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Naval Facilities Engineering Systems Command

EXWC Engineering and Expeditionary Warfare Center

CONTRACT REPORT
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AUGUST 2022

FIRE SUPPRESSION ASSESSMENT REPORT

FUEL TRANSFER INFRASTRUCTURE ASSESSMENT
Red Hill Bulk Fuel Storage Facility, Hawaii (RHL)

Austin Brockenbrough and Associates, LLC

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14. ABSTRACT

On November 21, 2021, a fuel spill occurred from AFFF containment drainage piping in the Red Hill Tunnel complex. At the time it was reported this leak occurred from the fire protection system. As a result of this a Statement of Work for Architecture / Engineering (Austin Brockenbrough and Associates) services was instigated to perform an assessment at the Red Hill Bulk Fuel Storage Facility at Joint Base Pearl Harbor Hickam. This work included a comprehensive assessment of the fire protection systems installed in the Red Hill Tunnel.

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Naval Facilities Engineering Systems Command

Engineering and Expeditionary Warfare Center

FIRE SUPPRESSION ASSESSMENT REPORT

FINAL SUBMITTAL

FUEL TRANSFER INFRASTRUCTURE ASSESSMENT
Red Hill Bulk Fuel Storage Facility, Hawaii

Delivery Order No. N3943022F4333
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ACRONYMS

AFFF	Aqueous Film Forming Foam
API	American Petroleum Institute
AUTO	Automatic
DCS	Digital Control System
EXWC	Engineering and Expeditionary Warfare Center
FAMN	Fire Alarm Mass Notification
FA/MN	Fire Alarm / Mass Notification
FLC	Fleet Logistics Center
FY	Fiscal Year
GPM	Gallons per Minute
IR	Infra-Red
ITM	Inspection, Testing and Maintenance
JP-5	Jet Fuel
Local Operating Console	LOC
NAVFAC	Naval Facilities Engineering Systems Command
NFPA	National Fire Protection Association
RHT	Red Hill Tank
RDC	Regional Dispatch Center
SCBA	Self-Contained Breathing Apparatus
UFC	Unified Facilities Criteria
UGPH	Underground Pump House
UL	Underwriters Laboratory
UT	Upper Tunnel

EXECUTIVE SUMMARY

On November 21, 2021, a fuel spill occurred from AFFF containment drainage piping in the Red Hill Tunnel complex. At the time it was reported this leak occurred from the fire protection system. As a result of this a Statement of Work for Architecture/Engineering services was instigated to perform an assessment at the Red Hill Bulk Fuel Storage Facility at Joint Base Pearl Harbor Hickam. This work included a comprehensive assessment of the fire protection systems installed in the Red Hill Tunnel.

A site assessment of the fire protection systems at Red Hill Bulk Fuel Storage Facility (Red Hill) was undertaken by Jensen Hughes from 21 March – 1 April 2022. The purpose of the assessment was to perform a comprehensive review of each Fire Protection System, documenting the current condition and comparing the installed conditions with the design conditions, to investigate how the active fire protection systems including the retention line and retention tank performed during the events of May 6 and November 21, 2021 and to examine the Inspection, testing and maintenance that has been performed on the fire protection systems and compare it with the requirements of UFC 3-601-02.

The assessment of the fire protection systems revealed that the overall condition of the fire protection systems was very good with most of this equipment having been constructed as part of project FY 15 MILCON P-1551 Upgrade Fire Suppression and Ventilation Systems Red Hill Bulk Fuel Storage Facility, completed in 2018. Several recommendations were made to correct code deficiencies. The apparent unreliability of the Kingfisher Fire Alarm Radio Transmitter was the most critical of these recommendations.

A review of the events of May 6th and November 21, 2021, revealed that fuel was lifted by sump pumps into the AFFF containment piping because of a large spill on May 6th. This action was not intended by the sequence of operations of this system – changes made to the sequence during construction required this system to be interlocked with the fire alarm system – which was not reported to have been operated on May 6th. A manual should be developed that documents the complete sequence of operation of these systems and these systems should be recommissioned to confirm their sequence of operations.

After this assessment was begun the Navy announced that they intend to return the Red Hill Bulk Fuel Storage Facility to operation so that it can be decommissioned as a fuel storage facility. As a result of this recommendations for significant design changes for the AFFF containment drainage system and changes to the fire protection Inspection, Testing and Maintenance program do not appear to be warranted. Similarly, recommendations for betterments for the system are only necessary if the facility is to remain as a fuel storage facility.

PART 1 – SITE ASSESSMENT AND ENGINEERING EVALUATION

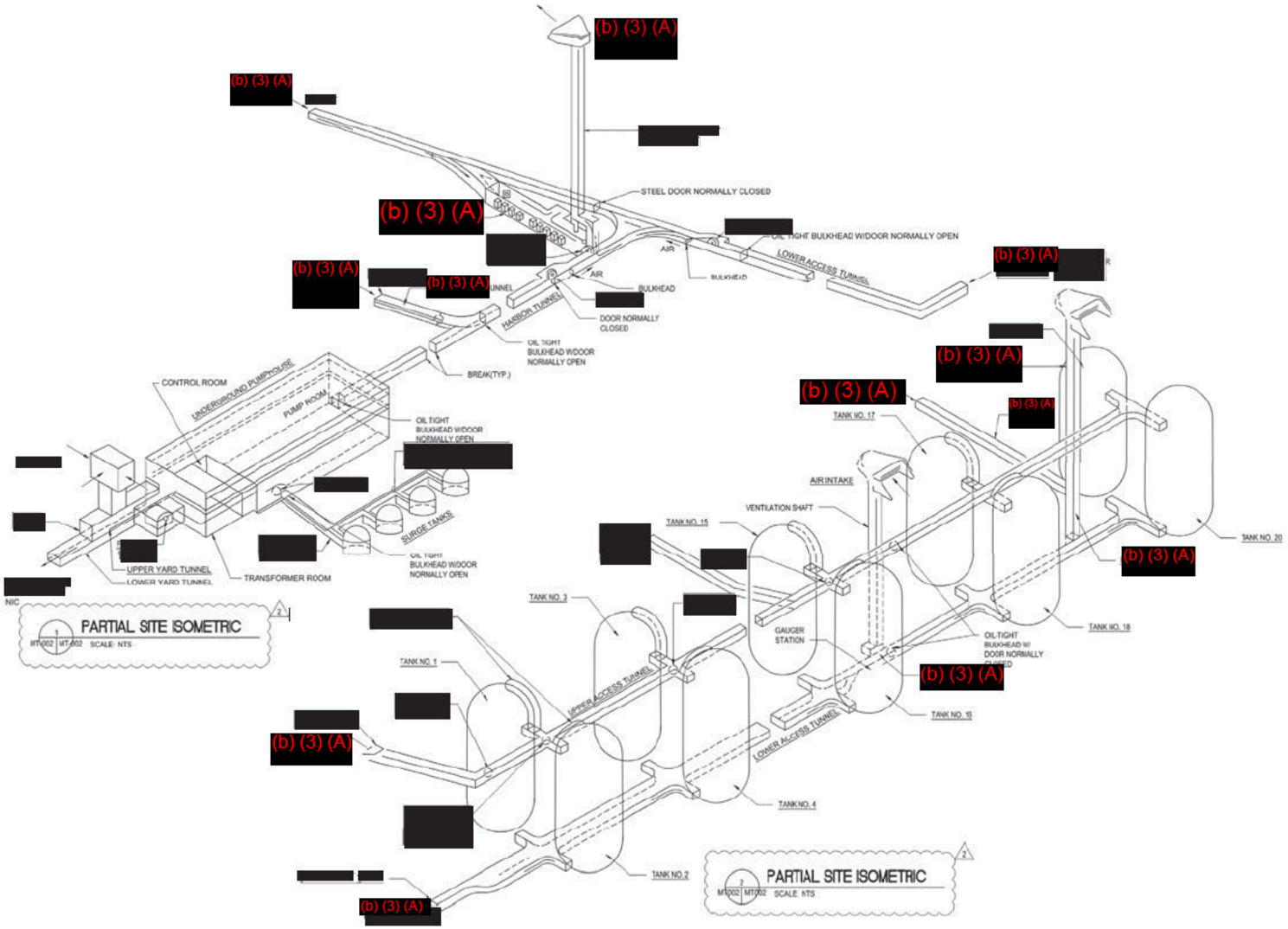
A site assessment of the fire protection systems at Red Hill Bulk Fuel Storage Facility (Red Hill) was undertaken by Jensen Hughes from 21 March – 1 April 2022. The purpose of the assessment was to:

