Development Services

From Concept to Construction

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APPEAL SUMMARY

Status: Decision Rendered

Appeal ID: 20536	**Project Address:** 7759 NE Mary Olson Way
Hearing Date: 6/19/19	**Appellant Name:** Camden Knoff
Case No.: B-019	**Appellant Phone:** 952-656-2689
Appeal Type: Building	**Plans Examiner/Inspector:** Geoffrey Pena
Project Type: commercial	**Stories:** 1 **Occupancy:** S-1 **Construction Type:** II-B
Building/Business Name: United Airlines Hangar	**Fire Sprinklers:** Yes - Sprinklers in support areas. Foam in hangar bay
Appeal Involves: Alteration of an existing structure	**LUR or Permit Application No.:** Acceptance of alternate form of detection in hangar
Plan Submitted Option: pdf [File 1] [File 2] [File 3]	**Proposed use:** Maintenance hangar

APPEAL INFORMATION SHEET

Appeal item 1

Code Section	OSSC 412.4.6. NFPA 409: 6.2.8.2.1
Requires	OSSC 412.4.6 requires that fire suppression systems for aircraft hangars are designed in accordance with NFPA 409. NFPA 409 (2011 edition) section 6.2.8.2.1 requires the detectors for the actuation of deluge foam-water sprinkler systems are rate-of-rise, fixed-temperature, or rate-compensation types. Therefore the only form of detection permitted to activate foam suppression in the hangar bay is heat detection.
Proposed Design	The proposed alternate method is to use IR flame detectors in lieu of heat detectors to activate the foam suppression system in the hangar bay. Flame detection is a commonly utilized form of hangar bay detection and is the only form approved by the DoD in their UFC codes. Flame detectors will be located around the perimeter of the hangar bay so that any point underneath the aircraft is in view of multiple detectors. Two detectors activated simultaneously will be required to initiate the foam suppression system.
Reason for alternative	Heat detection is not an ideal form of detection for this project. The roof deck of the hangar bay is approximately 60 ft above the floor. Activation for the heat detectors may be delayed due to the time taken for a fire to become large enough for heat to accumulate at the ceiling. Additionally, NFPA 72 provides minimal guidance on heat detector spacing requirements for ceiling heights >30 ft. Heat detector spacing at this height may be impractically closely spaced and hard to enforce

without prescriptive requirements. Finally, maintenance of individual heat detectors spaced throughout the hangar deck 60 ft above the ground would be extremely challenging for maintenance personnel and increases the risk of the system not being in constantly functional operation.

Providing flame detection in the hangar bay in lieu of heat detection is an equivalent and potentially superior option than heat detection. Flame detectors are already commonly used in DoD hangars. They are located near the floor level around the perimeter of the hangar bay and "see" the fire in its early stages. Flame detectors are easy to access and therefore maintain. Additionally flame detectors have a proven record of reliability and are not prone to false activation. The design will require simultaneous activation of two heat detectors in order to decrease the risk of accidental foam discharge.

APPEAL DECISION

Use of infra red flame detectors in lieu of heat detectors for foam suppression system: Granted provided detection system installation is per NFPA 72 and manufacturer's installation instructions.
Appellant may contact John Butler (503 823-7339) with questions.

The Administrative Appeal Board finds with the conditions noted, that the information submitted by the appellant demonstrates that the approved modifications or alternate methods are consistent with the intent of the code; do not lessen health, safety, accessibility, life, fire safety or structural requirements; and that special conditions unique to this project make strict application of those code sections impractical.

Pursuant to City Code Chapter 24.10, you may appeal this decision to the Building Code Board of Appeal within 180 calendar days of the date this decision is published. For information on the appeals process and costs, including forms, appeal fee, payment methods and fee waivers, go to www.portlandoregon.gov/bds/appealsinfo, call (503) 823-7300 or come in to the Development Services Center.

FIRE ALARM / RELEASING SYSTEM LEGEND

NOTE: SYMBOLS ARE BASED ON PORT OF PORTLAND DESIGN STANDARDS PER CLIENT'S REQUEST, THEY DO NOT NECESSARILY REFLECT THE STANDARDS OF NFPA 170 - STANDARDS FOR FIRE SAFETY AND EMERGENCY SYMBOLS (2018).

FANAC	NOTIFICATION CIRCUIT POWER BOOSTER, EXTENDER PANEL
BATT	SECONDARY POWER SUPPLY (BATTERY)
SS	SURGE SUPPRESSOR (TRANSIENT VOLTAGE SURGE SUPPRESSOR)
F	MANUAL FIRE ALARM PULL STATION
F (F)	MANUAL FOAM RELEASE STATION
TS	VALVE SUPERVISORY SWITCH (PROVIDED BY DIVISION 21)
R	OUTPUT RELAY
RSFACU	RELEASING SERVICE FIRE ALARM CONTROL UNIT
PS	PRESSURE DETECTOR / SWITCH (PROVIDED BY DIVISION 21)
RL	ADDRESSABLE RELEASING MODULE
DT	REMOTE DUCT DETECTOR TEST SWITCH
M	MONITOR MODULE, ADDRESSABLE (AIM)
MM	DOUBLE MONITOR MODULE, ADDRESSABLE (AIM)
CR	CONTROL RELAY MODULE, ADDRESSABLE (AOM)
FAC	FIRE ALARM COMMUNICATOR (e.g. RF TRANSMITTER)
	ANTENNA
	HEAT DETECTOR
R	IN-DUCT PHOTOELECTRIC SMOKE DETECTOR R= RETURN
P	CEILING MOUNTED SMOKE DETECTOR P = PHOTOELECTRIC
	HORN
	HORN / STROBE COMBINATION
	STROBE
	WALL MOUNT STROBE
	GROUND
SOV	SOLENOID VALVE

SYMBOL IDENTIFICATION LEGEND

EXISTING

NEW

ABBREVIATIONS:

AFF	ABOVE FINISHED FLOOR
DB	DECIBEL
DBA	DECIBEL A-WEIGHTED
DDC	DIRECT DIGITAL CONTROL
EMCS	ENERGY MONITORING AND CONTROL SYSTEM
FA	FIRE ALARM
FACU	FIRE ALARM CONTROL UNIT
FM	FM GLOBAL
FX	FIRE SUPPRESSION
HR	RESISTANT TO HOSE DIRECTED WATER (NEMA 250, TYPE 4)
IDC	INITIATING DEVICE CIRCUIT
NAC	NOTIFICATION APPLIANCE CIRCUIT
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
QTY	QUANTITY
RF	RADIO FREQUENCY
SLC	SIGNALING LINE CIRCUIT
UL	UNDERWRITERS LABORATORY

AUDIBLE DESIGN CRITERIA:

1. PROVIDE AUDIBLE NOTIFICATION APPLIANCES AS INDICATED TO ACCOMPLISH THE FOLLOWING DESIGN CRITERIA WITH ALL DOORS, FIRE SHUTTERS, AND WINDOWS CLOSED. WHERE THIS DESIGN CRITERIA IS NOT ACCOMPLISHED DURING COMMISSIONING, PROVIDE ADDITIONAL DEVICES TO MEET THE MINIMUM DESIGN CRITERIA WITHOUT EXCEEDING THE LIMITATIONS OF THE RSFACU OR NAC. (INCLUSIVE OF PRESCRIBED SAFETY FACTORS).
2. IN LOCATIONS WHERE NEW NOTIFICATION APPLIANCES ARE PROVIDED, PROVIDE A MINIMUM SOUND POWER OF 90 DBA IN THE HANGAR BAY AND TUG POCKET, 70 DBA IN THE SUPPORT SPACES AND 15 DBA OVER THE AVERAGE AMBIENT SOUND LEVEL AT THE MOST REMOTE LOCATION WITHIN THE ROOM/AREA MEASURED AT 5 FT AFF. MEASURE THE SOUND POWER OFF THE TEMPORAL THREE TONE PATTERN. THE FOLLOWING CRITERIA WILL BE USED FOR REVIEW AND APPROVAL OF SHOP DRAWINGS.
   A. REDUCE THE SOUND POWER BY 6 DB EACH TIME THE DISTANCE BETWEEN THE APPLIANCE AND THE LISTENER IS DOUBLED. STARTING DISTANCE IS PER MANUFACTURER'S DATASHEET, TYPICALLY 10 FT.
   B. REDUCE THE SOUND POWER IN ACCORDANCE WITH THE MANUFACTURER'S DATASHEET FOR SOUND POWER DISTRIBUTION NOT PERPENDICULAR TO THE FACE OF THE APPLIANCE. REFER TO MANUFACTURER'S TYPICAL SOUND OUTPUT DISTRIBUTION DIAGRAM.
   C. IN LIEU OF THE MANUFACTURER'S PUBLISHED DB LOSS, ASSUME A MINIMUM 15 DB LOSS THROUGH A STANDARD CLOSED DOOR.
3. PROVIDE A QUANTITY OF HORNS IN EACH ROOM / AREA TO ACHIEVE THE REQUIRED SOUND POWER.

