without removing the cover.
- J. Interior horns shall be Simplex TrueAlert ES 49AO-WRF or 49AO-WRA as applicable. When surface mounted, provide 4905-9937 surface-mount adapter skirt.
- K. Where required, exterior weatherproof horn/strobes and strobes shall be provided. Use Simplex TrueAlert ES 49AV-WRFO and/or 49VO-WRFO with weatherproof backbox 49WPBB-AVVOWR.
- L. Where required, exterior weatherproof speakers shall be provided. Use Simplex 49SO-APPLW-O with weatherproof back box; (49WPBB-SOWR) and separately ordered red, blank cover.
- M. Wire guards shall be installed to protect notification appliances in multi-purpose rooms, gymnasiums, locker rooms, all student restrooms, and other areas where subject to physical damage. This does not apply to elementary schools or Child Development Centers. Use compatible JCI/Simplex wire guards for the notification appliances installed.
- N. The notification appliances shall be fully synchronized throughout the school campus. Audible pulse and strobe flash shall be synchronized by device and by system.
- O. Specify and provide all accessory parts required. Reference Appendix C for commonly used notification appliances. Consult with JCI for other notification appliances as needed.

2.07 Addressable Notification Appliance Circuit (NAC) Repeaters (Tone Systems only)

The Simplex 4009 NAC Repeater (Simplex 4009-9601 or Simplex 4009-9401) shall be provided when auxiliary power panels are required. The 4009 NAC Repeater shall be connected to the system via an SLC. Each notification circuit shall have 10 percent spare capacity for future additions on that circuit. Battery back-up shall be provided for 24 hours in standby and 5 minutes in alarm. The control equipment shall operate from a three-wire 120 VAC supply fed from a single dedicated circuit breaker. The circuit breaker shall be clearly labeled Fire Alarm System and shall be fitted with a clip to prevent it from being turned off. No other (non-fire alarm) equipment shall be fed by this circuit breaker. All power connections whether AC or DC shall be separately fused within the panel. Where there is an emergency 120 VAC systems available, the 4009 NAC repeater shall be on the emergency panels. The location of the circuit disconnecting means shall be permanently identified at the 4009 NAC repeater. The location and route of the dedicated circuit should be shown on the fire alarm red-line drawings for incorporation into final as-built drawings. The 4009 NAC Repeater shall be located adjacent to the main FACU or remotely in non-student accessible locations, such as electrical or mechanical rooms. All other locations are to be approved by OUSD prior to installation.

2.08 Control Function Interface Devices

- A. New 24VDC magnetic door holders (DH24120FPC) shall be provided where indicated. These magnetic door holders shall be powered from and connected to the fire alarm system.
1. Electromagnetic door holders shall be wired so as to be de-powered 30 seconds after AC power failure at FACU.
 2. Surface-mounted magnetic door holders (Simplex DH24130SPC) shall mount on proper back boxes specifically manufactured for the device. Ordinary electrical junction boxes shall not be acceptable.
 3. If standard magnetic door holders cannot cover the required distance from the door to the wall, catch plate extender rods from the manufacturer shall be provided to cover the distance.
- B. Unless otherwise noted, auxiliary control functions such as door release, mechanical fan shut-off, elevator recall, etc., shall be performed using relay modules located within 3 feet of the component controlling the emergency control function. One or more of the following shall be used as applicable:
1. Simplex 4090-9008 with 4090-9802 cover plate (0.5-amp rated)
 2. Simplex 4090-9010 (8-amp rated)
- C. If there is interface that involves more power than the relay can handle, an MR-101 (or equivalent) relay shall be used in between the addressable relay and the device being interfaced with. For example, when dealing with a shunt trip breaker, the Simplex addressable relay cannot be used with direct connection to the breaker due to the current draw.

2.09 Supervisory Devices

Addressable supervised individual addressable modules (IAM, Simplex 4090-9001) shall be provided to monitor new and existing sprinkler control valves, waterflow switches, and PIVs. The wiring from the monitored device to the IAM shall be a Style B electrically-supervised circuit. The point-monitoring device shall send an individual address to the FACU. IAMs shall be installed at interior locations. When surface mounting, use 4090-9810 mounting brackets and 4090-9807 surface-mount cover plate.

2.10 Circuit Isolation

The addressable SLC and addressable NACs shall be isolated per floor and wing of buildings or group of portable buildings. Use IDNet 2+2 panel modules, IDNet Communications Isolator modules, and TrueAlert Addressable Isolator+ modules (Simplex model numbers 4100-3110, 4090-9116 with trim plate and 4905-9929) as appropriate for the design parameters. This will allow a short circuit from disabling the entire IDNet communications wiring in a building and also reduce time in locating the extent of shorted wiring and earth fault conditions. When using the 4090-9116, use 4090-9802 trim plate for surface mounting and 4090-9801 trim plate for semi-flush mounting.

2.11 Supervising Station Monitoring Panel (DACT)

- A. The fire alarm system shall provide supervising station functions using the Bosch B9512G as a DACT. The DACT shall use cellular technology as the primary transmission pathway and one telephone line as the alternate transmission pathway.
- B. Each building on campus shall be annunciated separately to the supervising station ([Bay Alarm Company](#)).

- C. For new school projects, a Bosch DACT (B9512G) shall be provided and installed in the telephone equipment room. Dedicated 120 VAC wiring shall be provided. Coordination is required between the security system designer (if applicable) to verify if the new security system can support the required security field devices and the monitoring of the fire alarm interface relays to avoid (two) separate systems that require separate monitoring contracts for OUSD.
- D. One new telephone jack (i.e., RJ31X) shall be provided and installed next to the new Bosch DACT. The telephone jack shall be connected to a telephone line serving the building. The telephone line shall be dedicated for the fire alarm system. The telephone line shall be wired to disconnect the telephone user if the Bosch DACT attempts to dial the supervising station.
- E. A Bosch tamper-proof transformer enclosure (D8004) shall be provided.
- F. The contractor shall provide and install a new CAT6 cable from the new or existing OUSD LAN system to the new DACT. In addition, the contractor shall provide and install a new CAT6 plug on the cable and shall install the plug on the OUSD IT switch/router. The contractor shall coordinate with the OUSD IT Department on which port the cable router should be terminated, prior to final testing. The CAT6 wire shall be ORANGE for Fire and GREEN for Security.
- G. The Bosch DACT shall provide monitoring of the Simplex FACU. The building fire alarm system shall be connected to the DACT to provide the signals to the off-site monitoring company on a per-building basis. See Appendix A, FACU/DACT Wiring Diagram.
- H. The programming/commissioning of the Bosch panel shall be done by the contractor and the contractor shall verify the correct operation of the telephone lines with the B&G technicians when the Bosch panel is programmed. The DACT programming and connection must be scheduled and tested prior to calling for a pre- or final test to confirm operation of the DACT . Supervision of the telephone lines (primary and secondary) shall be pre-tested to ensure proper and timely notification of non-response (trouble condition) when the lines are disconnected.
1. Expander No. 1 shall be used for fire alarm points, nothing else is to be programmed on Expander No. 1.
 2. The following minimum points to be used for fire alarm signals are:
 - a. 9 – FIRE ALARM - smoke/heat detectors, waterflow, and pull stations
 - b. 10 – TROUBLE
 - c. 11 – SUPERVISORY
 - d. 12 – CARBON MONOXIDE ALARM (priority two)
 3. The program manual shall be used to obtain and verify correct dipswitch settings.
 4. Program for the Bosch panel shall be submitted to OUSD B&G Alarm Shop in Bosch format for their review prior to final sign-off to confirm functionality and labels.
- I. For existing schools where the fire alarm system is to be modified, the existing Bosch panel shall be replaced as the DACT. The contractor shall provide the required off-site signals to the existing Bosch panel. For projects including an upgrade of the FACU to a Simplex 4100ES, the Bosch DACT shall be upgraded to a Bosch B9512G. Upgrading the DACT will require upgrading the 120 VAC power wiring as described in Section 2.03.D. Further discussion regarding this topic shall be had during the pre-design meeting. The designer must confirm that there are no field compatibility issues with the new Bosch panel and the existing field devices to be re-used from the non-B9512G panel. If there are compatibility issues, OUSD shall be notified immediately.

- J. DACT location shall be provided on the drawings. If a new security system is to be installed, then further discussion should be had during the pre-design meeting on the DACT. System design shall include a smoke detector installed directly above the DACT shown either as an existing device or installed new.

2.12 SafeLinc Monitoring

- A. Each new Simplex 4100ES panel shall be provided with a SafeLinc monitoring module (Model 637-590). The contractor shall provide and install a new CAT6 cable in a separate conduit from the new or existing OUSD LAN system to the new 4100ES and/or existing 4020 panels. In addition, the contractor shall provide and install a new CAT6 plug on the cable and shall install the plug on the OUSD IT switch/router. The contractor shall coordinate with the OUSD Project Manager for contact information for the OUSD IT Department. OUSD IT Department will provide the information on which port the cable router should be terminated, prior to final testing. The CAT6 wire shall be ORANGE for Fire and GREEN for Security.
- B. The contractor is to provide and install a new CAT6 jack within the Simplex FACU and should test the newly installed cable for continuity from the jack to the router plug. The Simplex technicians shall make the connection to the 4100ES panel and shall test it for proper operation. The contractor shall label the CAT6 jack with the port address and router plug. The CAT6 cable shall be run in conduit similar to all fire alarm circuits.

2.13 Sprinkler Control Valve Cages

If a sprinkler riser or PIV is located outside the building, protective cages shall be provided to prevent tampering or damage. The protective cage shall be lockable, and the riser or PIV shall be accessible for testing, inspection and maintenance. Cage shall fully protect the top and sides of the PIV. Sufficient clearance for work access shall be provided within the cage dimensions for service personnel to remove check valve and exercise valves when needed.

2.14 Fire Alarm Documentation Cabinet

- A. With every new system, a documentation cabinet shall be installed at the fire alarm control unit location. Use Space Age Electronics model FDB ACE-11.
1. The documentation cabinet shall be installed adjacent to the FACU.
- B. The documentation cabinet shall contain the following:
1. Record fire alarm drawings in the following formats:
 - a. Hard-copy, printed at one half size scale.
 - b. Electronic files on magnetic media or CD-Rom.
 2. Fire alarm system NFPA 72 Record of Completion.
 3. Two years of fire alarm test records.
 4. Fire alarm system point list.
 5. Fire alarm system program stored on magnetic media or CD-Rom.
 6. One set of fire alarm system keys for the fire alarm system enclosures and a manual pull station reset key.

2.15 Access Hatch

- A. Access hatches shall be provided for concealed spline ceilings and hard lid ceilings for access to above ceiling fire alarm devices.
 - 1. Access hatches shall be “Tough Guy” general purpose access door or other approved equal.
 - 2. Access hatches for a concealed spline ceiling shall be a minimum of 12 inches by 18 inches; and for hard lid ceilings, a minimum of 18 inches by 18 inches.

2.16 Two-Way Communication System (Emergency Communication System)

- A. Where required, the two-way communication system shall be the Rath SmartRescue System consisting of call box(es), a base station, a power supply and appropriate signage.
 - 1. Call box shall be the Rath 2100 series.
 - a. The call box(es) shall be installed at the location(s) required by building or fire code.
 - 2. Base Station shall be the Rath 2500 series.
 - a. The base station shall be installed in the main office, or other normally occupied location designated by OUSD.
 - 3. Power Supply shall be the Rath 2500-PWR24U.
 - a. The power supply shall be installed at the location designated by OUSD.
 - 4. Signage (appropriate for the application) shall be by Rath.
- B. The points of supervision on the Rath SmartRescue System (power failure and communications failure) shall be monitored by on-board points 1-8 of the Bosch B9512G DACT.

PART 3 – CONSTRUCTION REQUIREMENTS**3.01 General Conditions**

- A. Any after-hours emergency B&G service calls resulting from the contractor’s work shall be back-charged to the contractor.
- B. Any security or fire false alarms caused by the contractor resulting in false alarm fees from Oakland Fire Department and Oakland Police Department shall be back-charged to the contractor.

3.02 Certification and Qualification Requirements

- A. Certification shall be required for all persons who perform work as electricians for licensed Class C-10 Electrical Contractors under the contractor’s State License Board Rules and Regulations. The on-site electrician in charge shall be certified by the State of California to work on fire alarms.
- B. As part of the project, the fire alarm technician for the project shall be State of California certified. The fire alarm technician shall be responsible for assisting the contractor in completing the installation and overall testing of the fire alarm system.

- C. Sub-contracting of the fire alarm installation by the contracted C-10 licensed electrical contractor is allowed within the parameters of contract law. However, the original C-10 licensed electrical contractor shall remain the supervisor and must retain liability and insurance responsibility for construction.
- D. ALL electrician employees of C-10 electrical contractors working on circuits that exceed 100 VA in the State of California to be tested, and "certified" by the State to perform work under an Electrical Contractor's (C10) license. General Journeyman and Fire/Life Safety Technicians must carry cards, issued by the Division of Apprenticeship Standards (DAS), that prove they are certified, and which must be presented to the authority having jurisdiction, upon request of the code enforcement official.
- E. Per NFPA 72, fire alarm system installation personnel shall be supervised by persons who are qualified and experienced in the installation, inspection, and testing of fire alarm systems. Examples of qualified personnel shall include, but not be limited to, the following:
 - 1. Electrical Engineer;
 - 2. Factory trained and certified personnel, working under the supervision of a C-10 licensed electrical contractor;
 - 3. National Institute of Certification in Engineering Technologies (NICET) fire alarm level II certified personnel working under the supervision of a C-10 licensed electrical contractor; and
 - 4. Personnel licensed or certified by state or local authority.

3.03 Fire Watch Requirements

- A. If any time during construction a required fire protection system is impaired, the contractor shall be responsible to provide a full-time fire watch.
 - 1. OUSD Custodial Services Department shall be used for fire watch. A minimum of two OUSD custodians are required.
 - 2. The fire watch shall patrol areas where the fire protection system is impaired and shall coordinate the fire watch with the OUSD Project Manager.
 - 3. The fire watch shall be maintained until the impairment is repaired.
 - a. A fire watch is not required where a building is provided with one hundred percent sprinkler coverage, the sprinkler system is completely operational and monitored by the fire alarm system, there is no requirement for fire watch for that specific sprinklered building only.
 - 4. Fire watch personnel may not perform any duties that are not fire watch related. Fire watch personnel shall be provided with at least one means for notification of the fire department and shall have the following duties:
 - a. Continuously and systematically patrol the entire facility.
 - b. Identify and control fire hazards.
 - c. Detect early signs of unwanted fire.
 - d. Raise an alarm of fire and notify the fire department if a fire is discovered.
 - e. Notify the occupants of the facility of the need to evacuate.
 - f. Maintain a log of fire watch activities.
 - g. Have knowledge of the location and use of fire protection equipment, such as fire extinguishers.

4. Frequency of Inspections: Fire watch personnel shall patrol the entire facility between every 15 to 60 minutes.
 5. Record Keeping:
A fire watch log shall be maintained at the facility. The log must be available to the Fire Department at all times during the fire watch.
The log shall show the following:
 - a. Address of the facility.
 - b. Times that the patrol was completed for each tour of the facility.
 - c. Name of the person conducting the fire watch.
 - d. Record of communications to the fire department.
 6. If the individual building is provided with one hundred percent sprinkler coverage, and the sprinkler system is completely operational, there is no requirement for fire watch for that specific sprinklered building only.
- B. The respective OUSD Project Manager shall clarify at the time of bid what shall be required for fire watch for the project.