1. Perform a comprehensive review of each Fire Protection System, documenting the current condition of the fire protection systems including:
    a. A general description and summary of each system reviewed.
    b. Confirmation that the active fire protection systems were installed as designed in project FY 15 P-1551 – Upgrade Fire Suppression and Ventilation Systems, highlighting any variance of installation over designed conditions.
2. Summary of system performance May 6th and Nov 21.
3. Confirm the fire protection systems satisfy the recommendations of the 2010 Audit Report – Department of the Navy Red Hill and Upper Tank Farm Fuel Storage Facilities.
4. Identify pathways for fuel to get into the containment system.
5. Maintenance records review including a maintenance summary of each system versus requirements of UFC 3-601-02.

1. RED HILL SITE LAYOUT

The Red Hill Bulk Fuel Storage facility consists of a series of 20 – 300,000BBL (12.6M gal) underground fuel storage tanks. The 20 fuel tanks are located as 10 pairs of tanks with access tunnels located near the top and bottom of the tanks running between the pairs. The Upper Access Tunnel can be accessed directly via (b) (3) (A) entrances – (b) (3) (A) There are two elevators connecting the Upper and Lower Access Tunnel areas. (b) (3) (A) connects the Upper Access Tunnel to the Lower Access Tunnel, with a stop approximately midway between the Upper and Lower Access Tunnels, at the end of the (b) (3) (A) access tunnel. (b) (3) (A) connects just the Upper and Lower Access Tunnels. The Upper Access Tunnel is provided to access the top of the storage tanks and runs from Tanks 19 and 20 to (b) (3) (A) The Lower Access Tunnel is longer than the Upper Tunnel, it continues beyond Tanks 1 and 2 down the hillside eventually coming to a junction at the water pumping station, where the Harbor Access Tunnel splits off. The Lower Access Tunnel continues from the split to (b) (3) (A) While (b) (3) (A) serves as a discharge point from the Lower Access Tunnel, the Harbor Access Tunnel continues (b) (3) (A) to the Underground Pumphouse and (b) (3) (A) at Pearl Harbor. The Harbor Access Tunnel can also be accessed from (b) (3) (A) via the (b) (3) (A) Tunnel.

An isometric of the tank and tunnel layout can be found on the following page.


(b) (3) (A)
STEEL DOOR NORMALLY CLOSED
OIL TIGHT BULKHEAD W/DOOR NORMALLY OPEN
LOWER ACCESS TUNNEL
AIR
BULKHEAD
HARBOR TUNNEL
DOOR NORMALLY CLOSED
OIL TIGHT BULKHEAD W/DOOR NORMALLY OPEN
BREAK(TYP.)
CONTROL ROOM
UNDERGROUND PUMPHOUSE
PUMP ROOM
OIL TIGHT BULKHEAD W/DOOR NORMALLY OPEN
SURGE TANKS
UPPER YARD TUNNEL
LOWER YARD TUNNEL
TRANSFORMER ROOM
NIC
PARTIAL SITE ISOMETRIC
MT-002 MT-002 SCALE: NTS
TANK NO. 17
AIR INTAKE
VENTILATION SHAFT
TANK NO. 15
TANK NO. 20
TANK NO. 3
GAUGER STATION
OIL-TIGHT BULKHEAD W/ DOOR NORMALLY CLOSED
TANK NO. 18
TANK NO. 1
UPPER ACCESS TUNNEL
TANK NO. 19
LOWER ACCESS TUNNEL
TANK NO. 4
TANK NO. 2
PARTIAL SITE ISOMETRIC
MT-002 MT-002 SCALE: NTS

2. FIRE PROTECTION SYSTEMS SUMMARY

The fire protection systems installed at Red Hill include the following:

A. Class I Standpipe System

A looped 8-inch sprinkler/standpipe main boosted by the fire pump serves all fire protection systems within the tunnel. These systems include standpipes for Upper and Lower Tunnel, preaction sprinkler for Lower Tunnel and various wet pipe sprinkler systems for Upper Tunnel, elevator shafts and gauger station areas. This 8" loop includes three main legs: 1) An exterior leg routed outside the tunnel from the fire pump house to (b) (3) (A) 2) An interior leg from (b) (3) (A) up (b) (3) (A) shaft, through the Upper Tunnel to (b) (3) (A) and, 3) An interior leg from (b) (3) (A) down (b) (3) (A) shaft through the Lower Tunnel to (b) (3) (A) The fire pump ties to this loop with an 8-inch line from the fire pump house near (b) (3) (A) . Fire department inlet connections are provided outside the tunnel connecting to the 8" loop at (b) (3) (A) . The standpipe system includes valves and outlets with automatic pressure regulating valves that are UL listed for fire department use. The standpipe outlets are placed at each tank junction and spaced at 200-foot increments designed for 500 gpm hose stream in the Upper Tunnel and 200-foot increments design for 1,000 gpm hose stream in the Lower Tunnel. These design flows comply with NFPA 14 requirements. The standpipe system is provided in the Upper Tunnel from tanks 1 through 20 (not including (b) (3) (A)), and in the Lower Tunnel from the new oil tight door up to the end of the Lower Tunnel at tanks 19 & 20. The standpipe system is supported by an electric fire pump to boost the pressure in the Upper Tunnel to comply with NFPA 14 to provide 100 psi at the outlet of the hydraulically most remote 2 1/2 in. (65 mm) hose connection.

B. Preaction AFFF/Water Sprinkler System

Due to the hazards of (b) (3) (A) fuel lines with fittings, joints, valves, and other appurtenances that transfer fuel from the underground fuel tanks to/from the Pearl Harbor fuel pump house, the Lower Tunnel in the area of the tank farm was defined as an inside liquid storage area per NFPA. NFPA 30 requires inside liquid storage areas to be protected by a foam-water sprinkler system with 15-minute foam capacity. A preaction Aqueous Film Forming Foam (AFFF)/water sprinkler system, satisfying NFPA 16 guidelines, is provided for the Lower Tunnel area serving tanks 1-20. The system is designed for a density of 0.16 gpm per square foot over an area of approximately 10,000 square feet (one compartment) in accordance with NFPA 16. There are 5 preaction systems feed from the 8" sprinkler/standpipe main located in the Lower Tunnel. The preaction valves in each AFFF/water sprinkler riser are Viking flow control valves that regulate the water pressure downstream of the flow control valve.

Per NFPA 16 items such as storage tanks and proportioners for foam concentrates, pumps for water and foam concentrates, and control valves for water, foam concentrates, and foam solution, need to be located as near as possible to the hazard or hazards they protect but not be exposed to a hazard that

could impair the system. To satisfy this requirement, the five AFFF/water pre-action riser assemblies are provided within a 1-hour enclosure.

A triple IR flame detection system is provided to activate the preaction AFFF/water systems.

C. Wet-Pipe Sprinkler System

As there are no fuel lines in the Upper Tunnel, this area is not considered as hazardous as the Lower Tunnel. Therefore wet-pipe sprinkler systems, meeting NFPA 13 guidelines, are installed to protect the Upper Tunnel. Two risers are provided Upper Tunnel #1 (UT#1) and Upper Tunnel #2 (UT#2). UT#2 also supplies water for (b) (3) (A) machine rooms and lobbies as required by UFC 3-600-01 for electric traction elevators. These sprinkler systems include all pipe, fittings, valves, sprinklers, and appurtenances necessary to support these systems. Adequate pressures are achieved without the aid of the fire pump. However, the fire pump was connected to the sprinkler systems to augment any pressure shortages due to larger than design fire areas being activated. The wet-pipe sprinkler systems are sized for a density of 0.4 gpm per square foot over an area of 2,500 square feet following Extra Hazard 2 (EH2) design requirements. An additional 500 gpm will also be available for use by exterior fire hydrants or standpipe system.