VISIBLE DESIGN CRITERIA:

1. PROVIDE VISIBLE NOTIFICATION APPLIANCES AS REQUIRED TO ACHIEVE THE COVERAGE INDICATED.
2. SPACE STROBES IN ACCORDANCE WITH THE CRITERIA OUTLINED IN NFPA 72, UNLESS OTHERWISE NOTED.

GENERAL NOTES:

1. PROVIDE AN ADDRESSABLE COMBINED FIRE ALARM / RELEASING CONTROL SYSTEM. THIS PROJECT INCLUDES THE DEMOLITION OF PORTIONS OF THE EXISTING FIRE ALARM SYSTEM INCLUDING THE EXISTING SIEMENS SYSTEM 3 RSFACU AND MONACO FACU. EXISTING CONDUIT, WIRING, AND DEVICES THAT MEET THE DESIGN CRITERIA AND SPECIFICATIONS MAY BE REUSED AS INDICATED.
2. COORDINATE ALL REQUIRED SYSTEMS TO THE SATISFACTION OF THE ENGINEER AND AUTHORITY HAVING JURISDICTION. ANY DEFICIENCIES, INCONSISTENCIES, OR POORLY COORDINATED INSTALLATIONS SHALL BE CORRECTED BY THE SUBCONTRACTOR AT NO ADDITIONAL COST.
3. THE FIRE ALARM DRAWINGS ARE SCHEMATIC IN NATURE AND SHOW A MINIMAL QUANTITY OF DEVICES. DETERMINE THE FINAL QUANTITY AND LOCATION OF ALL DEVICES IN ACCORDANCE WITH THE SPECIFICATIONS, CONTRACT DRAWINGS, AND MANUFACTURER'S WRITTEN RECOMMENDATIONS TO BE COMPLIANT WITH ALL APPLICABLE CODES AND STANDARDS. PROVIDE ADDITIONAL DEVICES WHEN REQUIRED FOR A FULLY FUNCTIONING FIRE ALARM SYSTEM AS REQUIRED BY NFPA 72.
4. CONCEAL ALL CONDUITS IN WALLS OR ABOVE CEILINGS UNLESS OTHERWISE INDICATED. EXCEPTION: CONDUIT IS ALLOWED TO BE SURFACE MOUNTED ON WALLS AND CEILINGS IN UNFINISHED AREAS (SUCH AS MECHANICAL ROOM). WHERE A CONDUIT SUPPLIES A DEVICE NOT MOUNTED DIRECTLY ON THE WALL OR CEILING, ROUTE THE CONDUIT AS A SINGLE PENDENT DROP TO EACH DEVICE FROM THE CEILING SURFACE ABOVE. DO NOT TRAPEZE CONDUIT ACROSS AN OPEN SPACE.
5. EXISTING FIRE ALARM CONDUITS AND JUNCTION BOXES SHALL BE PAINTED RED.
6. PROVIDE CONDUIT IN ACCORDANCE WITH THE REQUIREMENTS OF THE ELECTRICAL SPECIFICATIONS, UNLESS OTHERWISE NOTED. NEW FIRE ALARM CONDUITS AND JUNCTION BOXES SHALL BE PURCHASED IN RED. SUPPORT CONDUIT IN ACCORDANCE WITH THE NEC SUCH AS MAXIMUM 10 FT SUPPORT INTERVALS AND 3 FT FROM A TERMINATION. TENSION ONLY HANGERS ARE NOT PERMITTED SUCH AS BATWINGS. FLEXIBLE CONDUIT IS ONLY PERMITTED WHEN CONNECTING TO THE FOLLOWING DEVICES AND APPLIANCES, DEVICES LOCATED ON FIRE SUPPRESSION EQUIPMENT SUCH AS FLOW/PRESSURE SWITCHES, SOLENOIDS, AND TAMPER SWITCHES, DEVICES AND APPLIANCES LOCATED IN REMOVABLE CEILING TILES, OR WHERE SPECIFICALLY NOTED. MAXIMUM LENGTH OF FLEXIBLE CONDUIT IS 6 FEET.
7. COLOR CODE FIRE ALARM CONDUCTORS DIFFERENTLY FROM THE NORMAL BUILDING POWER WIRING. USE ONE COLOR-CODE FOR ALARM CIRCUIT WIRING AND ANOTHER FOR SUPERVISORY CIRCUITS. COLOR-CODE AUDIBLE ALARM-INDICATING CIRCUITS DIFFERENTLY FROM ALARM-INITIATING CIRCUITS. USE DIFFERENT COLORS FOR VISIBLE ALARM-INDICATING DEVICES.
8. RUN CONDUCTORS FROM DEVICE TO DEVICE WITHOUT SPLICES. WIRE NUTS ARE PROHIBITED. UTILIZE TERMINAL STRIPS WHERE CONDUCTORS CANNOT BE DIRECTLY TERMINATED AT THE DEVICE SUCH AS PIGTAILS OFF A HEAT DETECTOR.
9. DO NOT USE FIRE ALARM EQUIPMENT PANELS AS RACEWAY FOR ROUTING POWER WIRING OR LOW VOLTAGE WIRING. ONLY ROUTE WIRING TERMINATING WITHIN THE PANEL INTO THE PANEL. PROVIDE 1/4 INCH SEPARATION BETWEEN POWER-LIMITED FIRE ALARM CIRCUITS AND POWER CIRCUITS.
10. MOUNTING DEVICES IN THE RSFACU, INCLUDING ANY SUBPANELS SUCH AS NAC. WHICH ARE NOT UL LISTED OR FM APPROVED AS PART OF THE UNIT IS PROHIBITED.
11. PROVIDE SURGE SUPPRESSORS TO PROTECT ALL POWER SUPPLY CIRCUITS TO THE RSFACU, INCLUDING ANY SUBPANELS SUCH AS NAC AND ALL FIRE ALARM CIRCUITS LEAVING OR ENTERING THE BUILDING. MOUNT SURGE SUPPRESSORS IN A SEPARATE ENCLOSURE, UNLESS IT IS UL LISTED OR FM APPROVED AND INSTALLED IN THE CONTROL UNIT BY THE FACTORY.
12. INSTALL FIRE ALARM BATTERIES IN THE ENCLOSURE OF THE DEVICE/UNIT IT SUPPORTS SUCH AS RSFACU ENCLOSURE OR IN AN INDEPENDENT DEDICATED ENCLOSURE. FOLLOW MANUFACTURER'S INSTRUCTIONS FOR FIRE ALARM BATTERY CABINET INSTALLATION. SHOW IN THE DRAWINGS IF INSTALLED OUTSIDE THE RSFACU.