3.04 New Construction

- A. Prior to installation of the fire alarm system, a pre-construction meeting shall be held with the general contractor, fire alarm sub-contractor and/or the electrical contractor, if different from the fire alarm sub-contractor, IOR, architect, and the OUSD project team.
- B. During installation, the general contractor shall notify the OUSD Project Manager that the system is ready for inspection by the OUSD project team at the following stages: conduit rough-in completion (before pulling wire), device connection and final acceptance. After each inspection, the OUSD project team shall issue a report on their findings. This report shall be distributed to the general contractor, IOR, OUSD Project Manager, and OUSD project team. Any deficiencies noted in these reports shall be corrected before calling for the next subsequent inspection.

3.05 Modifications/Modernizations

- A. In existing fire alarm systems where design modifications or additions are made, the new equipment must be compatible and CSFM listed with the existing fire alarm equipment. Modifications shall be integrated with the existing fire alarm system so that notification devices (horns or speakers and strobes) can be synchronized.
- B. Prior to working on the modifications of the fire alarm system, the contractor shall verify the existing conditions of the system and identify any deficiencies to the OUSD Project Manager. The existing fire alarm system should be free and clear of troubles prior to the contractor starting work unless otherwise agreed upon of an existing condition by both parties. Once the contractor begins work, they shall be responsible for any and all repairs in the area(s) of work.
- C. If there are issues found prior to, during or after the start of work, and the contractor did not contact and identify the deficiencies to the OUSD Project Manager and B&G personnel, the contractor shall be responsible for all necessary repairs, including time for OUSD's B&G personnel to repair the deficiencies.
- D. If the project intent plans to utilize any portion of the existing fire alarm system's conduit, the contractor shall be responsible for providing a fire watch in areas where the existing fire alarm system is impaired and shall coordinate the fire watch with the OUSD Project Manager.

- E. If the project is designated as a “Temporary Portables” project, the OUSD requires the project not utilize any manual fire alarm stations within the project areas, except at the FACU location. The intent is to provide the associated portable buildings full area smoke detection in accordance with the California Fire Code.
- F. All existing batteries in existing control units, remote power supplies, and Bosch DACT panel shall be replaced with new batteries as part of the modification.

3.06 Maintaining Systems

- A. The existing fire alarm system shall be maintained in all buildings until the new system is operational and accepted. A fire watch shall be provided at all times when the existing fire alarm system is non-operational during any fire alarm work or any other activity affecting the fire alarm system’s normal operations. All duplicated portions of the existing system shall be removed by the contractor after acceptance of the new system. Any and all existing equipment no longer being used after the installation of the new equipment shall be turned over to OUSD. The contractor shall disassemble the existing equipment and/or materials and deliver only the equipment and/or materials OUSD has elected to retain to the District’s Maintenance Yard at 955 High Street. All other removed equipment and materials shall be recycled, disposed of appropriately or kept by the contractor.
- B. Existing fire alarm system raceway or conduit and existing device locations may be re-used as part of the new fire alarm system if there are no occupants (i.e., staff or students) in the building during the installation portion of the project and as conduit fill percentages allow. A fire watch shall be provided if any components of the existing system are being reused. Existing surface mount raceway may not be reused for the fire alarm system.
- C. If a system is put on fire watch, the elevator service, if applicable, shall not be disabled. If the elevator is capable of recall, the recall operation shall be maintained, even if on a temporary basis. This may be achieved in several ways, even if the recall is being operated by a local only FACU (not monitored off-site while on security watch):
 - 1. Install temporary 120VAC detectors and hard-wire the connections to the elevator controller to perform elevator recall.
 - 2. Maintain the existing elevator lobby smoke detectors, elevator machine room smokes, and relays for recall on the existing panel (even if the panel is local only and not monitored off-site).
 - 3. Install elevator lobby smoke detectors, elevator machine room smokes/heats, and relays for recall on the new panel (even if the panel is local only and not monitored off-site).

3.07 Wiring and Raceway Configurations

- A. T-tapping of any fire alarm wiring is not permitted.
- B. All wire and cable shall be new and UL listed and/or approved for use in fire alarm signal systems per NFPA 70, Article 760. All wiring shall be in accordance with state and local electrical codes. No wire nuts allowed. All connections shall be from terminal to terminal. Use terminal blocks where needed. Device mounting boxes shall not be used as a junction box.
- C. The manufacturer shall provide recommendations as to wire size and type to be followed.

- D. Fire alarm drawings shall provide specific wiring direction for addressable systems. This shall include the use of shielded and non-shielded twisted pair cable. Wire shielding shall be continuous, taping off the shield shall not be allowed.
- E. The fire alarm circuits shall be provided with isolation modules upon leaving and entering a building(s). Notification branch circuits shall be provided with isolation modules. This module shall allow circuits that are faulty to be isolated from the rest of the fire alarm system.
- F. When addressable notification appliances are used, the wire and cable shall be distinguished from the signaling line circuits by installing striped wiring.
- G. Splices shall be kept at a minimum and clearly labeled at j-boxes and/or terminal cabinets. Splices are not acceptable in underground or outside areas. Splices shall be made in terminal cabinets via terminal strips. All wire shall be identified on both ends, at splice locations and in all visible locations with a cable tag.
- H. Where there are designated 12V or 24V power runs for different devices, they must be clearly identified with separate wire tags to avoid confusion by the installing contractors. This also applies to IDNET/MAPNET versus RUI circuits.
- I. All fire alarm cables shall be labeled with the associated circuit number in all FATC's, in all FACU's, and in all remote power supplies.
- J. No fire alarm cables shall be terminated at the FACU until all cables have been tested for continuity in the presence of the JCI (Simplex) fire alarm technician and are free of any grounds, faults or shorts. Once the integrity of the cables has been verified, the fire alarm technician shall terminate all field wiring at the FACU's and power supplies. FATC's shall be terminated by the contractor.
- K. All cable used in underground raceways shall be listed for outdoor use. West Penn Aqua-Seal or equal shall be used for underground raceways. The underground raceway shall be verified in the field for use and access.
- L. Pull string shall be installed in all underground conduits.
- M. No underground cables are to be spliced in underground pull boxes.
- N. All wiring components shall be UL listed. Wiring methods shall conform to NFPA 70, Section 760.
- O. All fire alarm cable shall be installed in conduit. The conduit shall be red in concealed spaces.
 - 1. Interior conduit shall be EMT.
 - 2. Exterior conduit shall be IMC or RMC.
 - 3. Flexible metal conduit (FMT) is permitted in limited applications and as permitted by the CMC. FMT shall be limited to lengths of 6 feet or less.
- P. Wet or Damp Locations
 - 1. All fire alarm devices or other equipment to be installed in wet or damp locations shall be listed for weatherproof application. Wet locations shall include, but not be limited to outdoor installations, machine rooms subject to high humidity, damp shower rooms, and locations subject to steam releases.

2. Addressable alarm electronic components shall be installed in either a different location or in an approved weatherproof mounting box.

3.08 Network Communications

- A. Networking and SafeLinc communications shall be installed, activated and assigned an IP address for network communications with the B&G Alarm Shop prior to any testing of the system. Testing shall be made in the form of email verification to B&G.
- B. If the network communications are not present, testing shall be made by sending a single FIRE ALARM and consequent FIRE RESET for every device to OUSD's Alarm Monitoring Company and B&G's Alarm Shop. Sending multiple alarms with a single alarm verification and FIRE RESET shall not be allowed.
- C. Provide one Cat 6 cable (orange jacket) in ¾" conduit from the IDF to the FACU for ethernet connection. Provide RJ45 jack in a biscuit block inside the FACU. Provide patch cable between biscuit block and the Safelinc Internet Interface Card. Contractor shall coordinate termination with OUSD.

3.09 Fire Alarm Device Labeling

- A. Initiating devices shall be provided with device labels, which will indicate the device's point address and shall match the addresses provided on the fire alarm drawings. The format of the point address shall include the system node (where applicable), loop, and sequential number. For example, N1M1-001. These self-adhesive labels shall be machine manufactured with 1/2-inch high black text on white background. Labels on smoke or heat detectors shall be affixed to side of the base and the text shall be sized to be legible from floor level.
 1. Fire alarm devices installed in concealed locations (e.g., above-ceiling heat detectors) shall be labelled both on the device, and at a conspicuous location in the immediate vicinity of the concealed device (e.g., the ceiling grid below an above-ceiling heat detector).
- B. The FACU shall be provided with descriptions that indicate the location of the initiating device in the field. The descriptions shall indicate the building name, the floor, the room number, the type of device, and the address associated with the devices (example: Gym, Floor 2, Classroom G212, smoke detector M 1-99).
- C. The descriptions for all areas, stairways and the classroom numbers shall be coordinated with the Architectural room numbers for the project. All rooms and areas shall be identified by a permanent room number above the door frame that shall designate the room number for the life of the building regardless of how it is identified by school staff during the years. All rooms without corridor/hall doors (accessed through other rooms) shall have the ID number of the corridor room and a letter designation as a separate space (200A and 200B) so the Oakland Fire Department will not be looking for room numbers not on the corridors.
- D. Conventional notification appliance labels shall correspond with the appliance's circuit number and position on the circuit (e.g., S3-8 for circuit no. 3, appliance no. 8) and should be consistent with the labels provided on the construction documents.
- E. Where the design uses addressable notification appliances, the labels shall correspond with the appliance's system point address (e.g., TAC2-1-4 for TrueAlert ES Addressable Controller No. 2, channel 1, appliance 4) and should be consistent with the addresses provided on the construction documents. Prior to programming the TrueAlert ES addressable notification

appliance's system point address, the contractor shall verify the labels with JCI (Simplex) in the field. If the address has changed in comparison with the drawings, the label shall be corrected on the drawings to represent field conditions.

1. Upon final programming, notification appliances shall be field labeled as directed by JCI.
- F. Existing devices/circuits that are to be re-used need to be reviewed for updated addressing in the program and corresponding physical labels on the devices.
 - G. All batteries shall be labeled with the date of manufacture and date of installation.
 - H. The construction documents shall include a point list, which indicate the associated description for all of the initiating devices for the system. The list shall provide the point number, device type, and location description. The location description shall be in the format of building name, floor, and room number.
 - I. Access door hatches shall be marked with screwed on engraved phenolic labels on the exterior and interior in 3/4-inch font height with the type of device (SD, HD, DD, etc.) and the address of the device(s).
 - J. Fire alarm terminal cabinets shall be labelled FATC.
 - K. Fire alarm junction boxes shall be labelled FA.

3.10 Test/Field Quality Control

- A. Conduit rough-in shall be inspected by the IOR prior to pulling wire/cable. The IOR shall report to OUSD when this inspection is complete. OUSD B&G shall confirm that the conduit rough-in is acceptable.
- B. Wire/cable installation shall be inspected by the IOR prior to installation of devices. The IOR shall report to OUSD when this inspection is complete. OUSD B&G shall confirm that the wire/cable installation is acceptable.
- C. The contractor shall maintain a set of working drawings during construction. The contractor's working drawings shall reflect all approved changes and deviations from the originally approved drawings. The IOR shall review the contractor's working drawings for compliance weekly during construction.
- D. Fire alarm devices installed in areas that have a potential to cause false alarms that are not obvious during plan review are to be re-located at the contractor's expense to areas where protection is provided, and false alarms resolved.
 1. Fire alarm devices shall be located a minimum of 5 feet away from wireless routers as possible.
- E. The contractor shall perform a complete pre-test of the installation prior to calling for final acceptance.
 1. Prior to the pre-test, the contractor shall prepare a written test plan and submit it to the OUSD Project Manager. As a minimum, the test plan shall identify the role(s) of all required personnel, proposed testing sequence, and include a printed points list of all devices to be tested.
 2. The general contractor, electrical contractor, alarm contractor(s), IOR, and OUSD's alarm consultant shall participate in the pre-test.



- a. Upon request by the OUSD Project manager, the OUSD Alarm Shop may participate in the fire alarm pre-test. Cost for OUSD Alarm Shop participation shall be covered by the OUSD Project Manager or by the Contractor.
3. As needed, other contractors shall participate to test and adjust fire alarm interfaced equipment (e.g., sprinkler, mechanical, elevator contractor, etc.).
4. A copy of the DSA-approved plans shall be available on site during the test.
5. Any deficiencies identified during the pre-test shall be corrected and re-tested prior to calling for final acceptance.
- F. The contractor shall perform a complete final acceptance test of the installation.
 1. The fire alarm system shall be stable (i.e., no trouble signals or unwanted alarms) for a period of one week prior to the final acceptance test.
 2. Before requesting final acceptance of the installation, the contractor shall provide a written statement to the OUSD Project Manager stating:
 - a. The installation is 100% complete.
 - b. The installation has been installed in accordance with the approved plans.
 - c. The installation has been pre-tested in accordance with the manufacturer's published instructions, NFPA requirements, and OUSD Standards.
 - d. The installation is fully operational.
 3. The B&G Alarm Shop, general contractor, electrical contractor, alarm contractor(s), IOR, and OUSD's alarm consultant shall participate in the final acceptance test.
 4. As needed, other contractors shall participate to test and adjust fire alarm interfaced equipment (e.g., sprinkler, mechanical, elevator contractor, etc.).
 5. The final acceptance test will not be scheduled until the written statement and NFPA 72 Record of Completion Form have been submitted to the OUSD Project Manager.
- G. The final acceptance test shall be coordinated with the OUSD Alarm Shop. The OUSD Alarm Shop shall be notified 72 hours prior to acceptance testing.
- H. **If the system requires a retest, all costs for the retest shall be the responsibility of the prime contractor. Costs for a retest shall include the involvement of OUSD's alarm consultant, JCI (for supervision), the project inspector (IOR), B&G Alarm Shop personnel, and any other contractor needed for testing various fire alarm interfaces (e.g. sprinkler mechanical, elevator, etc.).**
- I. Testing shall include verification of alarms, labels, and device addresses via SafeLinc emails and confirmed with the contractor, JCI/Simplex, or OUSD's fire alarm consultant during the testing. Multiple alarms may be transmitted to the monitoring station if SafeLinc is fully operational.
- J. The off-site signals, FIRE ALARM, TROUBLE, SUPERVISORY, and CARBON MONOXIDE ALARM shall be tested by activating the appropriate devices. Both OUSD Alarm Shop and OUSD's Alarm Company receivers shall report FIRE ALARM and FIRE RESTORAL, TROUBLE and TROUBLE RESTORAL, and SUPERVISORY and SUPERVISORY RESTORAL (where applicable) to both alarm receivers.
- K. Testing of fire sensors shall be by smoke or heat. No magnet testing shall be allowed. A Solo smoke, heat and CO tester shall be used (www.solo-tester.com) for testing devices.

1. An installed fire alarm device is considered not accessible if it cannot be tested using a Solo smoke, heat and CO tester.
- L. Testing of the addressable notification devices shall include testing of each device and confirming actual field label to the description annunciated at the FACU. If the field device label is different than the FACU, the label shall be changed on the field device.
- M. Testing shall be in accordance with NFPA 72 Chapter 14. Testing shall include, but not be limited to:
1. The system shall be placed on battery power for 24 hours before the scheduled acceptance test, so that the system can be verified for 24 hours of standby power and 5 or 15 minutes, as required, of notification signal operation on battery power.
 2. Activation of all initiating devices. Proper device function, sequence of operation, point number, location description, and field applied label shall be confirmed.
 3. Activation of every sprinkler waterflow switch. System shall respond within 90 seconds of waterflow.
 4. Activation of every sprinkler control valve supervisory device.
 5. Activation and visual check of every notification appliance.
 6. Activation of all applicable building fire-safety functions. These shall include, but not be limited to, door releasing service, HVAC fan shut-off, elevator designated and alternate recall, and damper actuation, etc.
 7. A test of the system initiating and notification circuits for electrical supervision, including detection of ground faults, opens, and shorts.
 8. A test of the kitchen hood suppression system (if applicable) for activation through relay contacts on the module. No discharge of the kitchen hood suppression system shall be required.
 9. The B&G Alarm Shop and First Alarm shall participate in all fire alarm pre-tests to ensure signals are being received. B&G Alarm Shop shall confirm signals have been received.
- N. Once the pre-test is complete, the B&G Alarm Shop shall provide the Project Manager a list of any alarm points that were not received at the Bosch panel and/or by SafeLinc email. These alarms shall be re-activated and must be re-transmitted to both First Alarm and the OUSD receiving station prior to scheduling the final test. The contractor shall pay all overtime fees required by the IOR for witnessing the acceptance test. Punch list items are only allowed on issues that do not create fire life safety issues, such as initiating or notification device failures, any trouble conditions, equipment failures, or for items that do not affect a fully operational fire alarm system with complete coverage in order to conduct a final acceptance test. Non-critical items such as painting and patching, demolition, access issues are examples of what may be considered as "punch list" items.
- O. After the final acceptance, the NFPA 72, Record of Completion Form shall be signed by a factory-certified technician, certifying that the fire alarm system has been installed, tested and will function in accordance with the manufacturer's specifications and the OUSD's requirements.