A wet pipe sprinkler system is also provided for the transformer room, gauger room, and electrical room in the Lower Tunnel. The riser for this system is in the Lower Tunnel fed from the 8" sprinkler/standpipe main.

D. Water Supply System

All fire suppression systems provided require water supply to function. When designed UFC 3-600-01 stated that where onsite storage is a sole source water supply that the tank or tanks must be divided to ensure that more than 50% of the required storage is always available. To this end, a new 250,000-gallon water storage tank was constructed for the exclusive use by the fire protection systems of the Red Hill Bulk Fuel Storage Facility. The new tank was connected on the suction side of the fire pumps along with an existing 250,000-gallon water tank which ensures that the 50% of the storage capacity is available with one tank out of service. UFC 3-600-1 requires distribution mains to be looped to always provide 50% flow during a main break. A water line that runs along the upper access road supplies water to hydrants located at (b) (3) (A) This line also ties-in to the interior water line system the feeds all fire suppression systems and forms a fire protection main loop. The water tanks are supplied with water primarily from the booster pumps tied to the water supply at Pearl Harbor. There is an additional line from a Board of Water Supply (BWS) system which serves as a secondary source should the main source become unavailable.

E. Fire Department Connections

NFPA 13 and NFPA 16 require two 2 1/2 in. NH internal threaded swivel fittings. NFPA 14 requires fire department connect to be sized per standpipe system demand with one 2 1/2 in. inlet for every 250 gpm of design flow. NFPA 14 requires 1,000 gpm flow rate calculation for standpipe system in a sprinklered building. Six 2-½" fire department inlet connections are installed at (b) (3) (A) NFPA 16 requires evaluation of fire department connection to avoid over pressurizing system components, imbalance of proportioning equipment, dilution of proportioned foam solution, and pressure and flows exceeding the foam system design. Each fire department connection should have signs indicating the following:

1. Per NFPA 16 to indicate "THIS CONNECTION FEEDS A FOAM-WATER SPRINKLER SYSTEM. DO NOT PUMP AT PRESSURES EXCEEDING [insert design pressure] UNTIL FOAM LIQUID SUPPLY IS EXHAUSTED. IF INCIDENT IS CONTROLLED BY FOAM BLANKET, DO NOT DESTROY FOAM BLANKET BY EXCESSIVE APPLICATION OF WATER, and
2. Per NFPA 13 and NFPA 14 to indicate "AUTOSPKR AND STANDPIPE".

F. Fire Pump

The AFFF/water preaction and wet-pipe sprinkler systems are provided adequate water and pressure to operate correctly without the aid of a fire pump. However, per NFPA 14, a minimum operating pressure of 100 psi is required at the most remote standpipe hose connection. The system alone would not be capable of delivering the required 100 psi to the most remote standpipe hose connection throughout the Upper and Lower Tunnels, therefore an electric fire pump is provided to increase the pressure to 100 psi at all outlets. A second fire pump is provided as a backup but remains "OFF" until an operator manually turns the fire pump "ON". Though technically only required for the Upper Tunnel portion of the standpipe system, boosted pressure is also available for use by all suppression systems to augment pressures as deemed necessary by the fire department.

G. Fire Alarm and Mass Notification System

The fire alarm and mass notification system was installed as part of the project to upgrade all fire suppression systems and the ventilation systems, Project FY15-P-1551. The fire alarm and mass notification (FAMN) system is a network of panels to allow command and control functions on a limited basis from multiple locations in the tunnel complex. The system uses Gamewell/FCI equipment (manufactured by Honeywell) to monitor and control fire alarm devices located throughout the Facility and interconnected/integrated with various auxiliary systems throughout the tunnel facility. Depending on the location within the Facility, the peripheral devices include manual fire alarm boxes, smoke and heat detection, duct-mounted smoke detection, and both addressable monitor and control modules to interface with various auxiliary system functions. Auxiliary systems monitored include:

- Fire sprinkler control valves and water flow switches
- Fire pump controllers

- Underground Pump House (UGPH) existing AFFF and FM-200 Releasing Panel (alarm, AFFF discharge, and trouble)
- Fire Suppression Water Tank Levels
- Aqueous Film Forming Foam (AFFF) fire suppression effluent retention tank levels
- Select Exhaust Fans for operation
- Compartmentalization and Oil-tight doors (local manual request for closure)

Auxiliary systems receiving an input from the FAMN system include:

- Release AFFF fire suppression systems in Lower Tunnel Tank Farm
- Activate AFFF pumps in the Fire Pump House
- Manual ON/OFF control of select exhaust fans associated with compartments in Lower Tunnel
- Activation (closure) of fire/smoke dampers
- Compartment roll-up and man door release
- Oil-tight door release and scissor-lift activation
- Elevator recall and shunt trip operation
- Elevator lobby door release

The FAMN system will also provide audible and visual notification throughout the tunnel facility utilizing speakers for both automatic and live voice message, and strobes.

The Lower Tunnel area is classified as a hazardous Class I Division 2 electrical environment, with the exception of the Gauger's Office, Gauger's Station Electrical Room, and the Office and Control Room areas of the UGPH. Devices located in the Lower Tunnel, outside of these specific rooms/areas are listed for installation and use in explosive environments.

The FAMN system is also connected to control and annunciation equipment using a dedicated fiber optic network. This equipment consists of graphic workstations with video display units (VDU), located in the UGPH Control Room, Gauger Office, each ADIT (tunnel entrance - total of six), and in Building 1757, a remote building outside the Tunnel Facility located at Pearl Harbor. The VDUs at the ADITs are enclosed in what appears to be temperature-regulated, weatherproof cabinets with a clear panel front. The network of graphic workstations provides the fire department with remote access and control of the FAMN system and ventilation systems from these same locations.

The FAMN system is monitored by the Base Fire Department using two Kingfisher Company, Inc. wireless communicators; one located at (b) (3) (A) covering the UGPH, (b) (3) (A) and the Harbor Tunnel systems, and one at (b) (3) (A) covering ADITs (b) (3) (A) Upper and Lower Tunnels, and the Fire Pump House. Connection of the FAMN system speakers to the base-wide mass notification system (Federal Signal Ultravoice) is provided by an Ultravoice Remote Interface (UVRI) cabinet located at the entrance to ADIT 1.

The equipment provided can vary by location in the tunnel complex, depending on the operating environment, auxiliary systems present, and the need for command-and-control functions, either on a limited or global basis. The following is a summary of the equipment by location.

UGPH/ADIT 1 – The Control Room in the UGPH is the location of the system "headend" equipment with all inputs annunciating here, and provisions for making live voice announcements, as well as controlling fans, smoke dampers, and releasing compartment doors associated with the tunnels. The fire alarm detection system installed prior to the project in 2015, which uses a Cheetah brand fire alarm control unit and also controls the existing FM-200 fire suppression system, was not replaced in 2015. It was retained, and remains operational, strictly for activation of the FM-200 system and to control the various fans in the UGPH during a fire emergency. It monitors a combination of heat detection and infra-red (IR) flame detection throughout the UGPH but has no associated notification appliances. The new fire alarm/mass notification system was installed with its own heat detection and IR flame detection in parallel with that of the existing system, along with manual fire alarm boxes (pull stations). It provides the live and automatic voice messages for the UGPH, along with visual notification using strobes throughout the building. Power for the equipment is derived from an emergency power electrical panel in the immediate vicinity of the panel equipment.