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UAL - PDX HANGAR MODIFICATIONS
FIRE ALARM NOTES, LEGEND AND ABBREVIATIONS

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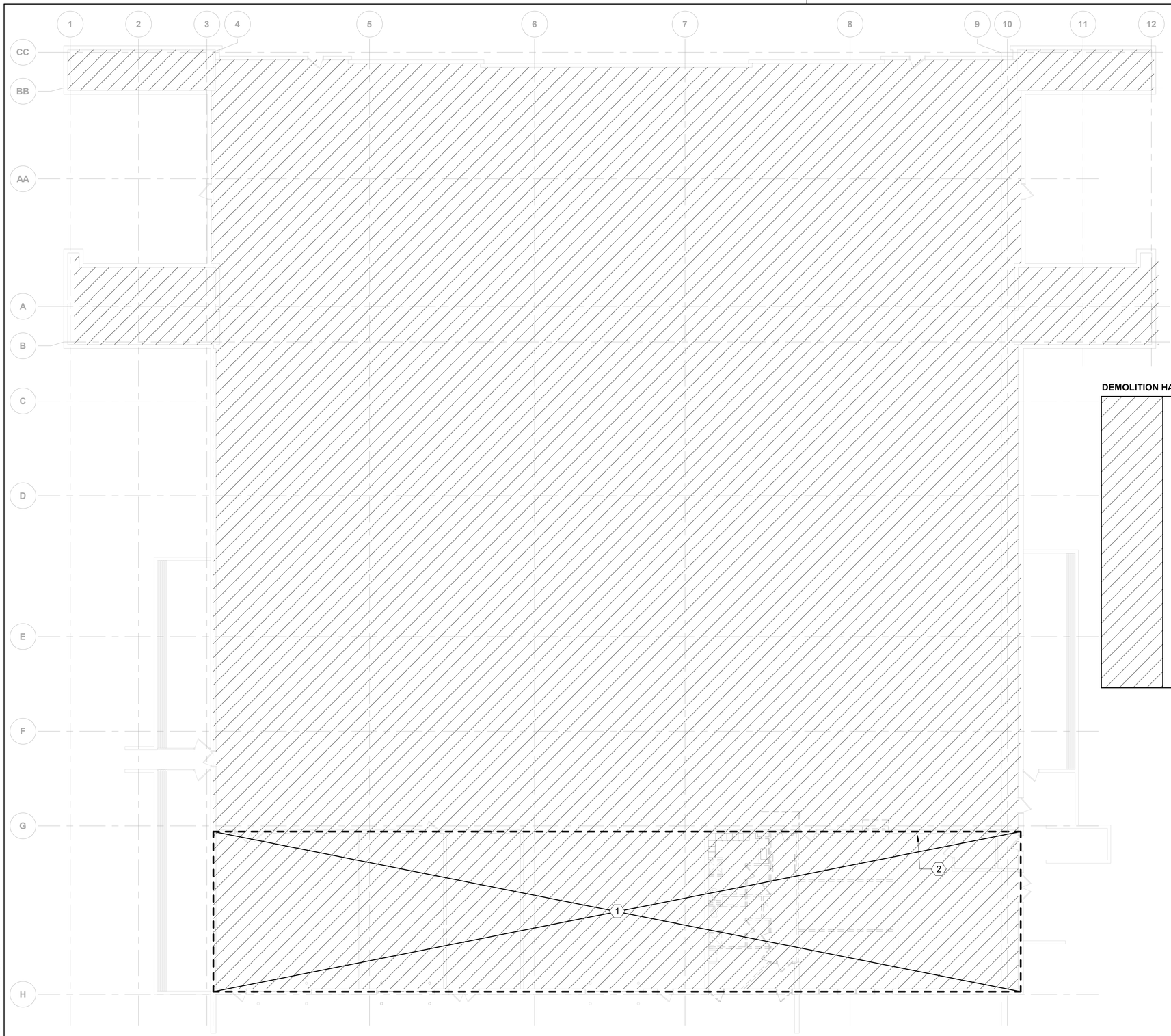

NOTES:

1. REFER TO FA001 FOR GENERAL NOTES, DESIGN CRITERIA, ABBREVIATIONS AND SYMBOLS.
2. WHERE WIRING IS REMOVED FROM EXISTING CONDUIT THAT CONTAINS ADDITIONAL WIRING THAT IS TO REMAIN, EITHER ALL WIRING SHALL BE REMOVED FROM CONDUIT, OR NEW CONDUIT SHALL BE PROVIDED.

KEYED NOTES:

(1) REMOVE EXISTING FIRE ALARM DEVICES AND NOTIFICATION APPLIANCES IN THIS AREA AS REQUIRED TO COMPLY WITH NEW ARCHITECTURAL LAYOUT, CEILINGS AND FEATURES. SEE ARCHITECTURAL DRAWINGS FOR NEW FLOOR PLAN.

(2) REMOVE EXISTING RELEASING PANEL, RF TRANSMITTER, AND FIRE ALARM CONTROL UNIT.

DEMOLITION HATCH LEGEND

1. DEMOLISH ALL CONVENTIONAL FIRE ALARM DEVICES AND ASSOCIATED WIRING IN THE FACILITY. WHERE APPLICABLE, EXISTING CONDUIT MAY REMAIN FOR FUTURE WIRING CONNECTION TO NEW ADDRESSABLE DEVICES. EXISTING CONVENTIONAL DEVICES INCLUDE BUT ARE NOT LIMITED TO:
   - MANUAL PULL STATIONS (QTY 7)
   - MANUAL FOAM RELEASE STATIONS (QTY 7)
2. DEMOLISH ALL ADDRESSABLE FIRE ALARM DEVICES AND ASSOCIATED WIRING IN THE FACILITY. WHERE APPLICABLE, EXISTING CONDUIT MAY REMAIN FOR FUTURE WIRING CONNECTION TO NEW ADDRESSABLE DEVICES. ADDRESSABLE DEVICES INCLUDE BUT ARE NOT LIMITED TO; SMOKE DETECTORS, MONITOR MODULES, AND CONTROL MODULES.
3. DEMOLISH ALL NOTIFICATION APPLIANCES IN THE HANGER BAY (QTY 7). EXISTING WIRING AND CONDUIT SHALL REMAIN. NOTIFICATION APPLIANCES AND NAC CIRCUITS IN THE SUPPORT AREAS SHALL BE DEMOLISHED AND ADJUSTED AS REQUIRED FOR THE ADJUSTED FLOOR PLAN.
4. DEMOLISH ALL HEAT DETECTORS (QTY APPROXIMATELY 55) AND ASSOCIATED WIRING IN HANGAR BAY.

K1 FIRE ALARM DEMOLITION
SCALE: 3/32" = 1'-0"

0 8' 16' 32'
SCALE IN FEET

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FIRE ALARM DEMOLITION PLAN

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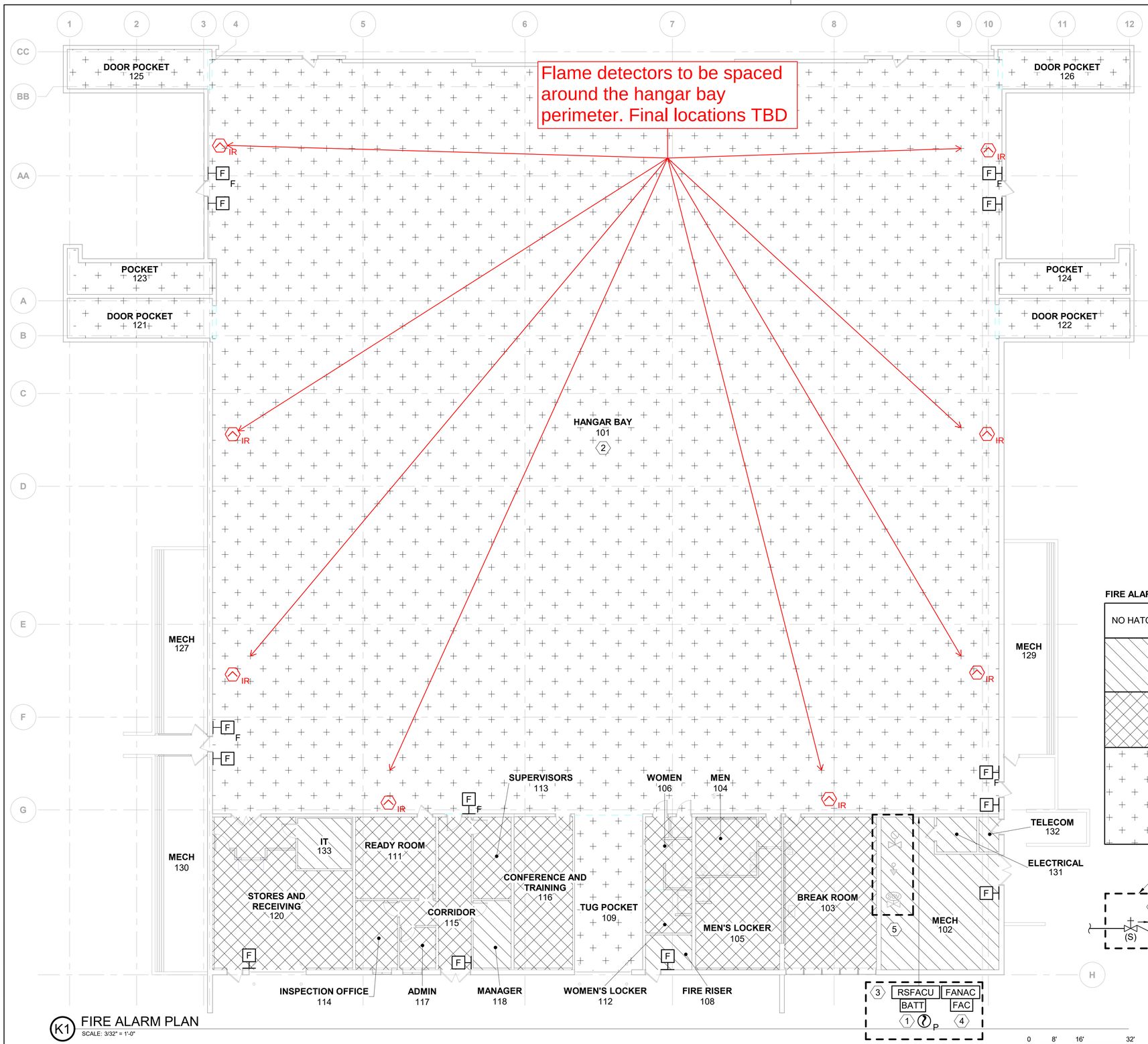