- P. Copies of completed NFPA 72 Record of Completion Forms and/or Fire Suppression System Testing Certifications shall be provided to the Project Manager and JENSEN HUGHES, and copies shall also be sent to B&G Alarm Shop.
- Q. Reacceptance testing shall be in accordance with NFPA 72 Section 14.4.2.
1. Reacceptance testing is required when an initiating device, notification appliance, or control function is added, deleted, relocated, or reprogrammed.
 2. All new initiating devices, notification appliances, or control relays shall be functionally tested.
 3. When a device, appliance, or control relay is deleted, another device, appliance, or relay on the circuit shall be operated.
 4. When changes are made, all functions known to be affected by the change shall be tested. In addition, 10 percent of initiating devices not directly affected by the change, up to a maximum of 50 devices, shall be tested, and correct system operation verified.
 5. If any of the 10 percent devices fail, only the repaired devices need to be re-tested after they are repaired or replaced. This required testing shall be included under the contractor's scope.
- R. If the fire alarm installation or modification is in "phased" stages or if there are substantial corrections and additions to the scope of the project, then the contractor shall be responsible for subsequent reacceptance testing. After the last phase of the fire alarm system has been completed and tested totally, 10 percent of the previously completed phases are to be tested with the final test phase.
- S. The contractor's project manager shall be responsible for contacting and coordinating with B&G personnel.
- T. Once a fire installation has been tested, and subsequent changes are made after the final test that affect the configuration of the original installation and scope of the project's fire alarm system, a new final fire alarm test shall be performed due to the changes of the originally installed system. Label changes do not require a new final fire alarm test. Only changes, such as device additions, deletions or changes to functional programming shall require a new final fire alarm test.
- U. Downloading of the Simplex Test Records from the 4100ES is not allowed under any circumstance after a fire test has been completed. Doing so deletes all the history from the FACU which is not acceptable.
- V. No Simplex 4100ES panel history report will be accepted as proof of the alarm testing for B&G unless the 4100ES can be configured to include the panel identification for the school name and IP address.
1. This information must be inherent to the panel program and be provided on the printout. No ALTERING of the printout shall be permitted.
 2. If modifications to the panel is made that will allow the printout to provide the site name and SafeLinc IP address, B&G will consider accepting the report as proof, if they are unable to confirm SafeLinc signals and/or Bosch fire alarms on the day of testing.
 3. This will be reviewed by B&G and discussed with the project at that time.

3.11 OUSD B&G Project Sign-off and Acceptance

- A. No system troubles or equipment failures shall be present at the final acceptance test. If there are troubles, the test shall not occur.
- B. OUSD B&G as the End User/Owner of these systems reserves the right to not accept any installation that does not adhere to these Standards. The contractor shall correct all issues to B&G's satisfaction before B&G will accept the system handover.

3.12 Training

- A. School staff shall to be trained on how to reset the fire alarm system, use the Bosch Fire Keypad, how to have a fire drill and the procedure to put the fire alarm system into the "test" mode for drills and how to cancel a false fire alarm. Documentation is required to confirm training has been done. The contractor shall provide the training during the interim period of construction, and then JCI/Simplex or Bosch personnel shall provide formal training of at least two 1-hour training sessions after the system has been accepted by the DSA IOR, JENSEN HUGHES, and OUSD. Training shall be scheduled with the Project Manager within one week of system acceptance.

3.13 Warranty

- A. The contractor shall provide a one-year written warranty against defects in material and workmanship (parts and labor) furnished under the project.
 - 1. The costs of such warranty shall be part of the project cost. OUSD shall also (optional) perform its own complete test to determine the working order of the fire alarm system.
 - 2. The warranty period starts when the entire project is 100 percent completed, and continues for one year after acceptance.
 - 3. The date of acceptance is the date indicated on the NFPA 72 Record of completion.
 - 4. During the warranty period, OUSD shall monitor the site and request service as required through the appropriate installer.
 - 5. One month prior to the expiration of the warranty period, the JCI inspection team representative shall conduct a 100 percent test of the work performed. Any deficiencies found during that testing shall be corrected under the warranty agreement.
 - 6.
- B. The warranty shall include all necessary material, travel, labor and parts to replace defective components or materials at the job site. The contractor shall commence repair of any "in warranty" defects within 24 hours of notification of such defects. Warranty service shall be supervised by a qualified factory-trained service representative.
- C. Any component of the fire alarm system that becomes defective or non-operational during the one-year warranty period shall be repaired to the satisfaction of OUSD. If repairs are not made within the one-year warranty period, the defective or non-operational component shall be repaired at the contractor's cost and shall not fall out of warranty.
- D. The contractor shall make allowances in his warranty to cover diagnosis of system defects, which might ultimately be the responsibility of others to correct. When this occurs, OUSD's Representative and other affected trades shall be notified.



- E. The warranty shall include all necessary factory and field software required to perform the specified tasks.

3.14 Spare Parts

- A. Spare parts in accordance with this Standard shall be delivered to the Alarm Shop at the start of construction. A FINAL test shall not be scheduled until the spare parts have been received by the Alarm Shop.
- B. At least 2 percent of the bill of materials of the devices used on the project shall be provided for spare parts. Unless otherwise noted, provide a minimum of five units per device for new and modernization projects. Provide a minimum of one unit per device for portable projects.
- C. The following spare parts shall be furnished to OUSD:
 - 1. Manual fire alarm boxes – the greater of 2 percent or minimum of one.
 - 2. Smoke detectors, including bases – the greater of 2 percent or minimum of five.
 - 3. Duct smoke detector – the greater of 2 percent or a minimum of one.
 - 4. Each type of heat detector (standard and high temperature), including bases – the greater of 2 percent or minimum of five.
 - 5. Addressable control modules – the greater of 2 percent or minimum of five.
 - 6. Addressable relay and/or dual relay modules – the greater of 2 percent or minimum of five.
 - 7. Addressable monitoring modules – the greater of 2 percent or minimum of five.
 - 8. Speaker/Strobe or Horn/Strobe - the greater of 2 percent or minimum of five.
 - 9. Speaker or Horn - the greater of 2 percent or minimum of five.
 - 10. Strobe - the greater of 2 percent or minimum of five.
- D. Five spare sets of keys for the manual fire alarm boxes, remote annunciators if applicable, remote LED test stations, and FACU(s).

3.15 As-Built Project Records

- A. Before acceptance of work and final inspection, the contractor shall provide project record “as-built” drawings in AutoCAD, reflecting any and all changes and deviations made to the fire alarm system during construction. The drawings shall indicate the following:
1. As-built physical routing of wires to devices, including junction box locations.
 2. As-built riser diagram showing the zoning of initiating devices and notification appliances.
 3. As-built panel wiring diagrams of the FACU(s).
 4. Floor plan with final room number showing each alarm initiating device (1-10 for device 10 on IDnet 1 and 2-10 for device on IDnet 2, etc.), and card number per notification appliance, TAC panel and control point with their respective address identification number (i.e., for addressable device number 5 on card 3, channel 1, branch 1 is 3-1-5.)
 5. All electrical circuits panels and breakers used for the FACU and remote power supplies.
 6. Submitting the **ORIGINAL** construction documents back to the fire alarm vendor and specifying “no changes” shall not be acceptable. The original as-built drawings indicating true as-built conditions that have been updated throughout the duration of construction shall be submitted to the fire alarm vendor for their use in creating a master set of “as-built” drawings reflecting the complete system installation including any changes made during construction. These drawings shall be returned to the contractor if requested. Retention monies shall be withheld if the original as-built drawings are not provided.
 7. The acceptance testing records.
- B. Upon completion of the work, three sets of blackline record drawings shall be submitted to OUSD. In addition, two (2) CD’s (one for OUSD records and one to be placed inside the FACU) with the fire alarm as-built drawings in AutoCAD version 2015, full-size PDF drawing files, a complete system device points list incorporating any field device label changes, and a scanned copy of the final test forms signed by all parties shall be submitted as part of the close-out package.
- C. New system installations shall be provided with a documentation storage cabinet.
1. Documentation cabinet shall be Space Age Electronics model FDB ACE-11 or approved equal.
 2. The cabinet shall be installed in the vicinity of the FACU.

PART 4 – TITLE 19 REQUIREMENTS

4.01 Buildings & Grounds

The following automatic fire extinguishing systems – sprinkler system inspections are the responsibility of B&G Alarm Shop for Title 19 compliance:

- A. Sprinklers
 - 1. Sprinkler installed under an exposed ceiling should be inspected quarterly from the floor level.
 - 2. Sprinklers installed in concealed spaces such as above suspended ceilings or in concealed spaces where access is provided shall be inspected at a frequency not to exceed 5 years.
 - 3. Sprinklers installed in inaccessible concealed spaces are not required to be inspected.
 - 4. The supply of spare sprinklers shall be inspected quarterly for the proper number and type of sprinklers and a sprinkler wrench for each type of sprinkler.
- B. Sprinkler Pipe
 - 1. Sprinkler pipe installed under an exposed ceiling shall be inspected annually from the floor level.
 - 2. Sprinkler pipe installed in concealed spaces such as above suspended ceilings or in concealed spaces where access is provided shall be inspected at a frequency not to exceed 5 years.
 - 3. Sprinkler pipe installed in inaccessible concealed spaces are not required to be inspected.
- C. Hangers and Seismic Braces
 - 1. Sprinkler pipe hangers and seismic braces installed under an exposed ceiling shall be inspected annually from the floor level.
 - 2. Sprinkler pipe hangers and seismic braces installed in concealed spaces such as above suspended ceilings or in concealed spaces where access is provided shall be inspected at a frequency not to exceed 5 years.
 - 3. Sprinkler pipe hangers and seismic braces installed in inaccessible concealed spaces are not required to be inspected.

4.02 School Principal and Site Administrators

The posting of room capacity are the responsibility of the school principal and site administrators for Title 19 compliance.

Any room having an occupant load of 50 or more where fixed seats are not installed, and which is used for assembly, classroom, dining, drinking, or similar purposes, shall have the capacity of the room posted near the main exit of the room. Posting shall be by means of a durable sign having contrasting colors from the background to which it is attached.

4.03 Risk Management

The following items are the responsibility of Risk Management for Title 19 compliance:

- A. Posting of Room Capacity

Any room having an occupant load of 50 or more where fixed seats are not installed, and which is used for assembly, classroom, dining, drinking, or similar purposes, shall have the

capacity of the room posted near the main exit of the room. Posting shall be by means of a durable sign having contrasting colors from the background to which it is attached.

B. Evacuation Maps

1. General:
 - a. Signs must be of professional quality acceptable to Oakland Fire Department (OFD).
 - b. Easily readable in standard block lettering and accurate as to content
 - c. Each sign must be oriented to its specific individual location
2. Sign Locations:
 - a. Placed/maintained in unobstructed view at every elevator lobby and immediately inside all public entrances of the building.
 - b. "In Case of Fire Use Stairway For Exit, Do Not Use Elevator" sign shall be installed adjacent to the elevator call station.
3. Size:

Each sign must be a minimum of 144 square inches with a minimum of 40 square inches for the building floor plan. Any reduction in the square inches must be approved by Oakland Fire Department (OFD).
4. Floor Plan:
 - a. The floor plan must show building core, building perimeter, and every wall and opening, including door swings.
 - b. Areas not directly related to the exit must be shaded or screened in a light tone.
5. Exit Routes:

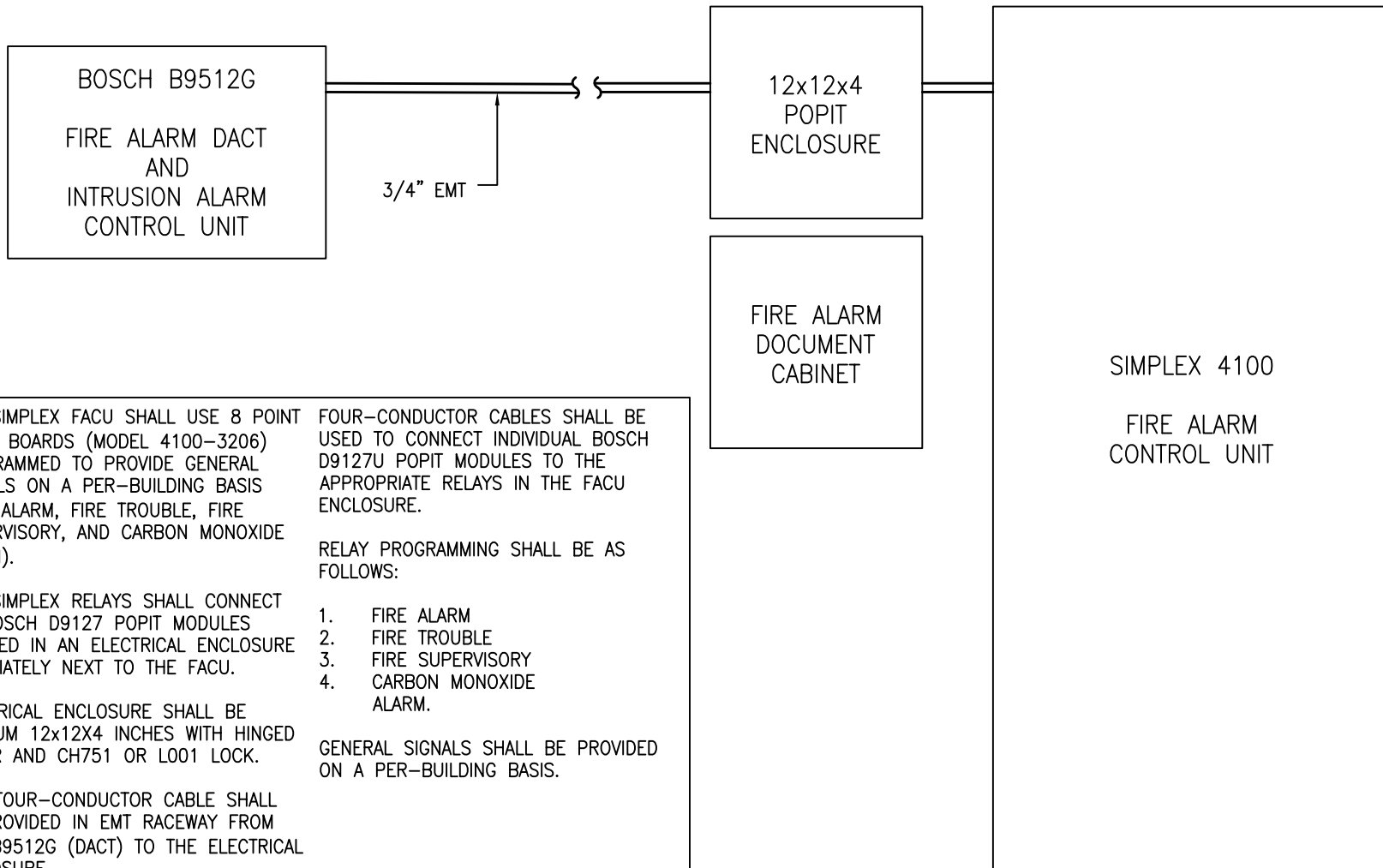
Exit routes must be identified by dashed leading from the "**YOU ARE HERE**" symbol to both the primary and secondary exits. The corridor size shall be a minimum of 3/8 inch wide. The dashes and arrows shall not be less than 1/4 inch in length and 1/8-inch-thick in width and the word "EXIT" shall be depicted in not less than 3/16 inch in height at the exit point.