Harbor Tunnel – The main tunnel from the UGPH to the fuel tanks contains explosion-proof equipment consisting of pull stations, heat detectors, speakers, and strobes. There are also equipment cabinets in explosion-proof enclosures containing amplifiers, power supplies, etc. every few hundred feet to support the devices in the tunnel. Power for the equipment is derived from an emergency power electrical panel in the immediate vicinity of the panel equipment.

(b) (3) (A) Connection Tunnel – This is the entrance from COMPACFLT headquarters and connects with the Harbor Tunnel near the UGPH. It contains weatherproof equipment consisting of pull stations, heat detectors, speakers, and strobes. There are also equipment cabinets in weatherproof enclosures containing amplifiers, power supplies, etc. to support the devices in the tunnel. Power for the equipment is derived from an emergency power electrical panel in the immediate vicinity of the panel equipment.

(b) (3) (A) Connection Tunnel – This is an entrance at Red Hill and connects with the Harbor Tunnel nearest to the Tank Farm. It contains weatherproof equipment consisting of pull stations, heat detectors, speakers, and strobes. In addition, this is one of two locations where the FAMN system interfaces with the Digital Control System (DCS) panel DDC-9, which serves as an interface between the FAMN system and other systems in the tunnel (e.g., fire resistance-rated compartment door status, sump, and sump pump status, AFFF and groundwater retention system level, etc.) and their status. There are also equipment cabinets in weatherproof enclosures containing amplifiers, power supplies, etc. to support the devices in the tunnel. Power for the equipment is derived from an emergency power electrical panel in the immediate vicinity of the panel equipment.

(b) (3) (A) Connection Tunnel – This is an entrance at Red Hill to the Upper Tunnel of the Tank Farm at Tanks 1 and 2. It contains weatherproof equipment consisting of pull stations, heat detectors, speakers, and strobes. There are also equipment cabinets in weatherproof enclosures containing amplifiers,

power supplies, etc. to support the devices in the tunnel. Power for the equipment is derived from an emergency power electrical panel in the immediate vicinity of the panel equipment.

(b) (3) (A) Connection Tunnel – This is an entrance at Red Hill at the Upper Tunnel and connects to the Tank Farm between Tanks 15 and 16. It contains weatherproof equipment consisting of pull stations, heat detectors, speakers, and strobes. It also provides access to the Lower Tunnel and (b) (3) (A) Connection Tunnel using one of two elevators. In addition, there is a remote command panel equipped with: a network annunciator; a remote microphone; as well as fan, smoke damper, door, and speaker control switches. There are also equipment cabinets in weatherproof enclosures containing amplifiers, power supplies, etc. to support the devices in the tunnel. Power for the equipment is derived from an emergency power electrical panel in the immediate vicinity of the panel equipment.

(b) (3) (A) Connection Tunnel – This is an entrance at Red Hill which accesses the (b) (3) (A) Elevator at a level between the Upper Tunnel and Lower Tunnel. It contains weatherproof equipment consisting of pull stations, heat detectors, speakers, and strobes. It also provides access to the Upper and Lower Tunnels using the (b) (3) (A) Elevator. In addition, there is a remote command panel equipped with: a network annunciator; a remote microphone; as well as fan, smoke damper, door, and speaker control switches. There are also equipment cabinets in weatherproof enclosures containing amplifiers, power supplies, etc. to support the devices in the tunnel. Power for the equipment is derived from an emergency power electrical panel in the immediate vicinity of the panel equipment.

Lower Tunnel Tank Farm – This level is located at the bottom of the storage tanks and contains the pipes which transport the fuel to/from the UGPH. The Lower Tunnel contains explosion-proof equipment consisting of pull stations, heat detectors, duct-mounted smoke detectors for smoke damper control, IR flame detectors, speakers, and strobes. The IR flame detectors are used as part of the AFFF fire suppression deluge system present in this part of the tunnel complex. The FAMN system also monitors the door position of the compartment doors (man doors and roll-down doors). There are also equipment cabinets in explosion-proof enclosures containing amplifiers, power supplies, etc. every few hundred feet to support the devices in the tunnel. Power for the equipment is derived from an emergency power electrical panel in the immediate vicinity of the panel equipment.

Gauger Office – This office area is in the Lower Tunnel between Tanks 15 and 17, next to the passenger elevator from the Upper Tunnel. It is separated from the Lower Tunnel hazardous environment by fire and smoke resistance-rated construction which allows the use of non-explosion-proof equipment inside its area. This area has a remote command panel equipped with a network annunciator; a remote microphone; as well as fan, smoke damper, door, and speaker control switches. It also has one of the fire alarm control panels which monitors the IR flame detectors in the Lower Tunnel of the Tank Farm and houses the panel which activates the AFFF fire suppression systems in this same area. In addition, this is the second location where the FAMN system interfaces with the Digital Control System (DCS) panel DDC-1.

Upper Tunnel Tank Farm - This level is located near the top of the storage tanks, with ships ladders at the tanks providing access to the very top of the tanks. It contains weatherproof equipment consisting of pull stations, heat detectors, duct-mounted smoke detectors for smoke damper control, speakers, and strobes. While the shafts surrounding the ships ladders to the top of the tanks contain explosion-proof heat detectors, speakers, and strobes. The Upper Tunnel itself also has equipment cabinets in weatherproof enclosures containing amplifiers, power supplies, etc. every few hundred feet to support the devices in the tunnel. Power for the equipment is derived from an emergency power electrical panel in the immediate vicinity of the panel equipment.

Fire Pump Building – This building is located just below (b) (3) (A) It has a remote command panel equipped with a network annunciator; a remote microphone; as well as fan, smoke damper, door, and speaker control switches. The building houses: two fire pumps; the AFFF storage tank, two AFFF pumps, and an emergency generator. It is protected by standard pull stations, speakers, and strobes. The FAMN system also monitors the building wet fire sprinkler system, as well as the fire and AFFF pumps.

a. Digital Control System

The Digital Control System (DCS) consists of networked digital controller panels used to monitor and, in some cases control, systems associated with compartmentalization and remediation during a fuel fire or fuel leak in the Lower Tunnel Tank Farm. The DCS is not part of the fire alarm system, but the two systems communicate with each other. This network is used to monitor various systems associated with the removal and containment of the effluent from the activation of the AFFF fire suppression systems during a fuel leak or fire. The DCS monitors:

- Level of effluent in sump pits (float switch and high level).
- Associated sump pumps (four at each compartment door) for running, overheating, and water infiltration.
- High-level condition in retention tank.
- High-level condition in secondary containment area.
- Oil-tight door “close” request pushbutton and door position (open/close), scissor lift motion and position.
- Fire water tank water level (high/low).
- Groundwater level at compartment doors.
- Groundwater collection pumps running.
- Emergency generator fuel tank level and leak detectors (Fire Pump Building).

In turn, the DCS controls, provides local control of, or provides an output contact for:

- Sump pumps at compartment and oil-tight doors (hand/off/auto).
- Activation of audible and visual alarms indicating scissor lift and door activation at oil-tight door.
- Oil-tight door position and activation of local pushbutton associated with closing door manually.
- FAMN system monitoring of status for sump pumps and groundwater collection pumps running, sump high level, retention tank and secondary containment levels, pushbutton request to close oil-tight door, and fire water tank levels.

b. Smoke Ventilation

The Tunnel Complex has many supply and exhaust fans present throughout to maintain a tenable and safe environment. Command and control of the fans and dampers appears to be possible from a graphic control panel outside the entrance to (b) (3) (A) according to notes on the panel, not all fans in the complex are yet connected to it. The FAMN system has a limited role in the ventilation of smoke during or after a fire in the tunnels. It controls (b) (3) (A) fans (b) (3) (A)) in the Upper and Lower Tunnels in the Tank Farm area. It also controls the fire/smoke dampers in this area as well. The existing Cheetah fire alarm and releasing panel in the UGPH Control Room controls the fans located in the UGPH. The graphic fan control panels provided as part of the P-1551 project appear to indicate there are a total of (b) (3) (A) fans.