K1 FIRE ALARM PLAN
SCALE: 3/32" = 1'-0"

NOTES:

1. REFER TO FA001 FOR GENERAL NOTES, DESIGN CRITERIA, ABBREVIATIONS AND SYMBOLS.
2. PROVIDE ALL NEW ADDRESSABLE DEVICES INCLUDING BUT NOT LIMITED TO SMOKE DETECTORS, MONITOR MODULES, PULL STATIONS, AND CONTROL MODULES, THROUGHOUT THE FACILITY. ALL DEVICES SHALL BE UL LISTED WITH THE RSFACU. EXISTING CONDUIT MAY BE REUSED WHERE IN COMPLIANCE WITH THE SPECIFICATIONS.
3. REVISE AND PROVIDE NAC CIRCUITS AND ADDITIONAL NOTIFICATION DEVICES AS REQUIRED FOR ADJUSTED FLOOR PLAN IN SUPPORT AREAS.
4. WALL MOUNTED NOTIFICATION APPLIANCES ARE PERMITTED IN AREAS WITH CONGESTED CEILINGS, SUCH AS MECHANICAL ROOMS.
5. LOCATE ADDRESSABLE MODULES FOR DEVICES IN THE HANGAR BAY IN A CONDITIONED AREA OUTSIDE THE HANGAR BAY.

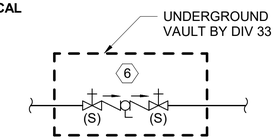
Will remove note and replace with note related to flame detection

KEYED NOTES:

1. PROVIDE SMOKE DETECTION ABOVE RSFACU AND NAC PANELS.
2. PROVIDE NEW ADDRESSABLE HEAT DETECTORS IN THE HANGAR BAY AND TUG POCKET TO MEET THE SPACING REQUIREMENTS OF NFPA 72 AND THE MANUFACTURER'S RECOMMENDATIONS. HEAT DETECTORS SHALL BE DIVIDED INTO AN EAST AND WEST ZONE AS PER THE EXISTING SYSTEM.
3. CONNECT NEW RSFACU TO EXISTING TAMPER SWITCHES ON FOAM CONCENTRATE SHUTOFF BUTTERFLY VALVES (QTY 6) FOR A FULLY SUPERVISED SYSTEM.
4. PROVIDE QUANTITY OF NAC PANELS AS REQUIRED TO MEET DESIGN CRITERIA.
5. EXACT QUANTITY AND LOCATIONS OF EXISTING FIRE SUPPRESSION SYSTEM DEVICES TO BE FIELD VERIFIED. PROVIDE ADDITIONAL DEVICES AS REQUIRED BY THESE DRAWINGS.
6. MONITOR RPZ BACKFLOW PREVENTER IN UNDERGROUND FIRE/DOMESTIC SERVICE LINE.

FIRE ALARM HATCH LEGEND

NO HATCH	NOTIFICATION APPLIANCES ARE NOT REQUIRED.
	PROVIDE CEILING MOUNTED HORNS AS REQUIRED TO ACHIEVE DESIGN CRITERIA.
	PROVIDE CEILING MOUNTED HORNS AND CLEAR STROBES AS REQUIRED TO ACHIEVE DESIGN CRITERIA.
	RECONNECT ALL EXISTING NAC CIRCUITS IN HANGAR BAY TO THE NEW FIRE ALARM SYSTEM FOR GENERAL ALARM AND FOAM RELEASE. PROVIDE NEW NOTIFICATION APPLIANCES IN HANGAR BAY AND TUG POCKET AS REQUIRED FOR ADJUSTED FLOOR PLAN TO MEET DESIGN REQUIREMENTS. NOTIFICATION APPLIANCES IN HANGAR BAY AND TUG BAY SHALL BE NEMA 4 RATED.



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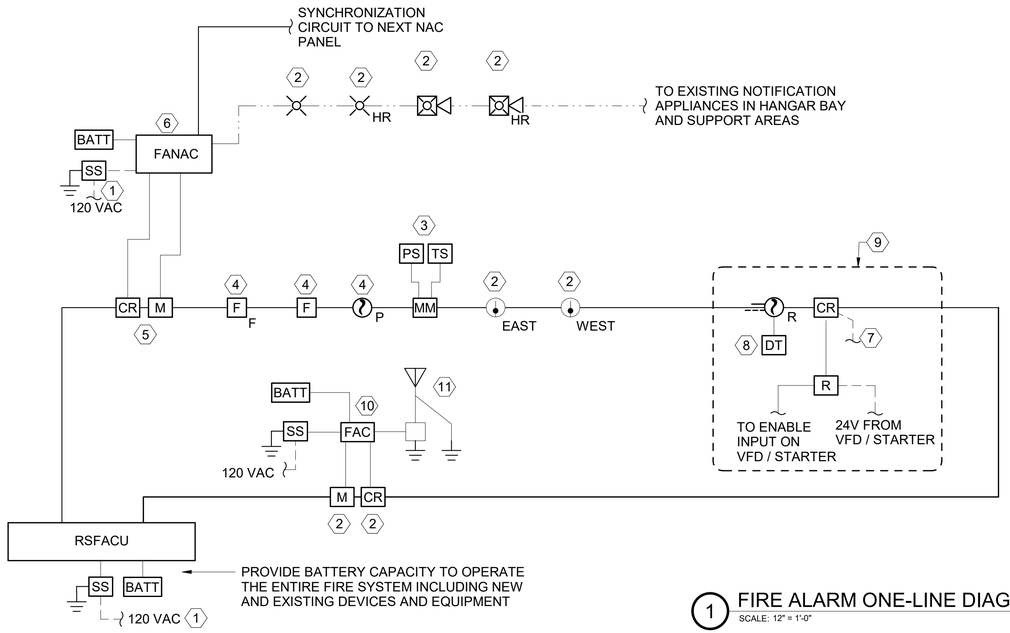
CIRCUIT LEGEND:

- SIGNALING LINE CIRCUIT (CLASS A)
- INITIATING DEVICE CIRCUITS
- VISIBLE NOTIFICATION APPLIANCE CIRCUIT (CLASS A)
- POWER CIRCUIT