END OF FIRE ALARM SYSTEM STANDARD



APPENDIX A – FIRE ALARM STANDARD DIAGRAMS

OAKLAND UNIFIED SCHOOL DISTRICT FACU/DACT INTERCONNECTION BLOCK DIAGRAM



THE SIMPLEX FACU SHALL USE 8 POINT RELAY BOARDS (MODEL 4100-3206) PROGRAMMED TO PROVIDE GENERAL SIGNALS ON A PER-BUILDING BASIS (FIRE ALARM, FIRE TROUBLE, FIRE SUPERVISORY, AND CARBON MONOXIDE ALARM).

THE SIMPLEX RELAYS SHALL CONNECT TO BOSCH D9127 POPIT MODULES LOCATED IN AN ELECTRICAL ENCLOSURE IMMEDIATELY NEXT TO THE FACU.

ELECTRICAL ENCLOSURE SHALL BE MINIMUM 12x12x4 INCHES WITH HINGED COVER AND CH751 OR L001 LOCK.

ONE FOUR-CONDUCTOR CABLE SHALL BE PROVIDED IN EMT RACEWAY FROM THE B9512G (DACT) TO THE ELECTRICAL ENCLOSURE.

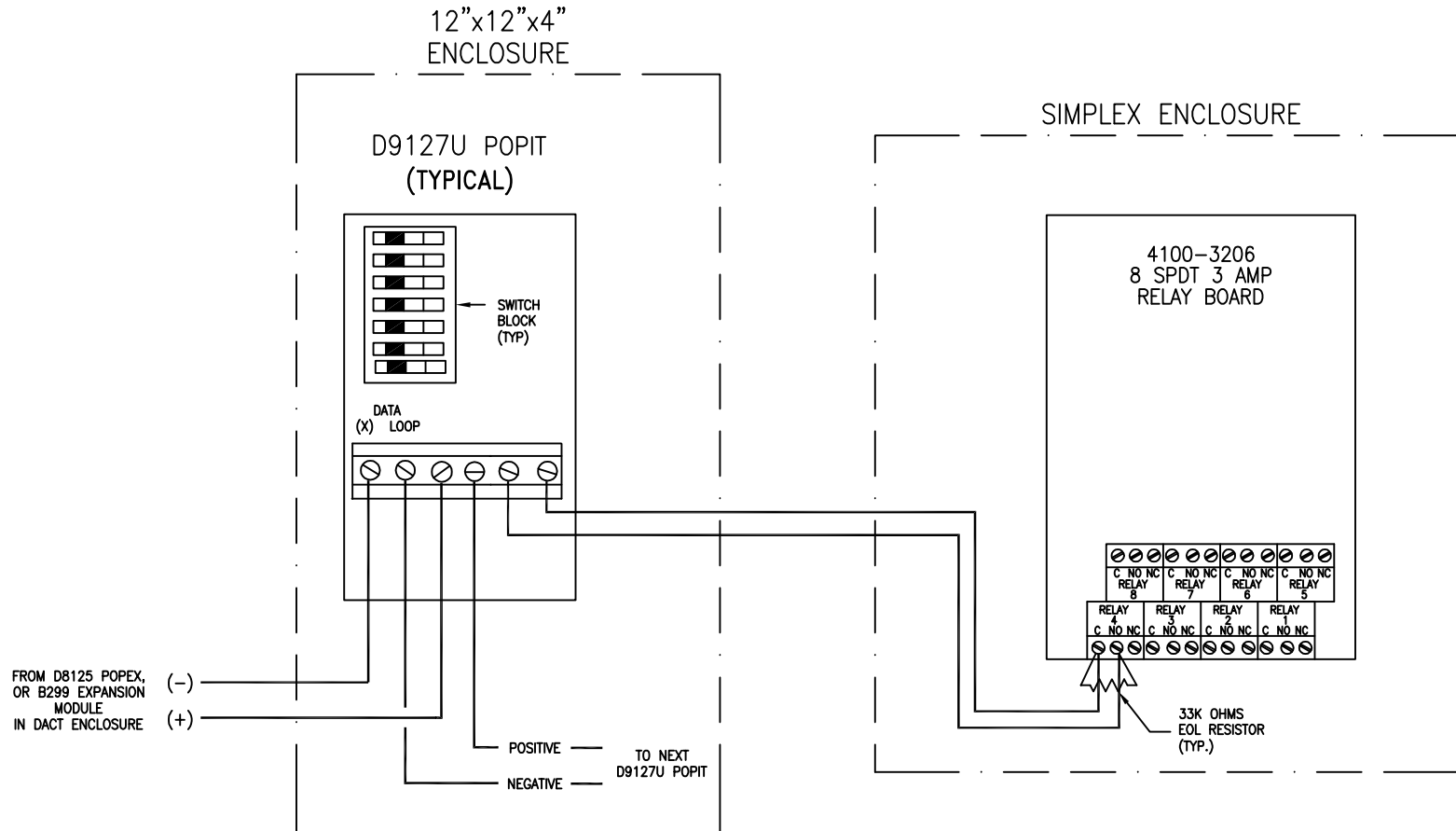
FOUR-CONDUCTOR CABLES SHALL BE USED TO CONNECT INDIVIDUAL BOSCH D9127U POPIT MODULES TO THE APPROPRIATE RELAYS IN THE FACU ENCLOSURE.

RELAY PROGRAMMING SHALL BE AS FOLLOWS:

1. FIRE ALARM
2. FIRE TROUBLE
3. FIRE SUPERVISORY
4. CARBON MONOXIDE ALARM.

GENERAL SIGNALS SHALL BE PROVIDED ON A PER-BUILDING BASIS.

OAKLAND UNIFIED SCHOOL DISTRICT POPIT/RELAY TYPICAL WIRING DIAGRAM



2
FA#.#

POPIT/RELAY WIRING DIAGRAM
N.T.S.



APPENDIX B – FIRE ALARM STANDARD MINIMUM SCHEDULE OF VALUES

Fire and Intrusion Alarm Replacement Project Work Breakdown

COMMON AREA WORK	
1	MOBILIZATION
2	SUBMITTALS
3	BONDS AND INSURANCE
4	GENERAL CONDITIONS
5	PATCH AND PAINT
6	ABATEMENT
SYSTEMS INSTALLATION	
7	FIRE ALARM CONDUIT ROUGH-IN
8	FIRE ALARM MATERIAL DELIVERY
9	FIRE ALARM WIRING INSTALLATION
10	FIRE ALARM DEVICE INSTALLATION
11	FIRE ALARM PROGRAMMING AND TESTING
12	FIRE ALARM EXISTING SYSTEM DEMOLITION
13	INTRUSION ALARM CONDUIT ROUGH-IN
14	INTRUSION ALARM MATERIAL DELIVERY
15	INTRUSION ALARM WIRING INSTALLATION
16	INTRUSION ALARM DEVICES INSTALLATION
17	INTRUSION ALARM PROGRAMMING AND TESTING
18	INTRUSION ALARM EXISTING SYSTEM DEMOLITION
CLOSE-OUT	
19	TEST & ACCEPTANCE REPORTS, NFPA 72 RECORD OF COMPLETION
20	WARRANTY
21	SPARE PARTS
22	TRAINING
23	PUNCH LIST
24	AS-BUILT DRAWINGS



APPENDIX C – JCI NOTIFICATION APPLIANCE PART NUMBERS

DEPARTMENT OF BUILDINGS & GROUNDS

Notification Appliance (Wall)	Model #	Mounting Plate	Cover	Cover Descr	Surface Adapter Skirt	Wire Guard	Backbox	Backbox Descr	Spec Sheet Ref
Speaker/Visual	49SV-APPLW	49MP-SVWR	49SVC-WRS	Red w/ Simplex Logo Only	4905-9941	49WG-SVWCR	N/A	mts on 4 Sq x 2-1/8" Deep elec box or Surface/WP Box (49WPBB-SVWR)	S49SVW-0001
Visual Only	49VO-WRS	included	included	Red w/ Simplex Logo Only	4905-9937	4905-9961	N/A	mts on single-gang, double-gang and 4 sq x 1-1/2" deep elec box	S49VO-0001-6
Speaker Only	49SO-APPLW	49MP-SOWR	49SOC-WRS	Red w/ Simplex Logo Only	4905-9941	49WG-SOWR	49WGBB-SOWR (if wire guard needed)	mts on 4 Sq x 2-1/8" Deep elec box (unless wire guard needed)	S49SOW-0001
Weatherproof Speaker	49SO-APPLW-O	49MP-SOWR	49SOC-WRS-O	Red w/ Simplex Logo Only	N/A-Req Surface mt WP Box	49WG-SOWR	49WPBB-SOWR or 49WGBB-SOWR-O	WP Surface mt Backbox-Red Wire Guard BB, Wall/Red/WP	S49SOW-0001
Weatherproof Visual Only	49VO-WRSO	N/A	included	Red Blank-Surface	N/A-Req Surface mt WP Box	N/A	49WPBB-AVVWR	WP Surface mt Backbox-Red	S49WP-0001-5
Weatherproof Speaker/Visual	49SV-APPLW-O	49MP-SVWR	49SVC-WRS-O	Red w/ Simplex Logo Only-Surface	N/A-Req Surface mt WP Box	49WG-SVWCR	49WPBB-SVWR or 49WGBB-SVWR-O	WP Surface mt Backbox-Red Wire Guard BB, Wall/Red/WP	S49SVW-0001

INTRUSION ALARM SYSTEM STANDARDS

PART 1 - GENERAL

1.01 Introduction

- A. Based on site conditions, OUSD uses Bosch and Simplex equipment for fire alarm and intrusion alarm functions. OUSD applications for the Bosch product are generally as follows:
1. Combined DACT and Intrusion Alarm – This is the most common application. The Bosch panel monitors the campus Simplex fire alarm (for fire alarm, trouble, supervisory, and carbon monoxide alarm conditions) and provides campus-wide intrusion detection. Bosch B299 expansion module # 0 is dedicated for the fire alarm monitoring points; B299 expansion modules #1, #2, and #3 are used for intrusion alarm points.
 2. Dedicated Intrusion Alarm – The Bosch panel provides campus-wide intrusion detection only. All Bosch B299 expansion modules are used for intrusion alarm points.
 3. Other arrangements as approved by the OUSD Alarm Shop.

1.02 General and Special Conditions

- A. This intrusion alarm standard is intended to be used by the architect and intrusion alarm designer for the development of detailed intrusion alarm drawings, product data sheets and specifications. This standard should also be followed by the installing contractor, as applicable during the submittal, construction, testing, closeout and warranty and maintenance phases of the project.
- B. The intrusion alarm system drawings shall be prepared by the architect's intrusion alarm sub-consultant (intrusion alarm designer). The intrusion alarm system drawings shall be included with other drawing submittals to the Division of the State Architect (DSA). The intrusion alarm designer shall provide all required design elements on the intrusion alarm design drawings. Required design responsibilities shall not be delegated to the intrusion alarm contractor through the preparation of contractor shop drawings. The intrusion alarm drawings shall be sufficiently detailed for installation and shall provide all elements described in this Standard. Architects shall utilize an Intrusion Consultant, approved by OUSD, to produce intrusion alarm system construction documents.
- C. Prior to initial design of the intrusion alarm system by the intrusion alarm designer, a pre-design meeting shall be scheduled with the OUSD project team. The project team may consist of the project architect, OUSD's intrusion alarm consultant; Bosch-certified vendor, OUSD's Buildings and Grounds (B&G) Alarm Staff, and OUSD's Project Manager. It is also recommended that representatives from Bosch be involved in the initial design.
- D. A mandatory job-walk with the architect, intrusion designer and the OUSD project team shall be required prior to the start of the design to review the site conditions. It is the intent of the mandatory job walk that device locations be thoroughly examined for access such as motion detector locations over stairs or in mechanical rooms. Devices are to be located in a manner where they can be readily accessed for maintenance purposes. Devices shall not be installed in locations where they may be compromised by storage shelving units and materials.
- E. As part of the design, consideration shall be made to upgrade or expand the school's existing intrusion system for conformity.

- F. On all school repaving projects of playgrounds, drive ways, etc.; after placement of rock, and prior to paving activity the intrusion alarm control unit status shall be verified with OUSD's Alarm Shop representative before the paving starts. If there is evidence of a problem (underground conduit and wire damaged during the demolition of the existing pavement), corrections shall be made and verified prior to starting the paving activity. Existing structures without fire/intrusion alarm protection connected to the main building fire/intrusion alarm system shall have 2-inch underground conduit installed as part of the repaving project. This is to be coordinated with the OUSD representative.
- G. Prior to the final design set being submitted to DSA, OUSD requires review of final design documents by the OUSD's project team. Any comments generated by the OUSD project team shall be addressed by the architect/designer and if requested, the drawings shall be resubmitted to OUSD project team for back check, prior to submitting to DSA. Any comments made by DSA shall be reviewed by OUSD's project team prior to back-check to DSA.
- H. Vendors shall be Bosch Certified with a Bosch Certificate of Training issued by Bosch, licensed by the Board of Consumer Affairs and must meet OUSD's pre-qualification requirements in the same manner as electrical contractors working with the OUSD representative. Proof of Bosch certification shall be provided to the OUSD Project Manager and forwarded to the OUSD Alarm Shop.
- I. A Bosch-certified technician with a Bosch Certificate of Training issued by Bosch shall supervise the installation acceptable to the OUSD.
- J. Any contractor responsible for programming the Bosch panels must have Bosch's most current RPS program and must be certified for programming on the new software and panel.
- K. Any company and/or Bosch programmer hired by the general contractor to program OUSD's Bosch systems must attend required project meetings and have all required equipment to properly program and test the system with the First Alarm and OUSD Alarm Shop receiver. OUSD does not loan or provide parts needed on a project for any reason.
- L. Prior to working or expanding an existing intrusion system, the contractor shall verify the existing conditions of the system and identify any deficiencies to the OUSD Project Manager and B&G personnel. Upon reporting the deficiencies, OUSD Alarm Shop is to correct the deficiencies and contractor is to agree that the system is free of any deficiencies before starting his work. Any deficiencies thereafter will be the contractor's responsibility to correct. The existing intrusion alarm system should be free and clear of troubles prior to the contractor starting work. Any issues in the area(s) of work regarding the operation and status of the existing intrusion system and/or repairs to protect the site once work has started are the responsibility of the contractor. Once the contractor begins work, they shall be responsible for any and all repairs in the area(s) of work.
- M. If there are issues found prior to, during or after the start of work, and the contractor did not contact and identify the deficiencies to the OUSD Project Manager and B&G personnel, the contractor shall be responsible for all necessary repairs, including time for OUSD's B&G personnel to repair the deficiencies.
- N. Anytime during the project, if a trouble condition is reporting on the existing intrusion alarm system, the contractor shall be responsible for notifying B&G Alarm Shop immediately of the trouble condition, so they can review and resolve the issue(s) not related to the contractor's work.