H. AFFF Retention System

The foam/water discharged from the AFFF/water preaction systems is collected by transverse trenches at each fire/smoke compartment in the Lower Tunnel. These fire/smoke separations segregate every four tanks into a separate compartment. The foam/water and any fuel from a fuel leak/discharge that sheet flows into these trenches is collected and routed to a sump pit, one for each 4-tank compartment area, these sumps are located near the downhill fire/smoke compartment separation. There are 4 large sump pumps in each sump pit (3 primary and 1 backup pumps) and these lift the effluent into a 14-inch AFFF retention line. This retention line is connected to a 153,000-gallon AFFF retention tank located outside of Adit 3. The tank is sized to accommodate a 20-minute discharge of the Lower Tunnel fire extinguishing system, plus an additional (b) (3) (A) fuel that could leak from the fuel system in the Lower Tunnel. The sump pumps are activated automatically on level controls and annunciate a supervisory alarm when operated. During construction changes were made to the sequence of operations of this system to require the fire alarm system to be in alarm before the sump pumps operate.

A separate smaller ground water collection pump is also located in the sump pits to collect and pump any incidental ground water seepage in the tunnel into the main slop tank sump pump pit located below tanks 1 and 2. This system is provided to prevent unintended operation of the main AFFF retention pumps. The ground water collection pumps are interlocked to shut down when the fire alarm system is activated.

The main AFFF retention sump pumps, and the ground water sump pumps are also interlocked to shut down if the new oil tight door is closed. This is done via the DCS, which monitors the closed position of the oil tight door via a door switch and is also interfaced with the sump pumps to shut them down. The new oil tight door is closed upon activation of the high groundwater float switch at the oil tight door, or activation of a manual push button at the oil tight door. During construction the sequence of operations was changed to remove closing on the oil tight doors upon receiving a signal from the fire alarm system.

The main AFFF retention tank is designed as an API 650 steel fuel storage tank as it may collect fuel from a fuel leak. The AFFF retention tank is provided with a containment berm to comply with environmental regulations for spill control.

I. Ventilation and Smoke Control

This facility currently has an operating ventilation system including several ventilation fans that are utilized to control the concentration of fugitive emissions of fuel fumes to below 25% of the lower explosive limit. It is desirable that these fans be able to exhaust smoke during or after a fire to be controlled by the fire department as they deem necessary. Currently, the fans are sized to control the smoke in most locations allowing occupants to egress prior to being overcome by smoke. The existing fans are tolerant of the heat of the smoke generated more than 3 feet from the fans. Fire closer than this will consume the fans and render them inoperable. The fans, however, are not explosion proof. The FY15 P-1551 project replaced mechanical/electrical motors of the fans to make them explosion proof in the Lower Tunnel, like the fire alarm system outlined above. Additional upgrades to the existing ventilation system for enhanced smoke control were not provided as part of the project. Similarly, the provision of self-contained breathing apparatus (SCBA) was not provided as part of the project.

3. FIRE PROTECTION SURVEY RESULTS

A. Condition of Fire Protection Systems and Comparison of Design Versus Installed Conditions

Over the 12-day period from March 21 to April 1, 2022, each of the fire protection systems was surveyed by a team of Jensen Hughes fire protection engineers. Surveys were conducted to compare the systems as installed to the as-built shop drawings provided from the FY 15 P-1551 project. Drawings of the survey results are contained in Appendices A through H.

a. Standpipe System

Site survey notes for the standpipe system can be found in Appendix A. Generally, the drawings provided as as-built drawings from the FY15 P-1551 did not appear to have been updated to reflect as-built conditions. This included how supply sprinkler piping was being routed and a few instances where the standpipe hose valve connections were installed in a different location.

The standpipe system itself was observed to be in very good overall condition. The hose valves are provided with pressure-regulating devices but were not provided with a valved outlet for a pressure gauge to be connected. A valved outlet should be provided for each location with a pressure-regulating device so a pressure gauge can be attached to verify the required pressure is being provided.

b. Preaction AFFF/Water Sprinkler System

Site survey notes for the preaction AFFF/water system can be found in Appendix B. Generally, the drawings provided as as-built drawings from the FY15 P-1551 did not appear to have been updated to reflect as-built conditions. There were many locations where additional sprinklers and/or additional branch lines had been provided and these are noted in the site survey notes. The location of seismic braces in many instances also did not match locations shown on the drawings. The backgrounds on which the drawings were prepare also seemed to have frequent inconsistencies with the observed field conditions.

The preaction AFFF/water sprinkler system itself was observed to be in very good overall condition. Significant external pipe degradation was observed in the riser for Preaction System 3 due to the constant dripping of ground water seepage into the riser closet and onto the piping. A ceiling should be constructed in this room, like the metal ceiling constructed in other areas of the Lower Tunnel, to stop water dripping in this room. Once water no longer dripping into this riser room the degraded riser piping should be replaced.

Site survey notes for the AFFF storage and pumping system can be found in Appendix D. The AFFF storage and pumping system, located in the fire pumphouse building, were also visually inspected, and appeared to be in very good overall condition. The foam pumps themselves were tagged out of service, this appeared to be due to a leak in the underground piping between the fire pumphouse and (b) (3) (A) where the foam concentrate piping enters the tunnel system. The system installation matched what was indicated on the as-built drawings provided.

The nitrogen generating system for the preaction system was observed to be in very good overall condition. The system as installed matched the as-built drawings provided.

c. Wet Pipe Sprinkler System

Site survey notes for the wet-pipe sprinkler system can be found in Appendix A. Generally, the drawings provided as as-built drawings from the FY15 P-1551 did not appear to have been updated to reflect as-built conditions. This included the routing of sprinkler piping, location of bulkheads/doors, and the number of branch lines installed in the access tunnels to the storage tanks.

The wet-pipe sprinkler system itself was observed to be in very good overall condition. Significant external pipe degradation was observed at various locations in the Upper and Lower Tunnels. There is sprinkler piping missing hangers on branch line; temporary ventilation ductwork obstructing sprinklers, sprinkler risers, and being supported by the sprinkler piping resulting in external loading not accounted for when designing hangers to support the sprinkler piping.

The "as-built" drawings should be redlined and incorporated into a new drawing to account for all field changes made during installation. Additionally, hangers need to be installed on unsupported piping and the temporary ventilation ductwork needs to be relocated.

d. Site Water Supply

The site water supply system installation matched what was indicated on the as-built drawings provided and was observed to be in very good overall condition.

e. Fire Department Connections

Site survey notes for the fire department connections can be found in Appendix A. The system installation matched what was indicated on the as-built drawings provided and was observed to be in very good overall condition.

The fire department connections were not provided with signs indicating the system they served, and the operating pressures required. The signs should be provided at each fire department connection are as follows:

1. Per NFPA 16 to indicate "THIS CONNECTION FEEDS A FOAM-WATER SPRINKLER SYSTEM. DO NOT PUMP AT PRESSURES EXCEEDING [insert design pressure] UNTIL FOAM LIQUID SUPPLY IS EXHAUSTED. IF INCIDENT IS CONTROLLED BY FOAM BLANKET, DO NOT DESTROY FOAM BLANKET BY EXCESSIVE APPLICATION OF WATER", and
2. Per NFPA 13 and NFPA 14 to indicate "AUTOSPKR AND STANDPIPE".

f. Fire Pump System

Site survey notes for the fire pump system can be found in Appendix C. The system installation matched what was indicated on the as-built drawings provided and was observed to be in very good overall condition.

g. Fire Alarm and Mass Notification System

Site survey notes for the fire alarm and mass notification system can be found in Appendix E. The upgrade of the fire alarm system was included as part of project FY15 P-1551 in direct response to findings and recommendations found in and audit conducted by Naval Audit Services and titled Department of the Navy Red Hill and Upper Tank Farm Fuel Storage Facilities (N2010-0049, dated 16 August 2010). Specifically, the audit referenced recommendations from a 1998 assessment which identified a need for emergency voice/alarm communication system in the RH facility to alert occupants of a fire or other emergency (Finding 3 Safety Measures). Based on our observations as to the extent to which the new system offers one-way voice communication to all areas of the Red Hill Bulk Fuel Storage Facility, it would appear the 1998 recommendation and 2010 audit comment has been addressed by the installation of this system. The overall physical condition of the system panels and devices appeared to be "good", with no signs of damage. However, there were code deficient conditions associated with device placement, spacing/coverage, or obstruction.