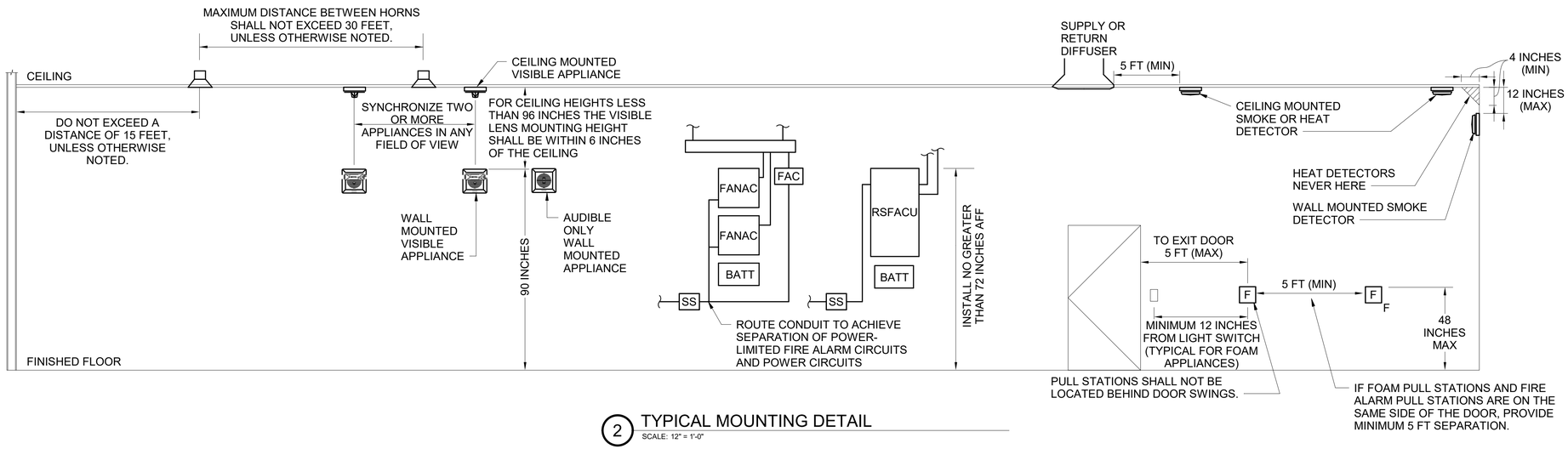
1 FIRE ALARM ONE-LINE DIAGRAM
SCALE: 12" = 1'-0"

NOTES:

1. REFER TO FA001 FOR GENERAL NOTES, DESIGN CRITERIA, ABBREVIATIONS, AND SYMBOLS.
2. THE FIRE ALARM RISER SHOWS THE INTENT OF THE FIRE ALARM INFRASTRUCTURE. NOT ALL DEVICES ARE SHOWN. SUBCONTRACTOR SHALL PROVIDE THE QUANTITY OF DEVICES AS REQUIRED TO COMPLY WITH NFPA 72, NFPA 409, AND CONTRACT DOCUMENTS.
3. EACH FLOW AND TAMPER SWITCH SHALL BE INSTALLED USING DUAL MODULES.

KEYED NOTES:

1. RED, LOCKABLE BREAKER LABELED "FIRE ALARM" PROVIDED BY DIVISION 26.
2. QUANTITY AND LOCATION BY SUBCONTRACTOR'S DESIGN TO MEET DESIGN CRITERIA.
3. REFER TO FIRE SUPPRESSION DRAWINGS FOR QUANTITY AND / OR LOCATIONS OF DEVICE(S).
4. REFER TO FIRE ALARM PLANS FOR QUANTITY AND / OR LOCATIONS OF DEVICE(S).
5. PROVIDE ADDRESSABLE INPUT AND / OR OUTPUT MODULE(S) AS REQUIRED TO ACHIEVE THE FUNCTIONALITY INDICATED IN THE FIRE ALARM MATRIX. BOOSTER PANEL "TBL" (TROUBLE) AND "ACT" (ACTIVATION) SIGNAL SHALL BE INSTALLED USING DUAL MODULES IF POSSIBLE.
6. PROVIDE ADDITIONAL BOOSTER PANELS CONNECTED TO THE RSFACU AS REQUIRED PER SUBCONTRACTOR'S DESIGN. WHERE ADDITIONAL BOOSTER PANELS ARE REQUIRED LOCATE AS INDICATED ON PLAN.
7. 24 VDC TO RSFACU OR NAC PANEL
8. PROVIDE REMOTE TEST STATION, INDICATING LIGHT AND SIGN NEAR HVAC UNIT MODULE ON SMOKE DETECTION WHERE INDICATION LIGHT ON THE SMOKE DETECTOR IS NOT VISIBLE FROM FLOOR.
9. PROVIDE RETURN IN-DUCT SMOKE DETECTORS FOR DIRECT SHUT DOWN FOR THE FOLLOWING UNIT: AHU-1. SHUT DOWN THROUGH THE EMCS/DDC IS NOT PERMITTED. REFERENCE MECHANICAL DRAWINGS FOR EXACT LOCATION.
10. CONNECT TO PORT AES RECEIVERS USING AES MESH RADIO SYSTEM. MONITORING CALL LIST SHALL BE MODIFIED SO THAT PORT DISPATCH IS THE FIRST CALL. A NICET CERTIFIED STAFF SIGNATURE IS REQUIRED FOR THE FIRE ALARM PERMITTING PROCESS.
11. MOUNT RADIO TRANSCEIVER ANTENNA PER MANUFACTURER'S RECOMMENDATION. ANTENNA SHALL BE MOUNTED ON FAC INSIDE THE BUILDING.



2 TYPICAL MOUNTING DETAIL
SCALE: 12" = 1'-0"

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RELEASING SERVICE FIRE ALARM CONTROL UNIT (RSFACU) FUNCTIONAL MATRIX

	ANNUNCIATION AT LOCAL PANEL			NOTIFICATION										AUXILIARY FUNCTION				
MATRIX SHOWS THE FUNCTIONALITY OF ALL NEW DEVICES. EXISTING DEVICES SHALL BE RECONNECTED TO THE NEW RSFACU WHERE INDICATED TO PERFORM THEIR ORIGINAL FUNCTIONALITY. **ALARM SIGNALS**	AUDIO-VISIBLE FIRE ALARM INDICATION BY DEVICE	AUDIO-VISIBLE TROUBLE INDICATION BY DEVICE	AUDIO-VISIBLE SUPERVISORY INDICATION BY DEVICE	MANUAL PULL STATION ALARM SIGNAL TO AIRPORT COMMUNICATIONS CENTER	SMOKE DETECTION ALARM SIGNAL TO AIRPORT COMMUNICATIONS CENTER	FIRE SUPPRESSION ACTIVATION ALARM SIGNAL TO AIRPORT COMMUNICATIONS CENTER	HEAT DETECTION ALARM SIGNAL TO AIRPORT COMMUNICATIONS CENTER	COMMON TROUBLE SIGNAL TO AIRPORT COMMUNICATIONS CENTER	COMMON SUPERVISORY SIGNAL TO AIRPORT COMMUNICATIONS CENTER	FOAM SYSTEM DISABLED SUPERVISORY SIGNAL TO AIRPORT COMMUNICATIONS CENTER	FIRE ALARM AUDIBLE NOTIFICATION	FIRE ALARM VISIBLE NOTIFICATION	ACTIVATE EXISTING BLUE BEACONS IN HANGAR BAY	SHUT-DOWN ASSOCIATED AIR HANDLING EQUIPMENT	RELEASE FOAM / WATER FLOW CONTROL VALVE (EAST HANGAR BAY)	RELEASE FOAM / WATER FLOW CONTROL VALVE (WEST HANGAR BAY)	RELEASE HOSE STATION FLOW CONTROL VALVE	RELEASE FOAM / WATER MONITOR FLOW CONTROL VALVE
MANUAL FIRE ALARM STATIONS	X			X							X	X						
SMOKE DETECTOR OVER RSFACU, AND, NAC PANELS	X				X						X	X						
FOAM DELUGE SYSTEM ALARM PRESSURE SWITCH	X					X					X	X						
HEAT DETECTION IN HANGAR BAY (EAST SIDE)	X					X	X				X	X	X		X		X	X
HEAT DETECTION IN HANGAR BAY (WEST SIDE)	X					X	X				X	X	X			X	X	X
FOAM RELEASE STATION	X					X					X	X	X				X	X
PRESSURE SWITCH ON FOAM / WATER RISER	X					X							X					
TROUBLE SIGNALS																		
AC POWER FAILURE		X						X										
LOW BATTERY		X						X										
OPEN CIRCUIT FAULT		X						X										
GROUND FAULT		X						X										
NOTIFICATION APPLIANCE CIRCUIT SHORT		X						X										
COMPONENT COMMON TROUBLE		X						X										
SUPERVISORY SIGNALS																		
COMPONENT COMMON SUPERVISORY			X						X									
GENERAL VALVE SUPERVISORY			X						X									
FOAM / WATER AND CONCENTRATE CONTROL VALVE SUPERVISORY			X							X								
IN DUCT SMOKE DETECTOR			X						X					X				

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KANSAS CITY, MO 64114

BMCD LICENSE NO: ARF-11103

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UAL - PDX HANGAR MODIFICATIONS
FIRE ALARM MATRIX

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DET-TRONICS
United Technologies

AUTOMATIC i

Shown with Q9033A
Aluminum Mounting Arm

Multispectrum IR Flame Detector
X3301

HART COMMUNICATION PROTOCOL

FDT Group Member

DESCRIPTION

5 YEAR WARRANTY

The X3301 is a multispectrum infrared (MIR) flame detector. It provides unsurpassed detection of fires from light to heavy hydrocarbon fuels combined with the highest degree of false alarm rejection. The detector has Division and Zone explosion-proof ratings and is suitable for use in indoor and outdoor applications.