DEPARTMENT OF BUILDINGS & GROUNDS

- O. Any existing intrusion panels shall not be accessed by the contractor until it is identified and confirmed by B&G that it is an OUSD-owned panel.
- P. When a Radionics 8112 panel is being replaced with a Bosch B9512G, OUSD requires all zones connected to the new dialer be tested and confirmed receipt to both supervising station and OUSD alarm receiver when the replacement has been completed. All existing devices that are being transferred shall also be tested to both receivers.
- Q. Project Managers shall provide to the OUSD Alarm Shop a user list for Intrusion Codes prior to going on line.
- R. Construction trailers on site requiring alarm monitoring equipment or cameras connected to a Central Station must have their own private Alarm Permit registered with the Oakland Police Department and under their own name. The use of Oakland Unified School District as the registered name is prohibited.
 - 1. The contractor shall provide the OUSD Project Manager with the alarm permit number, alarm company name and number, and supervising station phone numbers.
 - 2. Any false alarm fines billed to OUSD caused by the alarm equipment installed while on site are to be paid immediately by the contractor.
- S. False Alarm Prevention Program information is provided in Appendix B for the contractors to use as reference for training to minimize false alarms.
- T. Where a new system replaces an existing intrusion alarm system, all existing unused intrusion alarm devices, conduit, and wiring shall be removed following final acceptance of the new intrusion alarm system.

1.03 Contractor Qualifications

- A. Contractors and/or subcontractors whose work involves programming of the Bosch panel to any extent however small, shall possess the following qualifications:
 - 1. The individual involved with the programming of the Bosch panel shall be licensed by the California Department of Consumer Affairs, Bureau of Security & Investigative Services. License status may be verified at <https://search.dcs.ca.gov>.
 - 2. The individual involved with the programming of the Bosch panel shall be experienced and certified by Bosch as having completed the B Series Security Control Panel with RPS technical training.

1.04 Submittals

- A. General
 - 1. The OUSD project team shall review the design drawings for conformance with this Standard. If the design is found to not conform to the requirements of this standard, the architect/intrusion designer shall be required to resubmit with modifications.
 - 2. All equipment shall be installed in accordance with the manufacturer's recommendations and the UL listing limitations. The architect/intrusion alarm designer shall provide evidence with the submittal of listings of all proposed equipment and combinations of equipment.

3. The Bosch vendor shall be consulted to confirm all model numbers of proposed equipment are still valid.
- B. Equipment List/Product Data
1. Submit full sets of product submittals bound in protective binders. A Bill of Materials shall be provided listing the part number and quantity of all components and devices. All data sheets shall be original manufacturer's literature or shall be clearly legible if copies are provided. When a manufacturer's data sheet shows more than one product(s), the proposed product shall be clearly indicated by arrows or other suitable means.
- C. Intrusion Alarm Drawings
1. Prior to DSA submittal, the architect/designer/electrical consultant shall prepare and submit a minimum of three copies of the intrusion alarm drawings to the OUSD Project Manager for review and acceptance by OUSD.
 - a. Intrusion alarm drawings shall depict only the intrusion alarm system design, and where applicable, its interface to the fire alarm system for supervising station monitoring. Do not combine access control, CCTV, technology, or any other information with the intrusion alarm drawings.
 2. The intrusion alarm drawings shall include, at a minimum, the following information:
 - a. A legend sheet including symbols, equipment manufacturer, equipment model numbers, equipment descriptions, and device quantities. All modular components that makeup the Bosch B9512G shall be listed.
 - b. A wire legend detailing the type and quantity of cables and conductors for each circuit.
 - c. Location of the externally-mounted cellular antenna.
 - d. Sequence of Operation for each type of device on the intrusion alarm system.
 - e. School Site Plan – to include:
 - 1) All structures on site.
 - 2) Each system's connection(s) and show the interconnection(s) of structures on the site (clearly labeled).
 - 3) Locations of the control unit and all power supplies, and arming stations (keypads).
 - f. Intrusion alarm point list. The list shall provide the point number, device type (motion detector, POPIT module, door contact, etc.) and location description. The location description shall be in the format of building name, floor, and room number.
 - g. Provide substantiating calculations, including calculations for determining the secondary power supply (battery size) requirements for the IACP and all system power supplies.
 - h. Building floor plans shall be drawn to scale, showing conduit routing and device locations; complete wiring and schematic diagrams, including quantity, size and type of conductors and conduit for both existing and new, wire color codes, and field terminations; manufacturer provided detailed device wiring diagrams for all devices, control panel layouts, including all modules, circuit terminals and interconnections; complete riser diagrams indicating wiring sequence for all devices and control equipment, including all required wiring between the control unit. Drawings shall show proposed layout and anchorage of equipment and appurtenances and equipment relationship to other parts of the work,



including clearances for maintenance and operation. Prepare intrusion alarm drawings at a minimum scale of 1/8 inch equals 1 foot for plans. The device point number shall be provided next to the associated devices on the intrusion alarm drawings.

- i. Floor plans shall designate the devices which will be programmed with an entry/exit delay.
- j. Floor plan device annotations: A valid point number shall be assigned to all popit modules (points) connected to the system. Valid point numbers shall be assigned as follows:

- 1) Points 1 through 8 shall be used for monitoring items such as the two-way communication system, and emergency generator (if applicable).

- 2) Bosch B299 expansion modules shall be used for expanding the system beyond the capacity of on-board points 1 through 8. Valid point numbers for the B299 expansion modules shall be assigned as follows:

- a) Points 009 through 099 (B299 address # 0)

- (1) Fire Alarm
- (2) Fire Trouble
- (3) Fire Supervisory
- (4) Carbon Monoxide Alarm (where applicable)
- (5) ERRCS Supervisory points (where applicable)
- (a) Note: Each separate building shall be provided with a point for fire alarm, fire trouble, fire supervisory and carbon monoxide off-site signaling.

- b) Points 100 through 199 (B299 address #1)

- (1) Motion detectors, or
- (2) Other powered intrusion detectors

- c) Points 200-299 (B299 address #2)

- (1) Door contacts
- (2) Intrusion Alarm power supervisory points (low battery, a/c fail)

- d) Points 300-399 (B299 address #3)

- (1) Motion detectors, or
- (2) Other powered intrusion detectors

- k. The following verbatim note shall be indicated on the fire alarm floor plan near the FACU:

- 1) Provide one Cat 6 cable in ¾" conduit from the IDF to the IACP for ethernet connection. Provide RJ45 jack in a biscuit block inside the IACP. Provide patch cable between biscuit block and the B9512G. Contractor shall coordinate termination with OUSD.

- D. Submittals must be complete. Incomplete submittals may be rejected at the discretion of the architect or OUSD's intrusion designer.

1. Submit dimensioned elevation details of control panel and power supplies. The contractor is responsible for the actual location of the control panel and power supply in the designated room. Complete installation drawings, including system wiring diagrams, floor plans, and point-to-point wiring diagrams showing all conductors and terminations for all systems. Intrusion alarm drawings are to be prepared in CAD. A block diagram or single-line diagram alone is not acceptable.
 2. Manufacturer's names, model numbers, and catalog references for all equipment supplied.
 3. A complete listing of all system input and output points, and a sequence of operations for all functions of each system.
 4. A complete Bill of Materials.
 5. Battery calculations for all panels and remote power supplies.
 6. Service information, including the address and telephone number of the nearest service representative.
- E. Submittals at the Start of Construction
1. The contractor shall submit spare parts in accordance with this standard.
 2. The contractor shall submit a sample of typical initiating device and typical notification appliance installation for review by the project team. Samples shall include all accessories (as applicable) including standard or deep electrical box, extension ring, intrusion alarm device including dress skirts or trim plates, wire guard, etc.

1.05 Definitions

- | | | |
|----|-------------|---|
| A. | Approved: | Unless otherwise stated, materials, equipment or submittals approved by the Owner, Owner's Representative, or IOR. |
| B. | Concealed: | Where used in connection with installation of piping or conduit and accessories, shall mean "hidden from sight" as in shafts, furred spaces, soffits or above suspended ceilings. |
| C. | Contractor: | The Company awarded the prime contract for this work and any of its subcontractors, vendors, suppliers or fabricators. |
| D. | DSA: | Division of the State Architect. |
| E. | IACP: | Intrusion alarm control panel. |
| F. | IOR: | Inspector of Record. |
| G. | Listed: | Materials or equipment included in a list published by a nationally recognized laboratory that maintains periodic inspection of production of listed equipment and material, and whose listing states either that the equipment or materials meets nationally recognized standards or has been tested and found suitable for use in a specified manner. |
| H. | POPIT | Point of protection input transponder. |

- I. Remove: Remove material and equipment and restore surface.
- J. UL: Underwriters' Laboratories, Inc.
- K. UL Listed: Materials or equipment listed by Underwriters' Laboratories and included in the most recent edition of the UL Fire Protection Equipment Directory.

PART 2 - PRODUCTS

2.01 Intrusion Alarm System Configuration

- A. The OUSD Standard for the intrusion alarm equipment is as follows:
1. If a new intrusion alarm control system(s) is required, it shall be a Bosch B9512G. All Bosch B9512G installations shall be supplied with a ROM key.
 2. Manufacturer's catalog and system numbers of equipment listed in this standard indicate type, quality, and functions of the equipment required, and represent the minimum acceptable standards. Provide all compatible parts for the submitted system.
- B. OUSD does not permit or approve of glass break detectors or Octo-POPITS at any time.
- C. Intrusion alarm systems shall be subdivided into logical areas. Each logical area shall be provided with its own arming station (keypad) and sounder(s). In general, Area 1 is dedicated to fire alarm monitoring and Area 2 is dedicated for intrusion alarm.
1. Area 1 – Fire Alarm Monitoring
 2. Area 2 – Intrusion Alarm
- Additional intrusion alarm logical areas shall be provided for:
- Health Centers
 - Kitchens
 - Gymnasiums or Multi-Purpose Rooms
 - Schools with multiple separate administrations
 - Child Development Centers (CDC)
3. Each additional intrusion alarm area shall be provided with its own arming station (keypad) and sounder(s).

2.02 Manufacturers

- A. Acceptable manufacturers for this project shall be Bosch. This is a proprietary item to match existing OUSD intrusion alarm standard equipment requirements. No equal shall be accepted.
- B. Products shall be of the latest design; obsolete or discontinued products shall not be acceptable. All equipment supplied shall be UL listed for the required function.

2.03 Intrusion Alarm Control Equipment

DEPARTMENT OF BUILDINGS & GROUNDS

- A. The intrusion alarm control panel (IACP) and system power supply(ies) shall be located in the electrical or custodian's room. Exact location shall be determined at the pre-design meeting and/or as determined by actual or existing conditions.
- B. IACP and system power supply shall be wall mounted an elevation of 36 to 72 inches above the finished floor.
- C. The control panel shall provide, annunciation, supervision and control for the motion detectors, contacts, and sounders. The Bosch model is a proprietary item. No equal shall be accepted. The panel shall be modular in construction and contain all modules necessary to operate according to this standard.
- D. For DACT applications, provide and install a Bosch D8109 red enclosure.
 - 1. For systems that provide intrusion alarm functions only, provide the Bosch D8109G enclosure.
 - 2. The following are the minimum required components for a DACT:

<u>Units</u>	<u>Model #</u>	<u>Description</u>
<u>1</u>	<u>B9512G</u>	<u>B9512G Fire and Burglar Control Panel, Version 1 ONLY</u>
<u>1</u>	<u>D8109</u>	<u>Fire Enclosure</u>
<u>1</u>	<u>D8004</u>	<u>Transformer Enclosure</u>
<u>1</u>	<u>B925F</u>	<u>Fire and Intrusion Keypad, SDI2</u>
<u>1</u>	<u>ICP-SD1-9114</u>	<u>Isolator Keypad Module, see Note 1</u>
<u>see Note 4</u>	<u>B299</u>	<u>Expansion module, SDI2</u>
<u>1</u>	<u>B430</u>	<u>Plug-in Communicator, Telephone</u>
<u>1</u>	<u>B445</u>	<u>Conettix Plug-in Cellular Communicator</u>
<u>1</u>	<u>B40-MB50</u>	<u>Multiband Antenna, see Note 3</u>
<u>see Note 2</u>	<u>D9127U</u>	<u>POPIT Modules</u>
<u>2</u>	<u>D1218</u>	<u>12V 18AH Batteries</u>
<u>1</u>	<u>D101</u>	<u>Lock and Key Set</u>

Note 1 – Keypad isolator module is required where the DACT also provides intrusion alarm functions.

Note 2 – The specific quantity of POPIT modules required for fire alarm supervising station signaling shall be determined by the number of separate buildings served by the system.

Note 3 – The B40-MB50 antenna cable shall be routed in dedicated EMT conduit (1/2-inch minimum). The antenna shall be exterior wall mounted at the roof level.

Note 4 – Provide one B299 at a minimum. Where used as a DACT, provide additional expansion modules as required for the application. See OUSD Fire Alarm Standards for additional information.



- a. D101 lock and key set,
 - b. D110 tamper switch,
 - c. B430 plug-in communicator (telephone) module,
 - d. one D161 dual modular telephone cords,
 - e. one RJ31X phone jacks,
 - f. B299 expander modules as required
 - g. one B308 Octo-output module,
 - h. D9002-5 module mounting skirt,
 - i. D137 mounting brackets,
 - j. D1640 transformer,
 - k. D8004 transformer enclosure,
 - l. D122 dual battery harness,
 - m. B445 Conettix plug-in cellular communicator, and
 - n. B40-MB50 multiband antenna.
- E. Provide all necessary internal mounting brackets, hardware, and telephone or data patch cables.
- F. Battery backup for 4 hours of standby for dedicated intrusion alarm systems; 24 hours of standby and 5 minutes of alarm where used as a tone fire alarm dialer; and 24 hours of standby and 15 minutes of alarm where used as EVAC fire alarm dialer.
1. Provide a minimum of two D1218, 12-volt, 18-amp-hour gel-cell batteries.
- G. AC and battery power supplies monitored for “Trouble” shall have a new point index programmed for the trouble point.
- H. Provide a 12 AWG THHN BLACK common negative conductor between the IACP and all remote power supplies. All shields must be clear of any grounds, be continuous and grounded only at the IACP.
- I. Provide point identification for all initiating devices.
- J. The LAN line, CAT6 cable, shall be installed between the MPOE and the IACP prior to scheduling the final acceptance test.
- K. The control equipment and/or power supplies shall operate from a three-wire 120 VAC supply fed from a single dedicated circuit breaker. The circuit breaker shall be clearly labeled Intrusion Alarm System and shall be fitted with a clip to prevent it from being turned off. Where there is an emergency 120 VAC systems available, the intrusion alarm system and intrusion alarm auxiliary equipment shall be on the emergency panels. The location of the circuit disconnecting means shall be permanently identified at the panel.

2.04 Intrusion Alarm Power Supply

- A. Intrusion alarm power supply shall power all motion detectors, keypads, and sounders.
1. The intrusion alarm power supply shall be Altronix model AL1012ULXPD16, 12VDC, 10 Amp, or approved equal. Provide minimum 12-volt, 12-amp-hour gel-cell batteries. Battery backup for 4 hours of standby shall be provided to power the intrusion alarm systems in the event of AC power failure.

2. Monitor power supplies for AC power failure, battery fail, and battery presence with individual POPITs. Both battery and AC power loss are to be monitored by separate POPITs and alarm points.
3. Provide and install 120-volt AC power for power supplies.
4. Intrusion alarm power supply shall be located in the electrical or custodian's room, unless otherwise approved. System enclosures shall be mounted between 36 and 72 inches above the finished floor.

2.05 Intrusion Alarm Devices

A. Keypad

1. Intrusion alarm arming stations (keypads) shall be Bosch [B921C](#).
2. At a minimum, B921C keypads shall be provided:
 - a. On the front panel of the B9512G enclosure
 - b. In the main (admin) office, and
 - c. In the custodian's room.
3. An additional keypad shall be provided in every other intrusion alarm logical areas. Confirm locations with OUSD during pre-design meeting.
4. Keypads shall not be installed in a common area such as public hallways where access can be made by students or unauthorized persons.
5. Keypads shall not be located in the general public areas and in non-adult-supervised locations.
6. Keypads shall be located in a room accessible from the exterior entry points; for example: Data Rooms, Offices, and Custodial Closets.
7. Systems that provide fire alarm off-site signaling shall include one Bosch [B925F](#) fire keypad with function keys installed at the IACP location.
8. OUSD Alarm shop shall be provided with keypad locations at the site in writing.
9. All keypad locations shall be reviewed and accepted in writing by OUSD prior to installation.
10. Keypads shall be mounted between 54 to 60 inches above the finished floor. Provide a minimum of 6 inches vertical clearance above and below the keypad. Enough clearance to the keypad tabs to use a tool for access.
11. All keypads shall be powered by the intrusion alarm power supply, not by the B9512G.