In general, the as-built shop drawings provided (Revision 6, dated 23 January 2018) do not accurately reflect the installed device locations. For initiating devices (e.g., pull stations, heat detection, addressable monitor modules, etc.), approximately 5% - 10% of device locations were inaccurate. Most of the spacing of these installed devices appeared to maintain code compliance. However, it is estimated over 85% of the notification appliances were inaccurately located on the as-built drawings. Most of these devices still maintained compliance with required spacing, but a significant number of visual notification devices were over-spaced creating code deficient conditions. These devices are spaced beyond the maximum distance allowed by NFPA 72 of 100 feet. This occurs at several intervals, where a device will be spaced 110 – 120 feet from the previous device, and then 70 – 80 feet to the next device. There did not appear to be any field conditions which would contribute to the extended spacing. Spacing of these devices should be corrected so they are within the code required spacing. All devices in the entire length of tunnel from the Underground Pumphouse to the Harbor Tunnel intersection of Adit 2 were not accurately located on the as-built drawings. There are also numerous label errors, mostly of single, isolated devices, that should be corrected.

In addition, all of the explosion-proof strobes located in the Tank Farm portion of the Lower Tunnel are obstructed and violate NFPA 72. The code requires strobes to be visible by direct concentrated viewing (i.e., you have to be able to see the actual strobe lens from all parts of the corridor) in order to use corridor spacing of minimum 15cd strobes mounted up to 100 feet apart. The strobes in this section of the tunnel are mounted with the bottom of the strobe lens well above the adjacent pipe stand structure and pipes. Personnel on the actual walking portion of the tunnel will not be able to see the strobes at all.

There were also inaccuracies associated with equipment shown on the as built drawings not being installed, or installed in a different orientation (i.e., mounting on wall instead of ceiling, or vice-versa). Many of these examples involved duct-mounted smoke detection at smoke dampers, usually where installation of this type of device was not possible. However, there was no documentation indicating

the required detection was exempted nor was spot detection provided at the damper. Some of this may be attributable to the fact the drawings provided and reviewed would not necessarily reflect changes associated with Revisions R and S (dated 21 June 2018) of the design drawings, some of which affected systems monitored by the fire alarm and mass notification system.

h. AFFF Retention System

Ideally a foam retention system should operate by gravity flow such that discharged AFFF effluent and fuel may be collected via gravity thereby eliminating any moving parts. Unfortunately, it was determined during design that it was not possible for this system to operate under gravity. It would be ideal if drainage from the Adit 3 end of the tunnel into the retention tank could occur under gravity, however doing this would require finding a site for the tank where the top of the tank was below 98' elevation. Without significant additional excavation this would also require piping from the tunnel, which during a retention event would contain AFFF, to be located underground. There are numerous areas in the system where low points are provided and effluent collects at these points. The first low points are the 5 sump pits provided at each fire/smoke wall. Effluent drains to these pits and is lifted by sump pumps into the AFFF retention piping. The second collection of low points are those low points created when the retention line changes elevation in the tunnel to pass over doorways and other obstructions. Each of these changes in elevation creates a local localized low point which is eventually overcome by the overall grade of the tunnel and slope of the retention pipe. Low point drains were observed at these locations which permit the pipe to be drained at each of these individual low points. The third and final low point is created by the elevation of the retention tank, the drain line into the retention tank, and each of the 5 sumps. The bottom of the retention tank itself is noted as being at an elevation of 119', while the low point in the tunnels themselves at Adit 3 is 98'. During construction it was noted (RFI-0069) that all the tunnel retention piping to the point below the fire door between tanks 3-4 and tanks 5-6 is at or below the 119' elevation making the entire volume of the retention piping below this door a low point (~between 30,000 and 40,000 gals). As constructed the entry point in to the retention tank is at the top of the tank itself making the top of the tank the height that must be overcome for effluent to flow under gravity into the retention tank – the effect of this is to make even more of the retention line a low point, such that it is likely more than 40,000 gal of effluent would have to enter the retention line before any of it would flow into the tank. Any discharge from the tanks would have to fill the entire length of the retention line to Adit 3 to an elevation equal with the elevation of the top of tank entry before effluent could flow into the retention tank. For spills less than 40,000 gals no effluent will reach the retention tank, rather these spills will be held in the numerous low points throughout the system. An overall survey of elevations along the retention line, which was performed during the site survey, could be further developed, and used to evaluate where effluent is likely retained based on the location of effluent entering the retention system. A small sump and manually activated sump pump were provided at the low point of Adit 3 to be able to pump from the low point to a valved header at Adit 3 to allow fluid in the low point to be pumped to a tanker truck for disposal.

The AFFF retention system as finally installed did not match the as-built drawings. The retention system was constructed of HDPE pipe for the entire system. After installation changes were made to the retention system which are not reflected on the as-built drawings. These changes included:

1. Steel pipe and valves were installed for the system from the sump to the main 14-inch retention line.
2. The main 14-inch retention line was changed to steel pipe for approximately 100 ft from a point after the penetration of the fire/smoke wall to a point upstream of the sump piping inlet.
3. Spring operated control valves with a fusible link are in the piping upstream of the sump pumps and upstream of the pipe type junction.

These changes were not documented as part of the as-built drawings, and it is not clear that any acceptance testing of this altered system along with the already accepted fire alarm systems was undertaken.

There are numerous improvements that could be recommended to improve the operation of the retention system. However, at this stage with the established goal of ultimately taking the fuel storage tanks out of service within the next 2-3 years any recommendations for significant alterations to the retention system do not appear to be warranted.

B. Fire Protection Systems Recommendations of 2010 Audit Report

The 2010 Department of the Navy Red Hill and Upper Tank Farm Fuel Storage Facilities Audit report contained a list of 13 identified safety hazards. At the time of the report 7 of these hazards were identified as having been corrected, 2 were identified as outstanding but with funding having been secured for mitigation, and preventative maintenance was identified as ongoing. This left three remaining hazards that were identified in the Audit report. The report recommendations identified these items, as indicated below, and recommended they be prioritized as critical:

1. Install an automatic fixed fire suppression system at the lower tank storage area. NAVFAC Pacific engineers have recommended the installation of an Aqueous Film Forming Foam (AFFF) Deluge system.

2. Install an emergency voice/alarm communication system at Red Hill.

3. Upgrade the existing fire protection water main in the upper and lower tunnels at Red Hill.

Each of these Audit report recommendations was addressed by construction project FY15 MILCON P-1551 Fire Protection, which included the installation of:

1. Five (5) foam water preaction systems in the Lower Tunnel. As part of this system a new fire pump system was also provided that boosts the water supply pressure from the water storage tanks to the Red Hill Fire Protection Systems.

2. An emergency voice fire alarm and mass notification system from Adit 1 throughout the entire Red Hill Bulk Fuel Storage Facility.

3. An 8" looped fire protection main and standpipe & hose system throughout the Upper and Lower Tunnel areas.

4. A second water supply tank adjacent to the existing water supply tank to supply the Red Hill Fire Protection Systems.

The addition of these systems satisfies the outstanding fire protection/life safety recommendations of the 2010 Audit Report.

4. SUMMARY OF FIRE PROTECTION AND RETENTION SYSTEM PERFORMANCE

A. May 6, 2021, Fuel Release Incident

A significant discharge of fuel occurred from a rupture of a fuel line in the Lower Access Tunnel at Tanks 18 and 20 at approximately 1812 hours on May 6, 2021. The root cause of the incident was the incorrect sequence of opening of fuel valves while fuel was being taken from Tank 12, with collateral damage and leaks occurring in the area around Tanks 18 and 20. This leaked fuel, once in the Lower Access Tunnel, flowed in the direction of the sump pits associated with Door C-1 at Gaugers office (south of Tanks 17/18), and potentially Door 5 (south of Tanks 13/14), respectively.