The X3301 contains three IR sensors with their associated signal processing circuitry. The standard output configuration includes fire alarm, fault and auxiliary relays, with an isolated 0 to 20 mA output model with optional HART communication.

The detector provides superior performance in applications that are at the extremes, and where background infrared radiation is a normal condition:

— Hangars
— Offshore production platforms
— Offshore production ships
— Refineries
— Production facilities
— Loading racks
— Compressor stations
— Turbine enclosures
— Airport water curtains
— Automotive Painting
— LNG/LPG
— Gas Separation Plants
— Warehousing
— Marine

HIGHLIGHTS

X3301 TECHNOLOGY FEATURES

- Complies with FM 3260
- EN54 certified
- Certified SIL 2 capable
- ATEX Directive compliant
- Certified performance to multiple fuel types and fire sizes
- EQP models available
- Long detection range to carbonaceous fires
- HART models available
- FDT/DTM capable
- Multiple sensitivity levels
- Maximum false alarm rejection
- Reliable flame detection with modulated IR background
- Microprocessor controlled heated optics
- Calibrated automatic optical check for each sensor eliminates need for testing with external test lamp
- RFI and EMC Directive compliant
- Event logging with time and date stamp
- Integral wiring compartment for ease of installation
- Operates under adverse weather conditions and in dirty environments

BENEFITS

- Single detector for multiple hydrocarbon fuels
- Low cost of coverage
- Ability to detect smaller fires earlier
- Solid cone of vision to 125 feet for methane
- Better detection zoning capability
- Best combination of flame detection and false alarm rejection
- Low maintenance costs
- Reliable fault diagnostics
- Suitable for heavy industrial applications
- Explosion/flame proof (Ex d) or increased safety installations (Ex d e) in hazardous locations

SPECIFICATIONS

Operating Voltage
24 Vdc nominal (18 Vdc minimum, 30 Vdc maximum). Maximum ripple is 2 volts peak-to-peak.

Power Consumption
4 watts minimum (without heater), 17 watts at 30 Vdc with EOL resistor installed and heater on maximum.

Relays
Contacts rated 5 amperes at 30 Vdc.

Fire Alarm: — Form C (NO and NC contacts)
— normally de-energized
— latching/non-latching.

Fault: — Form A (NO contacts)
— normally energized
— latching/non-latching.

Auxiliary: — Form C (NO and NC contacts)
— normally energized/de-energized
— latching/non-latching.

Current Output (Optional)
0–20 mA (± 0.3 mA), with a maximum loop resistance of 500 ohms from 18–19.9 Vdc, 600 ohms from 20–30 Vdc.

Temperature Range
Operating: –40°F to +167°F (–40°C to +75°C).
Storage: –67°F to +185°F (–55°C to +85°C).

Hazardous location ratings from –55°C to +125°C.

Humidity Range
0 to 95% relative humidity, can withstand 100% condensing humidity for short periods of time.

Wiring
16 AWG or 2.5 mm^2 shielded cable is recommended.

Enclosure Material
Copper-free aluminum (painted) or stainless steel (316/CF8M Cast).

Conduit Entry Size
3/4 inch NPT or M25.

Warranty
5 years.

Response Characteristics

	Fuel	Size	Distance Ft (m)	Average Response Time (seconds)***
Very High Sensitivity	n-Heptane	1 x 1 foot	265 (80.7)*	22
	n-Heptane	1 x 1 foot	250 (76.2)	17
	n-Heptane	1 x 1 foot	100 (30.5)	3
	n-Heptane	6 in. x 6 in.	100 (24.4)	7
	Isopropanol	6 in. x 6 in.	70 (21.3)	6
	Diesel	1 x 1 foot	175 (53.3)	6**
	Ethanol	1 x 1 foot	210 (64)	11
	Methanol	6 in. x 6 in.	40 (12.2)	3
	Methanol	1 x 1 foot	150 (45.7)	7
	Methanol	1 x 1 foot	150 (45.7)	5**
	Methane	32 inch plume	125 (38.1)	5
	Propane	32 inch plume	125 (38.1)	5
	Jet A	1 x 1 foot	150 (45.7)	4**
	JP-5	2 x 2 feet	235 (71.6)	3**
	JP-8	1 x 1 foot	150 (45.7)	5**
	Class A	Ø12 in. x 7 in.	150 (45.7)	3**
Medium Sensitivity	n-Heptane	1 x 1 foot	100 (30.5)	7
	n-Heptane	1 x 1 foot	50 (15.24)	<2
	Diesel	1 x 1 foot	70 (21.3)	4**
	Ethanol	1 x 1 foot	85 (25.9)	7
	Methanol	1 x 1 foot	70 (21.3)	6
	Methane	32 inch plume	70 (21.3)	6
	Methane	32 inch plume	55 (16.8)	4
	Propane	32 inch plume	75 (22.8)	<5
	JP-5	2 x 2 feet	150 (45.7)	3**
	Class A	Ø12 in. x 7 in.	50 (15.24)	4**

* Outdoor test condition.
** 10 second pre-burn from ignition.
*** Add 2 seconds for EQP Model.
Ø Diameter
NOTE: Refer to the X3301 instruction manual (95-8704) for additional sensitivity levels.

Shipping Weight (Approximate)
Aluminum: 7 lbs. (3.2 kg).
Stainless Steel: 13.8 lbs. (6.3 kg).

Field of View
90° horizontal by 75° vertical, at a minimum of 70% of the on-axis detection distance.

Certification

Class I, Div. 1, Groups B, C & D (T4A);
Class II, Div 1, Groups E, F & G (T4A);
Class I, Div. 2 , Groups A, B, C & D (T3C);
Class II, Div 2. Groupd F & G (T3C);
Class III
Enclosure NEMA/Type 4X.

For FM and CSA Zone approval information, refer to the X3301 instruction manual (95-8704).

IEC 61508
Certified SIL 2 Capable.
Applies to specific models –
Refer to the SIL 2 Certified
X3301 Safety manual (95-8720).

RUSSIA & KAZAKHSTAN
VNIIFTRI
TP TC 012/2011
TC RU C-US. ГБ06.B.00418
2ExdeIICT6/T5 IP66
T6 (Tamb = –50°C to +60°C)
T5 (Tamb = –50°C to +75°C)
Ex tb IIIC T130°C Db.
– OR –
1ExdIICT6/T5/T4 IP66
T6 (Tamb = –55°C to +60°C)
T5 (Tamb = –55°C to +75°C)
T4 (Tamb = –55°C to +125°C)
Ex tb IIIC T130°C Db.

RUSSIA
VNIIPO
CERTIFICATE OF CONFORMITY TO TECHNICAL REGULATIONS,
GOST R 53325-2012
C-US.ГБ01.B.02910

Approvals to EN54-10. See instruction manual for details.

US Coast Guard
Coast Guard Approval No. 161.002/49/0.

DEMKO 01 ATEX 130204X
Increased Safety Model
CE 0539 Ex II 2 G
II 2 D
Ex d e IIC T6...T5 Gb
Ex tb IIIC T130°C
T6 (Tamb –50°C to +60°C)
T5 (Tamb –50°C to +75°C)
IP66/IP67.

Flameproof Model
CE 0539 Ex II 2 G
II 2 D
Ex d IIC T6...T4 Gb
Ex tb IIIC T130°C
T6 (Tamb –55°C to +60°C)
T5 (Tamb –55°C to +75°C)
T4 (Tamb –55°C to +125°C)
IP66/IP67.