B. POPITs

1. POPITs shall be Bosch D9127U.
2. The location of all POPITs and power supplies shall be provided to B&G Alarm Shop.

C. Door Contacts

1. Door contacts shall only be installed for roof hatches, boiler rooms, IDF, MDF, and electrical rooms with perimeter access, and any other perimeter room where ambient temperatures exceed 90 degrees.
2. All door contacts shall be Flair 1000-96L or approved equal.
3. Any exposed armored cable shall be properly secured using nylon cable clamps; such as <http://tinyurl.com/nylon-cable-clamp>.
4. Each door shall provide for point identification. Provide and install a POPIT for each exterior door or roof hatch contact.

D. Wall-Mounted Motion Detectors

1. Motion detectors shall be provided to protect all perimeter openings.
2. Wall-mounted motion detectors shall be Bosch Professional Series TriTech+ with Anti-Masking; model ISC-PDL1-WA18GB. Detector shall be mounted using the Bosch B328 Gimbal-mount bracket.
3. Device shall provide for point identification. This shall require providing a POPIT for each device. The POPIT shall be located at the motion detector.
4. See Appendix for typical motion detector-POPIT wiring arrangement.
5. Provide wire guards for motion detectors in all public areas; multi-purpose room, gymnasium, cafeterias, locker rooms, corridors, and classrooms for special-needs students.
6. Wire guards shall be Chase model CWGP 778, STI-9621-WEB, or STI-9623. The contractor shall confirm that the guard selected is appropriate for the application and can be installed on the motion detector or sounder (including mounting box and conduit), before installation of conduit.
7. OUSD Standards supersedes the manufacturer's installation requirements. If not in the OUSD Standards, installation shall be as required in accordance with manufacturer's specifications and documentation provided with each unit.
8. Wall-mounted motion detectors shall be installed at 8 feet above finished floor, measured from the bottom of the mounting box or mounting bracket.
 - a. Motion detectors shall be installed with a clear view of the opening(s) intended to be protected.
 - b. The range, sensitivity, and alignment of motion detectors shall be adjusted as necessary to detect intrusion at the openings intended to be protected.
 - c. Motion detectors shall not be installed above shelving or in locations where coverage is obstructed (e.g., above casework).
 - d. Detectors shall not be pointed directly at a window within its sensing range.
 - e. Motion detectors shall not be located in corners but shall be 8 to 36 inches from corners to help eliminate spiders from making webs on the detectors.

- f. Motion detectors shall be located a minimum of 5 feet away from wireless routers.
- g. All motion detectors shall be powered by the intrusion alarm power supply, not by the B9512G.
9. Motion detectors shall not be used in boiler rooms or restrooms.
10. Any motion detector in the entry/exit path of travel to the location of the keypad shall be programmed with a 90-second entry/exit delay.
11. Motion detectors shall not be installed in the path of heating/ventilation vents or drafty areas or high velocity (HVLS = Hi Volume Low Speed) ceiling fans where there is a possibility of temperature changes. Refer to the manufacturer's recommendations for installation information.
12. Motion detectors in auditoriums/multi-purpose rooms shall be located to detect intrusion at perimeter doors and other openings only. Motion detection coverage is not required for the entire auditorium/multi-purpose room open area.
13. The contractor shall make the necessary sensitivity adjustments in the field to minimize nuisance alarms. The use of default settings is not acceptable. The intermediate sensitivity shall not be used unless approved in writing by OUSD.
- ~~14.~~ Any Bosch motion detector that offers an optional "Look Down Zone" for greater security coverage is not to be adjusted for any reason. Failure to comply with this policy will require adjustments or replacement of motion detectors at the contractor's expense.

E. Sounders

1. Intrusion alarm sounders shall be Amseco Potter model SSX-52 and Honeywell Ademco model Wave2PDT.
 - a. Provide interior SSX-52 sirens in corridors of all buildings. Provide a minimum of one siren per floor and per wing with a separation not exceeding 175 linear feet.
 - b. Provide interior Wave2PDT sirens in portable buildings.
2. Sounders shall be controlled via Octo-relays.
3. A minimum of one interior sounder shall be installed with every intrusion alarm system. There shall be at least one interior sounder for every separate building. For portables, provide one Wave2PDT siren in each portable.
4. Interior sounders shall be wall mounted the lower of 9 feet above the finished floor or 12 inches below the ceiling.
5. Exterior sounders:
 - a. Shall be provided only when specifically required by the OUSD Alarm Shop (i.e., during the pre-design meeting).
 - b. Shall be the Amseco Potter model SSX-52.
 - c. Shall be provided with a tamper switch and POPIT module.
 - d. Shall be mounted 9 feet above finished grade.



- 6. Sounders shall operate only within the logical intrusion alarm area where they are installed.
 - a. Sounders shall activate only upon intrusion detectors assigned to the same logical intrusion alarm area.

- 6.7. All sounders shall be powered by the intrusion alarm power supply, not by the B9512G.

PART 3 - EXECUTION**3.01 New Construction**

- A. Prior to installation of the intrusion alarm system, a pre-construction meeting shall be held with the general contractor, fire alarm sub-contractor and/or the electrical contractor, if different from the fire alarm sub-contractor, IOR, architect/engineer, and the OUSD project team.
- B. Prior to proposing additional intrusion equipment on a site, B&G shall be consulted and shall determine if additional intrusion equipment is required.
- C. Certification shall be required for all persons who perform work as electricians for contractors licensed as Class C-10 Electrical Contractors under the Contractor's State License Board Rules and Regulations.
- D. During installation, the general contractor shall notify the OUSD Project Manager that the system is ready for inspection by the OUSD project team at the following stages: conduit rough-in completion (before pulling wire), device connection, and final acceptance. After each inspection, the OUSD project team shall issue a report on their findings. This report shall be distributed to the general contractor, IOR, OUSD Project Manager, and OUSD project team. Any deficiencies noted in these reports shall be corrected before calling for the next subsequent inspection.
- E. The OUSD Project Manager shall complete the Alarm Permit Application form and submit the document to the OUSD Alarm Shop for submittal to Oakland Police Department. (Refer to the Appendix for Alarm Permit Application.)

3.02 Modifications

- A. Prior to working on the modifications of the intrusion alarm system, the contractor shall verify the existing conditions of the system and identify any deficiencies to the OUSD Project Manager. The existing intrusion alarm system should be free and clear of troubles prior to the contractor starting work.
- B. If an existing fully-functional intrusion system is currently providing protection to the project area and the intrusion modifications is to be "phased," mandatory discussions shall be held during the pre-design meeting with B&G to determine which "phase" shall include the existing intrusion system.
- C. If exterior terminal cabinets or pull boxes are to be re-used as part of the modifications, the contractor shall review the cable connections prior to starting work to ensure the connections are free of any corrosion and the enclosure has not been compromised with moisture. Any deficiencies shall be identified to the OUSD Project Manager.
- D. All batteries for modifications utilizing existing control units shall be replaced with new batteries as part of the modification.
- E. Any and all existing equipment no longer being used after the installation of the new equipment shall be returned to OUSD to determine if any equipment can be retained as spare parts. Any equipment OUSD elects not to retain shall be returned to and discarded by the contractor.
- F. Any after-hours emergency B&G service calls resulting from the contractor's work shall be back-charged to the contractor.
- G. Any security false alarms caused by the contractor resulting in false alarm fees from Oakland Police Department shall be back-charged to the contractor.

3.03 Wiring and Raceway Configurations

- A. T-tapping of any intrusion alarm wiring is not permitted.
- B. The contractor shall follow the manufacturers' recommendation for cabling except as noted in this Standard. All Popex data loops and wiring shall be installed utilizing twisted shielded pair cable. Proper installation and draining techniques must be followed (CEC Standards apply). Although this requirement exceeds Bosch's standards, it is fully supported by Bosch. Refer to Bosch letter in the Appendix. Wire and cable sizes, number of conductors, shielding, or other data listed in this standard or if shown on drawings are a guide to the correct product required to achieve a working system and represent minimum acceptable equipment. Contractor is responsible for calculating and then installing proper wire gauge and type for manufacturer acceptable voltage drop/signal loss/distance limitations. The size of the school campus shall determine the wire gauge of the Zonex or POPIT cables for each project. Minimum gauge shall be 18 gauge. Maximum gauge shall be 12 gauge.
- C. All intrusion alarm cables shall be installed in conduit. No intrusion alarm cables shall be exposed. No intrusion alarm cables shall share a conduit with telephone, data, or intercom cables.
- D. All cable installed in underground or under slab conduits shall be listed for outdoor use. West Penn Aqua-Seal or equal shall be used for underground raceways. The underground raceway shall be verified in the field for use and access.
- E. When an underground wet usage rated cable enters into a building, it shall be continued un-spliced until it reaches the first device or panel.
- F. When new terminal cabinets or pull boxes are used on the exterior of the building, the enclosure shall be listed for weatherproof use, and water-resistant wire nuts shall be used for the cable connections. The enclosure shall be properly sealed with weatherproof gaskets to ensure no moisture shall enter into the enclosure and compromise the cable connections.
- G. There shall be no splicing of cables in underground boxes.
- H. A pull string shall be installed in all underground conduits.
- I. Cable colors and size shall be continuous throughout the building for each circuit.
- J. An additional 12 AWG THHN BLACK wire shall be installed from each remote equipment or power supply location directly back to the main panel to provide for a common reference point connection.
- K. All cables shall be labeled with the associated circuit number in all terminal cabinets, in the control unit, and in all remote power supplies.
- L. Splices shall be kept at a minimum and clearly labeled at j-boxes and/or terminal cabinets. Splices are not acceptable in underground or outside areas. Splices shall be made in terminal cabinets via terminal strips. All wire shall be identified on both ends, at splice locations and in all visible locations with a cable tag.
- M. Cables shall be Belden, West Penn, Atlas, or approved equal.
- N. No cables shall be terminated at the control unit until all cables have been tested for continuity in the presence of the Bosch technician and are free of any grounds, faults, or shorts. Once

the integrity of the cables has been verified, the Bosch technician shall terminate all field wiring at the control unit and power supplies. Terminal cabinets shall be terminated by the contractor.

- O. Interior intrusion alarm cables conductors shall be color coded as follows:
1. Motion detectors: Four-conductor, gray cable, with red, black, green and white conductors. The green and white shall be used for the expansion loop (i.e. data). The red and black shall be used for motion detector power.
 2. Popit modules not used for motion detectors: Four-conductor, gray cable, with red, black, green and white conductors. The green and white shall be used for the expansion loop (i.e. data). The red and black shall be taped-off as spare.
 3. Popit sensor loop: Four-conductor, gray cable, with red, black, green and white conductors. The green and white shall be used for the sensor loop (i.e. door contact). The red and black shall be taped-off as spare.
 4. Keypads: Four-conductor, white cable, with red (+12v), black (-12v), green (-data) and white (+data) conductors.
 5. Sounders: Four-conductor, gray cable, with red, black, green and white conductors. The red and black shall be used for the sounder circuit power. The green and white shall be taped-off as spare.

3.04 Intrusion Device Labeling

- A. All intrusion alarm motion detectors and popit modules shall be provided with device labels, which shall indicate the device's point assignment and shall be consistent with the information provided on the intrusion alarm drawings.
1. These self-adhesive labels shall be machine manufactured with 1/2-inch high black text on white background.
 2. Intrusion alarm sounders shall be labeled in the format of "power supply#-output#-position on circuit, i.e. PS1-1-1.
 3. Labels on motion detectors shall be placed on the front of the detector.
- B. Existing devices/circuits that are to be reused need to be reviewed for updated addressing in the program and corresponding physical label on the devices.
- C. The IACP shall be programmed with point location descriptions to indicate the location of the initiating devices in the field. The location description shall indicate the building name, floor, room number, and associated point assignment and text.
- D. If the school campus serves multiple administrative entities. The intrusion alarm point location descriptions shall correspond with each administrative entity that exists on the campus. The point location descriptions shall be prefixed with the letter corresponding to the associated administrative entity. (Example: L – Life Academy High School, U – United for Success Academy, etc.)
- E. All batteries shall be labeled with the date of manufacture and date of installation.
- F. The point location description for the classroom numbers shall be coordinated with the Architectural room numbers for the project. All rooms shall be identified by a permanent room

number above the door frame that shall designate the room number for the life of the building regardless of how it is identified by school staff during the years.

- G. The construction documents shall be provided with a list of point location descriptions that indicate the associated location description for all of the initiating devices for the system.
- H. Intrusion alarm terminal cabinets shall be labelled IATC.
- I. Intrusion alarm junction boxes shall be labelled IA.

3.05 Test/Field Quality Control

- A. Conduit rough-in shall be inspected by the IOR prior to pulling wire/cable. The IOR shall report to OUSD when this inspection is complete. OUSD B&G will confirm that the conduit rough-in is acceptable.
- B. Wire/cable installation shall be inspected by the IOR prior to installation of devices. The IOR shall report to OUSD when this inspection is complete. OUSD B&G shall confirm that the wire/cable installation is acceptable.
- C. The contractor shall maintain a set of working drawings during construction. The contractor's working drawings shall reflect all approved changes and deviations from the approved drawings. The IOR shall review the contractor's working drawings for compliance weekly during construction.
- D. Intrusion alarm devices installed in areas that have a potential to cause false alarms that are not obvious during plan review are to be re-located at the contractor's expense to areas where protection is provided and false alarms resolved.
 - 1. Intrusion alarm devices shall be located a minimum of 5 feet away from wireless routers.
- E. Programming
 - 1. Special coordination shall be required with the OUSD's Alarm Shop regarding programming requirements prior to any programming of new or existing control panels. The contractor shall meet with the OUSD's representatives and submit proposed labels for all input and output points in writing for OUSD review and comment prior to any programming.
 - 2. Prior to any field programming via laptop with a direct connection to any Bosch panel, the contractor is required to notify the B&G Alarm Shop at 510-535-2736 and provide notice to the OUSD Project Manager.
 - 3. Bosch's most current Remote Program Software (RPS) be used for programming. Prior to any request of a pre-test, the contractor shall submit the intrusion alarm program in Bosch RPS format to the alarm shop for review and approval.
 - 4. The contractor shall submit to B&G a completed programming sheet in electronic format for preliminary review of proposed programming and descriptors. The contractor shall make any changes to the programming sheet and directed by the written review comments from B&G. (Refer to Appendix for samples of programming sheets.)
 - a. When programming zones to indicated locations of alarms in the "Point Text," do not program the "Point Number" or abbreviations in the point field text.

- b. The intrusion alarm point index programming shall be in accordance with the assignments in the Appendix.
5. If there are more than one of the same type of location (i.e., Hall, Stairwell, Office, Storage, Janitor Closet, Rest Room, Counselor, Staff), the descriptor must indicate what area of which building. Programming with duplicate identical descriptor for different locations shall be rejected by OUSD and the contractor shall be required to revise programming. If any programming is found to be incorrect by the Alarm Shop, the contractor's project manager shall be notified via email. The contractor shall correct programming before continuing with project. All programming must be approved by the Alarm Shop before final testing of the alarm system can be scheduled.
 6. Programming for doors contacts, time zones, arming stations, motion sensors, tamper switches, etc. shall include text description locating initiating devices in the program with room numbers to be found on permanently mounted placards at room locations.