Ultimately most of this fuel discharge was collected by the retention system, however due to the significant number of low points and the relative elevation of the line into the retention tank at (b) (3) (A) compared with the tanks themselves, none of this fuel drained to the retention tank. As evidenced by the later discovery of fuel in the retention line however, it is unequivocal that fuel was lifted by the sump pumps into the retention line but there was no record of operation of the sump pumps on the day of the incident. Anecdotal reports from the day indicate that the fire alarm system in the tunnel was not in alarm during this incident. Sequence of operation changes made during construction of project P-1551 were supposed to interface the sump pumps with the fire alarm system such that they would not operate without a fire alarm. As evidenced by fuel being found in the containment system piping, it appears the installed sequence of operations does not match what is presented in the as-built drawings.

The fire alarm/mass notification (FA/MN) system does not, and is not required to, detect a fuel leak. It only detects conditions that could occur because of a fuel leak - ignition (flame detection) and fire (heat detection). Even with the manual pull stations provided, the normal procedure would not necessarily include activation during a fuel leak without ignition, or threat of ignition.

The indirect mechanisms in place to automatically notify and annunciate on the FA/MN system included the following auxiliary system interfaces:

- Fuel sump pump running at Door C-1; if sufficient fuel were to accumulate and cause the fuel levels to activate the individual float switches provided to engage the associated pumps.
- Fuel Sump pump running at Door 5; if sufficient fuel was able to travel this distance and cause the fuel levels to activate the individual float switches provided to engage the associated pumps.

The fuel sump pump float switches and pump running status are monitored by the Digital Control System (DCS). The DCS is the indirect mechanism that provides status inputs to the FA/MN for the following conditions:

- Sump “X” High Level Float Switch (1 for each sump), note that the high sump level float switch is located higher than all sump pump float switches in each sump pit.
- Sump Pump SP-Door-“X”-C1, 1 to 5 Pump Running (1 for each of the 5 pumps in each of the sumps)

Given the amount of fuel believed to be released, and reported observations made by personnel present during the leak, the sump pumps at Door C-1, at a minimum, accumulated enough fuel to activate the float switch and start the fuel sump pumps running in that door's associated sump pit.

The interface of the FA/MN system and the DCS occurs in two locations: at DCS cabinet DDC-9, near the (b) (3) (A) entry point; and at DDC-1 in the Lower Tunnel Gaugers Office. The FA/MN system uses addressable monitor modules to monitor the DCS outputs. At a minimum, the reporting addresses associated with Door C-1 would be (b) (3) (A) If any of the pumps activate, its corresponding address should appear as an input in the FA/MN history log.

Based on our analysis of the provided system history log, there were no inputs from these nodes (panels), much less these specific addresses, on the day of the leak event. It is not known as to why the fuel sump pump running status did not annunciate on the FA/MN system. The history log did not indicate any impairment of these associated panels on the day of the event. However, the fire protection ITM program indicates multiple occasions of a period of years where the Kingfisher failed to transmit signals to the Regional Dispatch Center.

B. November 21, 2021, Fuel Release Incident

A further fuel discharge occurred on November 21, 2021. This discharge was as a direct result of the May 6 incident. On this day a low point drain on the 14-inch retention line was hit by a vehicle (or something being carried on a vehicle) and broken. Fuel from the May 6 incident that remained in the retention line was then released to the Lower Tunnel. This occurred in the Lower Tunnel below the oil tight door. The only drainage in this area of the tunnel is directly to the groundwater aquifer.

The fuel from the retention line on November 21st appears to have been fuel that remained in the retention line from the May 6th incident. Due to system design all low points need to be checked, not finding fuel in the retention tank, or at the lowest point in the system is no guarantee that fuel is not in the system because it will be retained at the first low point below where fuel enters the system, until this low point is overcome and then it will accumulate at the next low point down the line. Due to the low slope and large diameter of the retention line this can mean significant pockets of fuel are retained at low points in the middle of the system.

5. MAINTENANCE RECORDS REVIEW

UFC 3-601-02 7 October 2021 contains maintenance requirements for fire protection systems. It should be noted that this UFC was updated after the project and the current fire protection maintenance contract. Items that are new to this edition of the UFC are shown shaded in these tables. The requirements for each system type are contained in sections A through I, there are no fire protection testing requirements for the AFFF retention system.

A. Standpipe System

Hose outlets and FDCs inspection, test and maintenance is conducted with the wet pipe sprinkler system. See Section C – Wet Pipe Sprinklers for more information.

B. Preaction AFFF/Water Sprinkler System

Lower Tunnel Preaction Maintenance Summary (Systems 1-5)

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
Semi-Annually	Foam concentrate		Inspect for quality and evidence of sludge or deterioration		
			Verify adequate supply		
Annually	Control valves (sealed, locked, or electrically supervised)		Verify proper valve position	Yes	06/20/2021 (RHT Lower Tunnel DS1 - June 20, 2021) 06/20/2021 (RHT Lower Tunnel DS2 - June 20, 2021), 06/20/2021 (FLC AFFF ZONE 5 PA_DS 6.20.21) 06/20/2021 (FLC AFFF ZONE 4 PA_DS 6.20.21), 06/20/2021 (FLC AFFF ZONE 3 PA_DS 6.20.21)
	Waterflow alarm devices		Operate alarm test valve to verify initiation and receipt of alarm		
			Verify alarm test valve alignment and tamper switch (if sealed or electrically supervised)		
	Pre-action valve and trim		Inspect the exterior of valves, gauges, trim alignment	Yes	06/20/2021 (RHT Lower Tunnel DS1 - June 20, 2021) 06/20/2021 (RHT Lower Tunnel DS2 - June 20, 2021), 06/20/2021 (FLC AFFF ZONE 5 PA_DS 6.20.21), 06/20/2021 (FLC AFFF ZONE 4 PA_DS 6.20.21), 06/20/2021 (FLC AFFF ZONE 3 PA_DS 6.20.21)
			Verify valve pressure and legibility of the hydraulic nameplate		
	Main drain		Conduct a main drain test to verify supply (valve position)	Yes	6/20/2021 (static only) (RHT Lower Tunnel DS1 - June 20, 2021)

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
			Document static and residual pressure readings on a 3-inch by 5-inch tag and secure it to the system pressure gauge	Yes	06/20/2021 (static only) (RHT Lower Tunnel DS2 - June 20, 2021), 06/20/2021 (static only) (FLC AFFF ZONE 5 PA_DS 6.20.21), 06/20/2021 (static only) (FLC AFFF ZONE 4 PA_DS 6.20.21), 06/20/2021 (static only) (FLC AFFF ZONE 3 PA_DS 6.20.21)
			Compare results with results from previous main drain tests and original acceptance test		
			Verify that the results are within acceptable limits or identify corrective measures		
	Fire department connection		Verify accessibility and condition		06/20/2021 (RHT Lower Tunnel DS1 - June 20, 2021) 06/20/2021 (RHT Lower Tunnel DS2 - June 20, 2021), 06/20/2021 (FLC AFFF ZONE 5 PA_DS 6.20.21), 06/20/2021 (FLC AFFF ZONE 4 PA_DS 6.20.21), 06/20/2021 (FLC AFFF ZONE 3 PA_DS 6.20.21)
			If caps are removed or missing, check for obstructions		
			Verify system check valve is not leaking		
			Verify gaskets are present		
			Lubricate if swivels do not rotate smoothly		
			Verify proper operation of ball drip drain prior to the cold season		
2 Years	Control Valves		Operate valve through entire travel to verify function	Yes	06/20/2021 (RHT Lower Tunnel DS1 - June 20, 2021) 06/20/2021