IECEx Certificate of Conformity
IECEx ULD 06.0017X
Ex d e IIC T6...T5 Gb
Ex tb IIIC T130°C
T6 (Tamb = –50°C to +60°C)
T5 (Tamb = –50°C to +75°C)
IP66/IP67.
– OR –
Ex d IIC T6...T4 Gb
Ex tb IIIC T130°C
T6 (Tamb = –55°C to +60°C)
T5 (Tamb = –55°C to +75°C)
T4 (Tamb = –55°C to +125°C)
IP66/IP67.

UL-BR 12.0093X
Ex d e IIC T6-T5 Gb IP66/IP67
Ex tb IIIC T130°C
T6 (Tamb = –50°C to +60°C)
T5 (Tamb = –50°C to +75°C).
– OR –
Ex d IIC T6-T4 Gb IP66/IP67
Ex tb IIIC T130°C
T6 (Tamb = –55°C to +60°C)
T5 (Tamb = –55°C to +75°C)
T4 (Tamb = –55°C to +125°C).

DNV
Type Approval Certificate Number A-13995.
DNV Certificate Number MED-B-9427.

Specifications subject to change without notice.

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DET-TRONICS UL REGISTERED FIRM ISO 9001 2008

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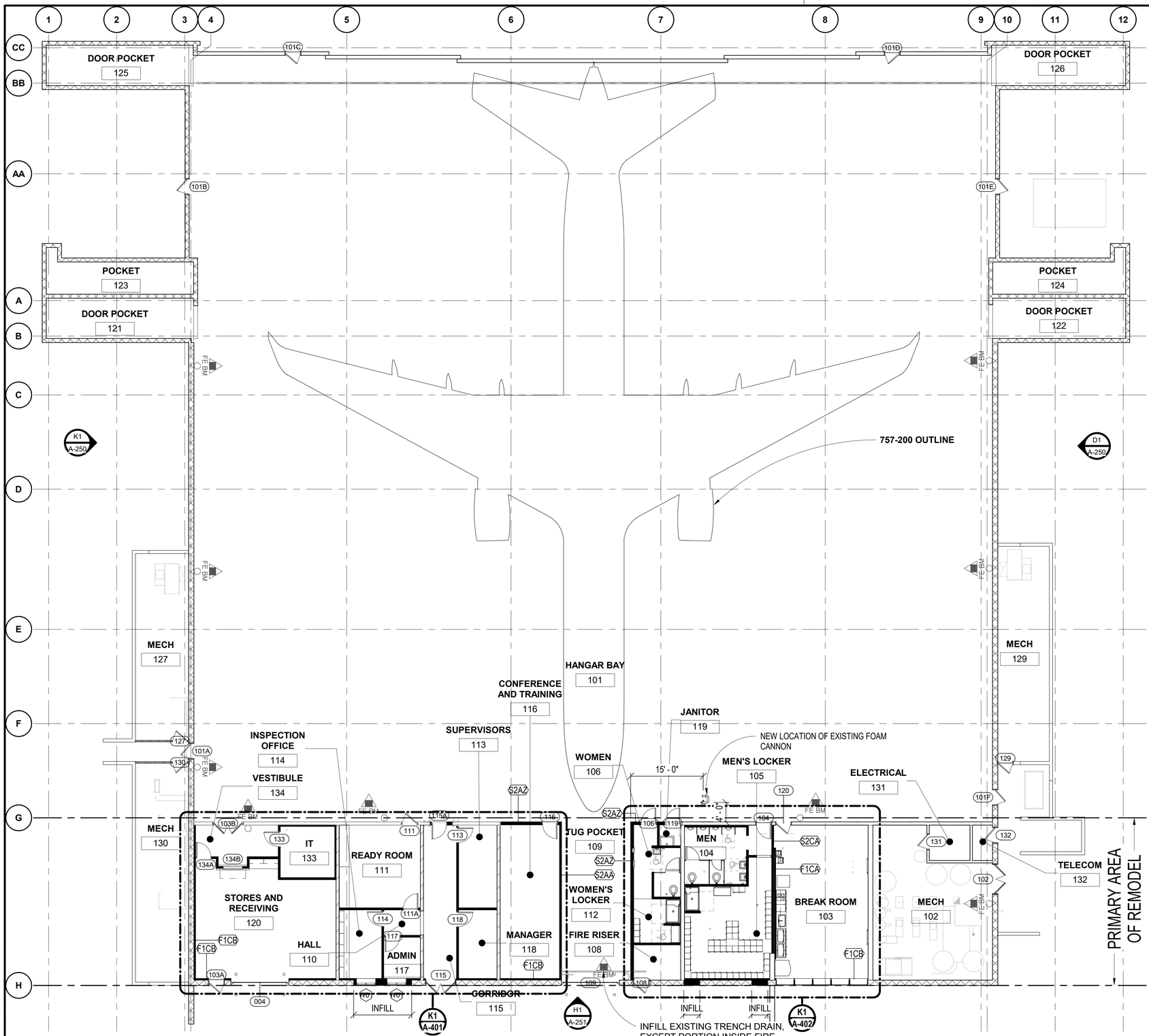

K1 OVERALL GROUND FLOOR PLAN

SCALE: 3/32" = 1'-0"

LEGEND

- LOCATION OF FIRE EXTINGUISHER
- EXISTING DOOR
- NEW DOOR
- ACCESSIBLE SHOWER
- TOILET
- LOCKER
- URINAL
- EXISTING WINDOW
- EXISTING WALLS
- NEW PARTITION WALL
- LOCATION OF EXIT SIGNAGE

PLAN NOTES

1. SEE MECHANICAL, ELECTRICAL, PLUMBING AND STRUCTURAL DRAWINGS FOR ADDITIONAL INFORMATION.
2. ALL NEW BUILDING AND RAMP SIGNAGE SHALL BE REVIEWED BY PORT PRIOR TO FABRICATION & INSTALLATION. MAY BE A SEPARATE SUBMITTAL.
3. EXISTING WALLS TO REMAIN ARE NOT TAGGED.
4. REFER TO UA RAMP DESIGN STANDARDS FOR SIZING, FINISHES, QUANTITIES AND LAYOUTS.
5. SEE CIVIL DRAWINGS FOR WALL PROTECTION AT TUG POCKET, ROOM 109.