Example:

Point #	Label	Point Index	Point Index Description	Area
Point 143	Room B203	4	MD-Instant	2

7. The control panel and the program shall be the property of OUSD and not the contractor. As such, no data lock or access codes shall be allowed with this system. Final payment shall not be made and the warranty period shall not begin until any such data lock or access codes (other than factory default codes) are removed.
 8. Programming software and programming files shall belong to OUSD. Turn over programming software and programming files shall be provided to OUSD prior to the end of project. Final payment shall not be made and the warranty period shall not begin until programming software and programming files have been received by OUSD.
- F. The contractor for any intrusion installation/modifications must receive a temporary alarm code for programming through the OUSD Project Manager before any programming is done. At no time shall the contractor extract alarm codes from the existing intrusion alarm system.
1. If OUSD Alarm Shop personnel verify that the existing codes are compromised at the site, the contractor shall be liable for OUSD Alarm Shop's programming cost to correct the codes. An hourly rate of \$62.00 with a minimum 2 hours of OUSD's Alarm Shop's programming time shall be charged to the contractor.
 2. If Master District codes where all intrusion systems use the same Master District code are compromised, all intrusion system codes shall be deleted and reprogrammed by OUSD's Alarm Shop. A minimum of 60 hours at the aforementioned hourly rate will be charged to the contractor.
 3. It is a violation of security standards, as well as OUSD Standards to extract any secure or confidential information through security equipment unless OUSD's Alarm Shop has been contacted and has approved access for a specific reason.

DEPARTMENT OF BUILDINGS & GROUNDS

4. Any contractor that has access to OUSD's security information shall be licensed by the Board of Consumer Affairs.
 5. Should a violation occur, OUSD shall file a report and formal complaint of the contractor to the Board of Consumer Affairs of the violation in protocol.
- G. Any wiring problems or troubleshooting assistance shall be provided by a Bosch Certified vendor on a prevailing wage basis obtained by the contractor.
- H. OUSD B&G Alarm Shop Protocols
1. OUSD Alarm Shop and its technicians' scope of work does not include assisting, advising, consulting, troubleshooting, or supporting any contractor hired for intrusion installations.
 2. OUSD reserves the right to check the progress and status of all installations at any time during the project with or without the permission of the superintendent at the site. They shall check-in with the contractor and may be accompanied with a contractor during their site visit.
 3. The contractor shall be responsible for ordering phone lines through B&G. An estimated test date shall be provided to OUSD Project Manager.
 4. The contractor shall provide the Alarm Shop's phone number to all subcontractors who may require the existing alarm systems be placed on test mode. The Alarm Shop's normal business hours phone number is 510-535-2736. If unable to reach the B&G Alarm Shop, call [Bay Alarm Company at 800-610-1000](tel:800-610-1000).
 5. The contractor shall submit a request in writing to the IOR for a list of authorized security code holders. The IOR shall submit this request to OUSD. OUSD shall provide in writing the full names and titles of all persons who are to have authorized security codes.

3.06 Testing

- A. The contractor shall perform a complete pre-test of the installation prior to calling for final acceptance.
1. Prior to the pre-test, the contractor shall prepare a written test plan and submit it to the OUSD Project Manager. The test plan shall include a printed points list of all devices to be tested. As a minimum, the test plan shall identify the role(s) of all required personnel, proposed testing sequence, and include a printed points list of all devices to be tested.
 2. The general contractor, electrical contractor, alarm contractor, IOR, and OUSD's alarm consultant shall participate in the pre-test.
 3. As needed, other contractors shall participate to test and adjust interfaced equipment.
 4. A copy of the DSA-approved plans shall be available on-site during the testing.
 5. Any deficiencies identified during the pre-test shall be corrected and re-tested prior to calling for final acceptance.
- B. The contractor shall perform a complete final acceptance test of the installation.



1. The intrusion alarm system shall be stable (i.e., no trouble signals or unwanted alarms) for a period of one week prior to the final acceptance test.
 2. Before requesting final acceptance of the installation, the contractor shall provide a written statement, to the OUSD Project Manager stating that:
 - a. The installation is complete.
 - b. The installation has been installed in accordance with the approved plans.
 - c. The installation has been pre-tested in accordance with the manufacturer's published instructions and OUSD requirements.
 - d. The installation is fully operational.
 3. The B&G Alarm Shop, general contractor, electrical contractor, alarm contractor(s), IOR, and OUSD's alarm consultant shall participate in the final acceptance test.
 4. As needed, other contractors shall participate to test and adjust interfaced equipment.
 5. The final acceptance test will not be scheduled until the written statement is submitted to the OUSD Project Manager.
- C. The final acceptance test shall be coordinated with the OUSD Alarm Shop. The OUSD Alarm Shop shall be notified 72 hours prior to acceptance testing.
- D. If the system requires a retest, all costs for the retest shall be the responsibility of the prime contractor. Costs for a retest shall include the involvement of OUSD's alarm consultant, the project inspector (IOR), Buildings & Grounds Alarm Shop personnel, and any other contractor needed for testing various alarm interfaces.
- E. The test shall include, but not be limited to:
1. Arming of each intrusion alarm logical area.
 2. Activation of all motion detectors, door contacts, and POPIT modules.
 3. Activation and visual check of every sounder.
 4. JENSEN HUGHES and/or B&G Alarm Shop shall be present at the final test.
 5. Alarm Shop and [Bay Alarm Company](#) shall participate in the intrusion system final tests to ensure signals are being received. B&G Alarm Shop shall confirm signals have been received.
- F. The contractor shall pay all overtime fees required by the IOR for witnessing the acceptance test.
- G. Punch list items should be developed at the pre-test, and corrected by the final acceptance test date, providing OUSD with a 100 percent functional and operating system, with no residual repair issues or requirements.
- K. The Alarm Shop shall advise the contractor and IOR in writing (email is an acceptable method) once all data has been entered into the alarm system and receiving station. Only after receiving this notification shall the contractor request a time and date for final testing.
- L. Final testing shall be performed by the contractor in the presence of the IOR. The B&G Alarm Shop shall participate in the final test.
- M. Provide property watch through the OUSD Custodial Services Department if the system is not operational at the final. If intrusion watch is required, then the OUSD Project Manager



- shall discuss the property watch requirement with B&G to make the necessary arrangement with OUSD personnel.
- N. Testing shall not be conducted during school or custodial hours or any school functions. The building(s) must be completely unoccupied during any testing.
- P. At the time that a new intrusion alarm panel/dialer is installed and ready to be put online, the contractor shall place the panel into test mode with the OUSD's Alarm Shop (phone 510-535-2736) and perform a complete system walk test. The walk test shall confirm that First Alarm and the OUSD Alarm Shop receive all programmed points prior to putting the system online. All devices shall be tested for reporting to First Alarm and the OUSD Alarm Shop. Once confirmation that all points have been received by First Alarm and the OUSD Alarm Shop, B&G will advise First Alarm's supervising station that the system is officially online. The contractor shall request from the OUSD Project Manager to obtain from B&G a written memo as to the time and date that the system was officially put online. A copy of this memo shall be submitted to the IOR.
- Q. On all projects where an existing intrusion alarm system is in place and new devices are added to the existing intrusion alarm system, the contractor must provide a 100 percent test of all new devices.
- R. The contractor shall pay all overtime fees required by the IOR for witnessing the acceptance test.
- S. When an existing intrusion alarm system is modified or altered, 10 percent of devices that are not directly affected by the change, up to a maximum of 50 devices, shall be tested to assure the IOR and the OUSD project team that the existing devices are functional. If any of the 10 percent devices fail, only the repaired devices need to be re-tested after they are repaired or replaced. The contractor shall be required to test 10 percent of the existing devices as part of their scope.
- T. The contractor shall provide a count to the OUSD Alarm Shop for the quantity of new and existing intrusion alarm devices to be tested prior to testing.
- U. If the intrusion alarm installation or modification is in "phased" stages or if there are substantial corrections and additions to the scope of the project, then the contractor shall assume responsibility for subsequent testing and retesting of the intrusion alarm system installation. After the last phase of the intrusion alarm system has been completed and tested totally, ten percent of the previously completed phases are to be tested with the final tested phase.
- V. The contractor's project manager shall be responsible for contacting and coordinating with B&G personnel.
- W. Provide an 8.5- by 11-inch site plan indicating the school name, school buildings (identified) and location of the GV4, power supplies, and keypads. This site plan shall be provided to OUSD Alarm Shop prior to testing.
- X. Provide complete Final Test Report of system along with Operation and Maintenance Manuals, as-built drawings, and warranty information. This information shall be provided before commencement of training.

3.07 Training

- A. Any Bosch security system installations shall include training of site personnel. The training program for the Owner's personnel shall include the following:



1. Operations and Maintenance Manuals including 11- by 17-inch as-built drawings. Operations and Maintenance Manuals shall be a binder, containing complete operating instructions, outlining step-by-step procedures required for system start up, operation, and shut down, including the manufacturer's name, model number, service manual, parts lists, and brief description of all equipment and their basic operation features. Complete maintenance instructions listing routine maintenance procedures, possible breakdowns and repairs, trouble-shooting guide, and as-built drawings of the complete system, including conduit layout, equipment layout, device labels, and simplified wiring and control diagrams of the system. Two Operations and Maintenance Manuals shall be submitted and approved prior to conducting the training course.
2. Manuals containing listings of all points, event programs, basic programming and instructions, and software troubleshooting information.
3. Two-hour training session for site and operating personnel. The session shall cover proper operating and response procedures, including training on false alarm prevention, system operations and fire keypad operation.
4. Instructions provided by OUSD regarding other alarm system information such as identification label changes, code requests, service need information, Oakland Police Department's online test requirements, and the site's alarm permit number, account number, and current status are to be reviewed with the staff administrators and principals during the training session.

3.08 OUSD B&G Project Sign-off and Acceptance

- A. Spare parts in accordance with this Standard shall be delivered to the Alarm Shop at the start of construction. A FINAL test shall not be scheduled until the spare parts have been received by [the Alarm Shop](#).
- B. No system troubles or equipment failures shall be present at the final acceptance testing. If there are troubles, the test shall not occur.
- C. OUSD B&G, as the End User/Owner of these systems, reserves the right to not accept any installation that does not adhere to these Standards. The contractor shall correct all issues to B&G's satisfaction before B&G will accept the system handover.
- D. No intrusion system shall be placed on line for site protection without user names for codes to arm/disarm the intrusion system been given to B&G Alarm Shop, the user information package delivered to the site administrator or principal, and training for site staff and personnel have been provided.
- E. The B&G Alarm Shop retains the right to disable an intrusion system until all requirements have been met.

3.09 Warranty

- A. The contractor shall warrant all materials, equipment, and workmanship to be free of defective materials, erroneous or missing programming, and faulty workmanship for one year from written notification of acceptance by Owner. The costs of such warranty shall be part of the project cost. If repairs are necessary during the warranty period, the contractor shall furnish all parts and labor to restore the system to normal operation at no cost to the Owner. The warranty period starts when the entire project is 100 percent completed and accepted in writing. During the warranty period, OUSD shall monitor the site and request service as required through the appropriate installer. One month prior to the expiration of the warranty period, the factory-trained service representative shall conduct a 100 percent test of the work performed. Any deficiencies found during that testing shall be corrected under the warranty agreement.
- B. The warranty shall include all necessary material, travel, labor and parts to replace defective components or materials, and all necessary factory and field software required to perform the specified tasks.
- C. The contractor shall commence repair of any “in warranty” defects within 24 hours of notification of such defects. Warranty service shall be performed by a Bosch-certified field service technician.
- D. The contractor shall provide, upon notification of a problem, a Bosch-certified field service technician to correct the problem within 24 hours of notification. The contractor shall provide loaner equipment if unable to repair faulty equipment within 48 hours of notification. The loaner equipment shall be operational within 48 hours of the original notification of a problem.
- E. Any component of the intrusion alarm system that becomes defective or non-operational during the one-year warranty period shall be repaired or replaced to the satisfaction of OUSD. If repairs are not made within the one-year warranty period, the defective or non-operational component shall be repaired at the contractor’s cost and shall not fall out of warranty.

3.10 Spare Parts

- A. At least 2 percent of the bill of materials of the devices used on the project shall be provided for spare parts. Unless otherwise noted, provide a minimum of five units per device for new and modernization projects. Provide a minimum of one unit per device for portable projects.
- B. The following spare parts shall be furnished to OUSD:
 - 1. Keypad/arming station, [B921C](#) – the greater of 2 percent or minimum of one.
 - 2. Motion detectors – the greater of 2 percent or minimum of five.
 - 3. Each type of sounder – the greater of 2 percent or minimum of five.
 - 4. Two [B299](#) expansion modules.
 - 5. POPIT modules – the greater of 2 percent or minimum of five.
 - 6. One B600 Retrofit Zonex Module.
- C. All spare parts shall be new and not previously used.

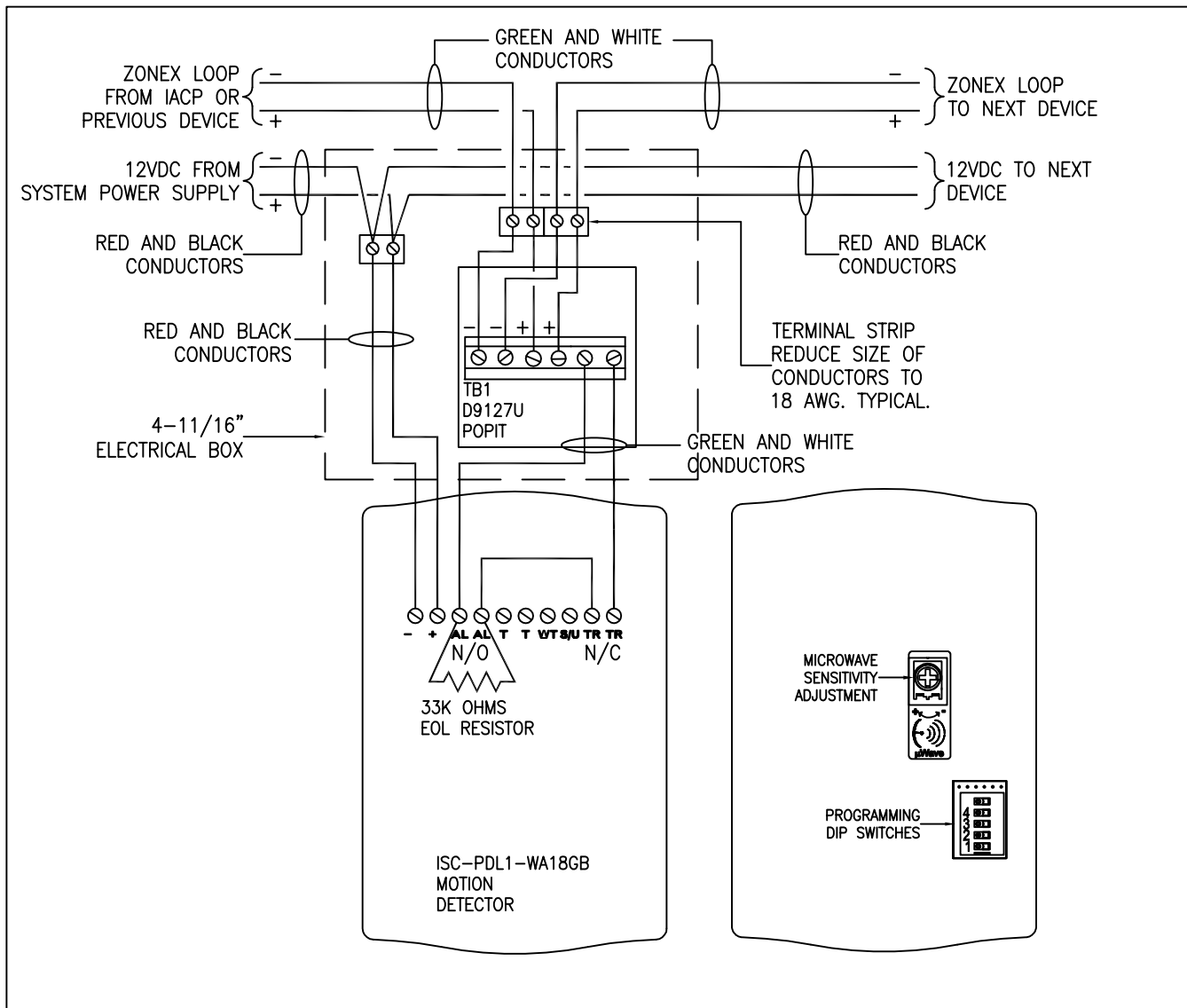
3.11 As-Built Project Records

- A. Before acceptance of work and final completion, the contractor shall provide project record “as-built” hard copy drawings and in AutoCAD format, reflecting any and all changes and deviations made to the fire alarm system during construction. The drawings shall indicate the following:
1. As-built physical routing of wires to devices, including junction box locations.
 2. As-built riser diagram showing the zoning of devices and sounders.
 3. As-built panel wiring diagrams of the intrusion control panel(s) and power supplies.
 4. Floor plan with final room number showing each intrusion device, notification appliance, keypad and control point with their respective address identification number (i.e., an address of (MD1-24) for Device 24 on Expansion Board 1).
 5. All electrical circuit breaker panels and circuit numbers used for the IACP and remote power supplies.
 6. The original red-lined drawings that indicate true as-builts that have been updated throughout the duration of construction shall be submitted to the fire alarm vendor for their use in creating “as-built” drawings. These drawings shall be returned to the contractor if requested. Retention monies shall be withheld if the original as-built drawings are not provided.
 7. The acceptance testing records.
- B. Upon completion of the work, three sets of blackline record drawings shall be submitted to OUSD. Additionally, a CD-Rom with the intrusion alarm system as-builts in AutoCAD version 2011, full-size PDF drawing files, and a scanned copy of the final test forms signed by all parties shall be submitted as part of the close-out package.
- C. B&G Alarm Shop is to receive all equipment documentation, specifications, and data sheet information and manuals before project sign off.

END OF INTRUSION ALARM SYSTEM STANDARDS



APPENDIX A – INTRUSION ALARM STANDARD DIAGRAM



MOTION DETECTOR INSTALLATION CONSIDERATIONS:

- DO NOT MOUNT OUTDOORS.
- DO NOT POINT TOWARD WINDOWS.
- DO NOT INSTALL FACING DIRECT SUNLIGHT.
- DO NOT POINT TOWARDS FIREPLACES OR AIR CONDITIONERS.
- DO NOT INSTALL NEAR MOVING OBJECTS SUCH AS CEILING FANS.
- ADJUST RANGE AND MICROWAVE SENSITIVITY TO FIELD CONDITIONS.

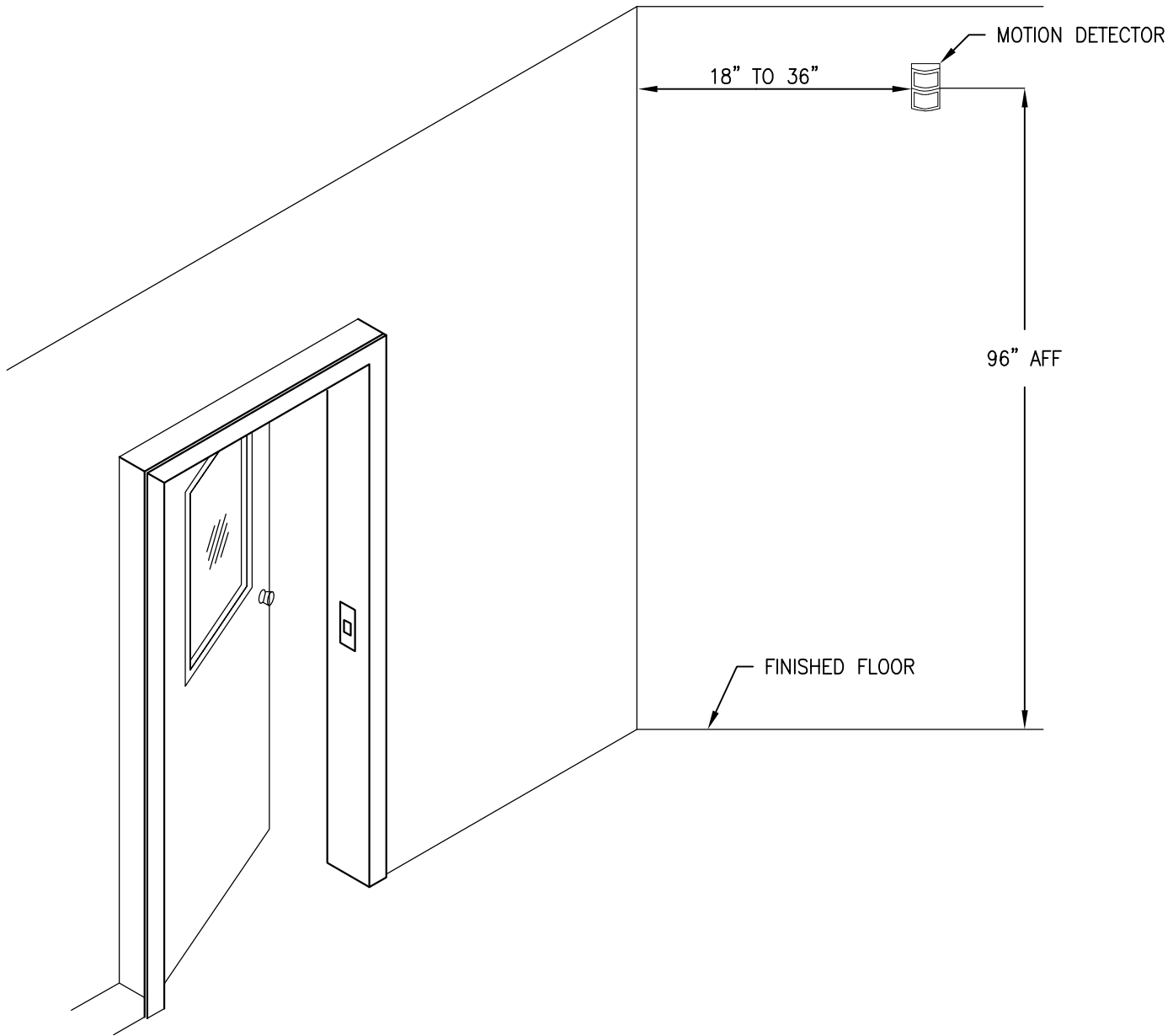
PROGRAMMING SWITCH SETTINGS:

- SW1: OFF (WALK TEST ENABLED)
- SW2: OFF (ALARM MEMORY DISABLED)
- SW3: RANGE (ON=25 FT. OFF=60FT)
- SW4: ON (ANTIMASK ENABLED)

1
IA#.#

ISC-PDL1-WA18GB MOTION DETECTOR TYPICAL WIRING DIAGRAM

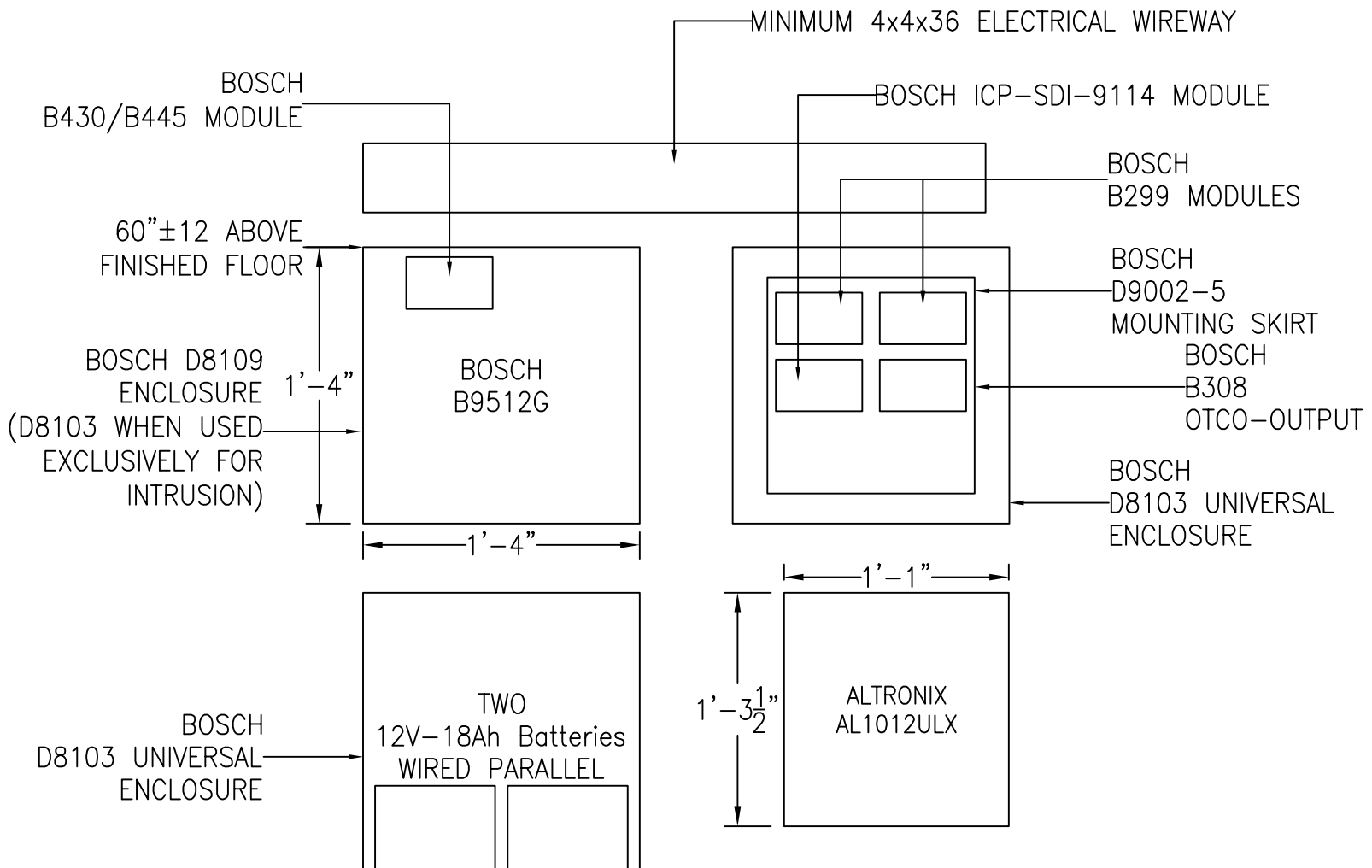
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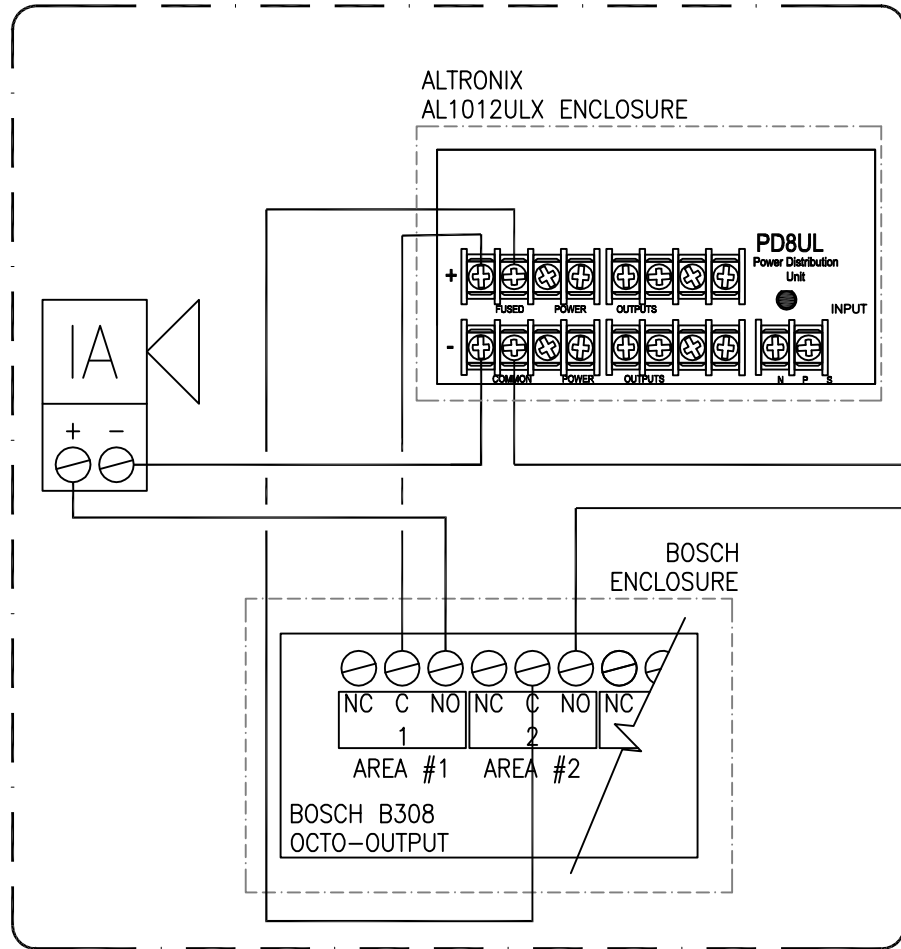
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MOTION DETECTOR MOUNTING DETAIL

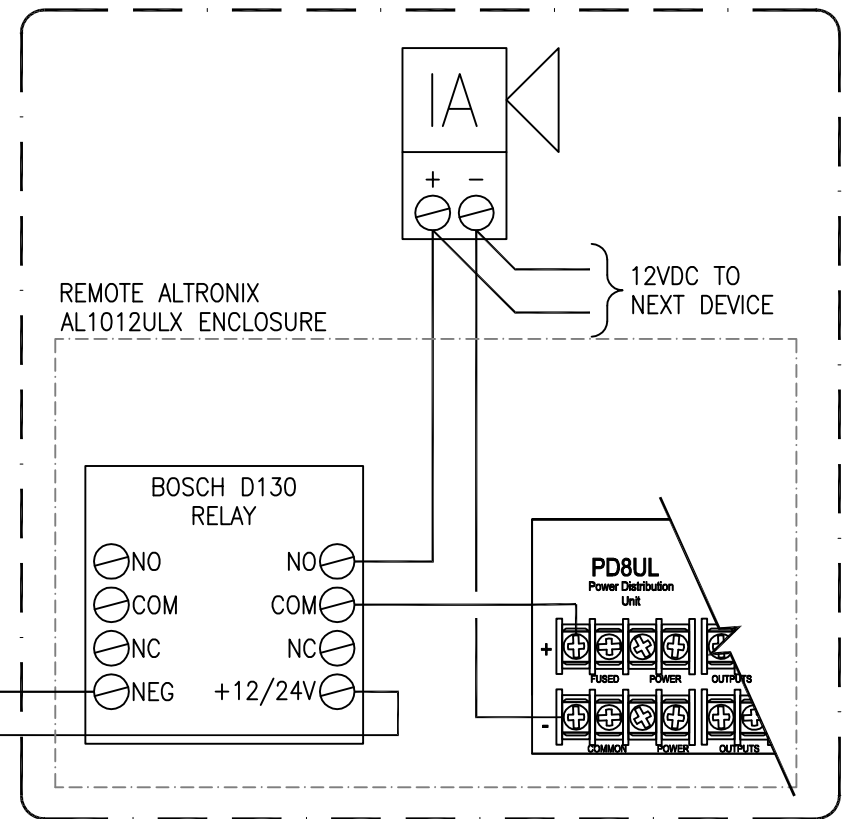
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INTRUSION ALARM AREA #1



REMOTE INTRUSION ALARM AREA #2



4
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INTRUSION ALARM HORN TYPICAL WIRING DIAGRAM
NTS