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UAL – PDX HANGAR MODIFICATIONS
OVERALL FLOOR PLAN

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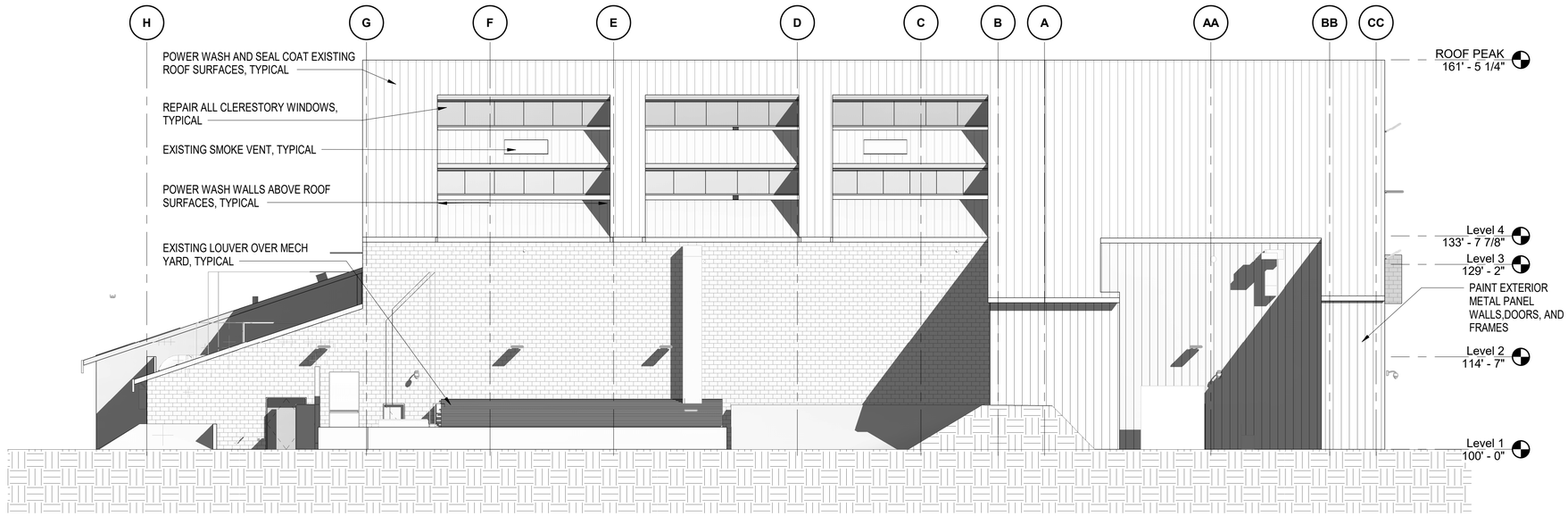
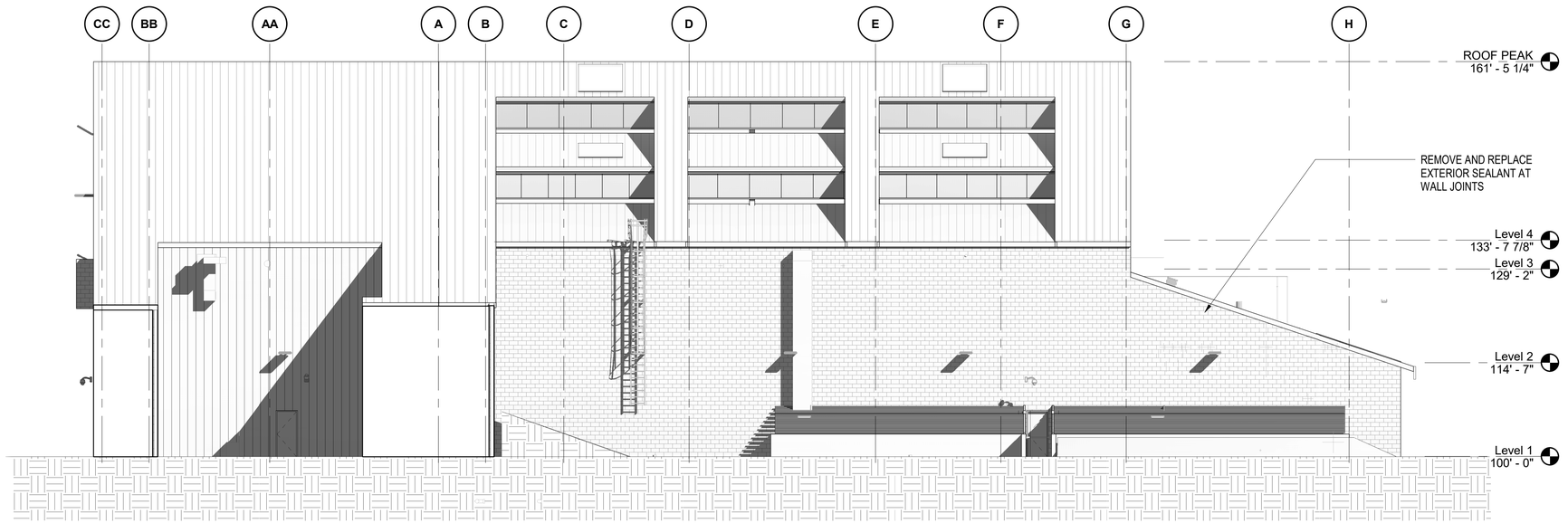


D1 EAST ELEVATION

SCALE: 3/32" = 1'-0"

0 8' 16' 24'

SCALE IN FEET



K1 WEST ELEVATION

SCALE: 3/32" = 1'-0"

0 8' 16' 24'

SCALE IN FEET

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date	detailed
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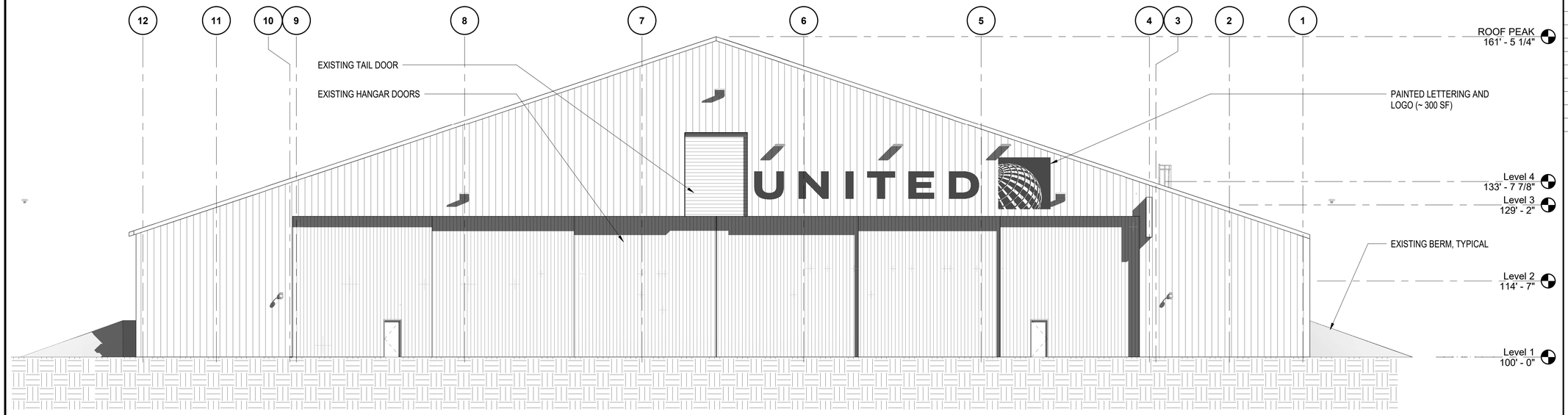
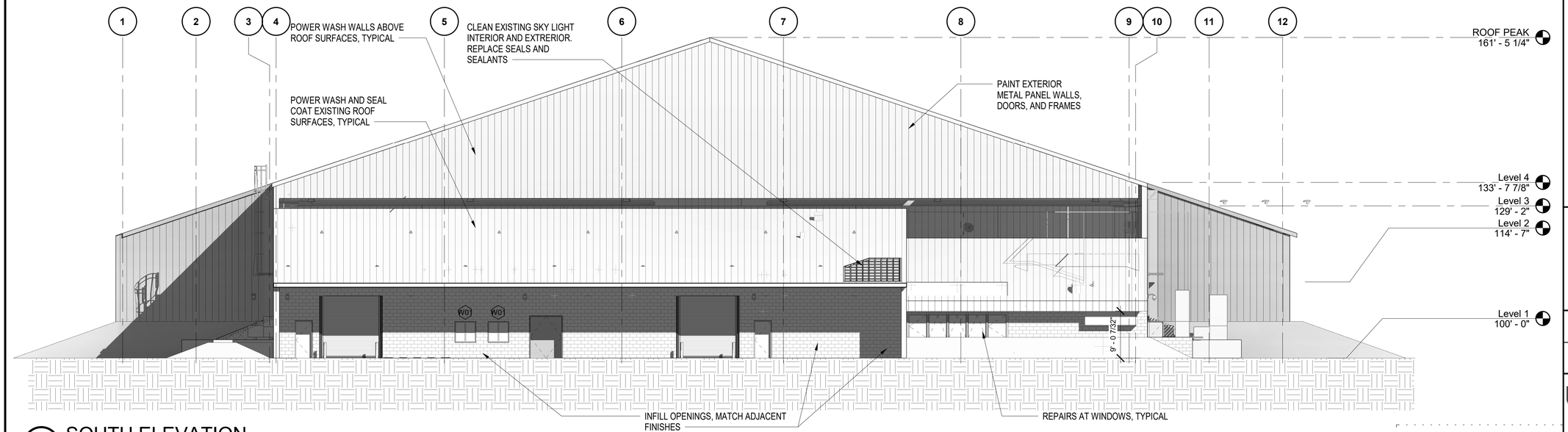


D1 NORTH ELEVATION

SCALE: 3/32" = 1'-0"

0 8' 16' 24'

SCALE IN FEET



H1 SOUTH ELEVATION

SCALE: 3/32" = 1'-0"

0 8' 16' 24'

SCALE IN FEET

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