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
			Lubricate valves and stems to ensure operability	Yes	(RHT Lower Tunnel DS2 - June 20, 2021), 06/20/2021 (FLC AFFF ZONE 5 PA_DS 6.20.21), 06/20/2021 (FLC AFFF ZONE 4 PA_DS 6.20.21), 06/20/2021 (FLC AFFF ZONE 3 PA_DS 6.20.21)
			Verify that valve supervisory switches detect a change in valve position	Yes	
	Pre-action valve		Trip to verify proper operation		
			Verify function of manual actuators (if provided)		
			Inspect internal condition and clean valve seat before resetting		
	Low point drains		Drain all low points after pre-action valve trip test		
	Air supply (if present)		Test the automatic air pressure maintenance device		
			Test the high/low air supply alarms		
5 Years	Strainers		Clean and inspect the interior to verify condition		The system is not old enough to have required this testing.
10 Years	Gauges		Calibrate or replace gauges		
10 Years and every 10 years thereafter	Dry Sprinklers		Replace all sprinkler or test a sample of sprinklers to verify response characteristics *		
20 Years and every 10 years thereafter	Fast response sprinklers and extra high temperature sprinklers		Replace all sprinkler or test a sample of sprinklers to verify response characteristics*		
50 Years and every 10 years thereafter	Standard sprinklers		Replace all sprinkler or test sample closed-head sprinklers to verify response characteristics *		

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
Following system modification or repair	Main drain (following maintenance or repair action requiring the water supply to be shut off)		Conduct main drain test to verify supply (valve position)		
			Compare results with result from previous main drain tests and original acceptance test		
			Verify that the results are within acceptable limits or identify corrective measures		
			Document static and residual pressure readings on a 3-inch by 5-inch tag and secure it to the system pressure gauge		

*** A representative sample of sprinklers for testing must consist of one (1) percent of the sprinklers installed of the same type, with a minimum of four (4) sprinklers sampled. Submit sprinklers to a recognized testing laboratory (NRTL) for these tests.**

C. Nitrogen Generation System

These ITM items should be part of the preaction systems ITM (however these requirements are new to the October 2021 edition of UFC 3-601-02 and are shown shaded).

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
Monthly	Generation System		Verify generation system is free of physical damage.		
			Verify proper valve positions		
			Verify generation system is in normal operating condition.		
			Verify the power wiring to the generation system is free of physical damage.		
			Verify piping from generation system to system served is intact and free of physical damage.		
Annually	Filter Elements		Replace the activated carbon and coalescing filter elements.		
	Intake Filters		Clean the air compressor intake filter elements, replace intake filters if necessary.		
	Strainer Screens		Clean air tank blow-down strainer screens.		
	System Concentration		Verify the generation system is maintaining a nitrogen composition of 98% in the system served. Verify nitrogen composition at remote test locations.		
2 Years	System Operation		Verify generation system operates on the proper pressure drop and ceases operation at the proper set point.		
			Verify generation system does not overheat or present any unusual noise or vibration during operation.		

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
			. Verify the means of anchoring the generation system to the structure is secure, tight, and free of physical damage.		
	Safety Relief Valves		Manually test safety relief valves.		
5 Years	Leakage Test		Inspect system served by generation system for leaks by conducting a pressure loss test.	The system is not old enough to have required this testing.	
	System Performance		Verify generation system restores normal gas pressure and concentration in the system served within the required timeframe.		

D. Wet Pipe Sprinkler System

Wet Pipe Maintenance Summary - Upper Tunnel WS #1

Frequency	Component	Task	Record of Completion	Date
Annually	Control valves (sealed, locked, or electrically supervised)	Verify proper valve position	Yes	04/26/2019RHT Upper Tunnel 06/25/2021RHT Upper Tunnel
	Waterflow alarm devices	Verify initiation and receipt of alarm (alternate use of alarm test line and inspectors test connection annually)	Yes	04/26/2019RHT Upper Tunnel 06/25/2021RHT Upper Tunnel
		Verify operation of exterior water flow alarm (if present)	N/A	N/A
		Verify alarm test valve alignment and tamper switch (if sealed or electrically supervised)	Yes	04/26/2019RHT Upper Tunnel 06/25/2021RHT Upper Tunnel
	Alarm valve and trim	Visually check the exterior of valves, gauges, trim alignment	Yes	04/26/2019RHT Upper Tunnel 06/25/2021RHT Upper Tunnel
		Verify valve pressure and legibility of the hydraulic nameplate	Yes	04/26/2019RHT Upper Tunnel 06/25/2021RHT Upper Tunnel
	Main drain	Conduct a main drain test to verify supply (valve position)	Yes	04/26/2019RHT Upper Tunnel 06/25/2021RHT Upper Tunnel
		Document static and residual pressure readings on a 3-inch by 5-inch tag and secure it to the system pressure gauge	Yes	04/26/2019RHT Upper Tunnel 06/25/2021RHT Upper Tunnel
		Compare results with results from previous main drain tests and original acceptance test	No	-
		Verify that the results are within acceptable limits or identify corrective measures	No	-
	Fire department connection	Verify accessibility and condition	Yes	04/26/2019RHT Upper Tunnel 06/25/2021RHT Upper Tunnel
		If caps are removed or missing, check for obstructions	Yes	04/26/2019RHT Upper Tunnel 06/25/2021RHT Upper Tunnel

Frequency	Component	Task	Record of Completion	Date
		Verify system check valve is not leaking	Yes	04/26/2019RHT Upper Tunnel 06/25/2021RHT Upper Tunnel
		Verify gaskets are present	Yes	04/26/2019RHT Upper Tunnel 06/25/2021RHT Upper Tunnel
		Lubricate if swivels do not rotate smoothly	Yes	04/26/2019RHT Upper Tunnel 06/25/2021RHT Upper Tunnel
		Verify proper operation of ball drip drain prior to the cold season	N/A	N/A
2 Years	Control Valves	Operate valve through entire travel to verify function	Yes	04/26/2019RHT Upper Tunnel 06/25/2021RHT Upper Tunnel
		Lubricate valves and stems to ensure operability	Yes	04/26/2019RHT Upper Tunnel 06/25/2021RHT Upper Tunnel
		Verify that valve supervisory switches detect a change in valve position	Yes	04/26/2019RHT Upper Tunnel 06/25/2021RHT Upper Tunnel
5 Years	Alarm Valve	Clean and inspect the interior to verify condition	The facility is not old enough nor have system modifications or repairs been made to have required this testing.	
	Strainers	Inspect internally and clean to good condition		
	Automatic Air Release	Confirm proper operation		
10 Years	Gauges	Calibrate or replace gauges		
20 Years	Fast response sprinklers and extra high temperature sprinklers	Replace all sprinklers		
50 Years and every 20 years thereafter	Standard sprinklers	Replace all sprinkler or test sample closed-head sprinklers to verify response characteristics *		
Following system modification or repair	Main drain (following maintenance or repair action	Conduct main drain test to verify supply (valve position)		
		Compare results with result from previous main drain tests and original acceptance test		

Frequency	Component	Task	Record of Completion	Date
	requiring the water supply to be shut off)	Verify that the results are within acceptable limits or identify corrective measures		
		Document static and residual pressure readings on a 3-inch by 5-inch tag and secure it to the system pressure gauge		

*** A representative sample of sprinklers for testing must consist of one (1) percent of the sprinklers installed of the same type, with a minimum of four (4) sprinklers sampled. Submit sprinklers to a recognized testing laboratory (NRTL) for these tests.**

Wet Pipe Maintenance Summary - Upper Tunnel WS #2

Frequency	Component	Task	Record of Completion	Date
Annually	Control valves (sealed, locked, or electrically supervised)	Verify proper valve position	Yes	04/26/2019RHT Upper Tunnel 06/25/2021RHT Upper Tunnel
	Waterflow alarm devices	Verify initiation and receipt of alarm (alternate use of alarm test line and inspectors test connection annually)	Yes	04/26/2019 RHT Upper Tunnel 06/25/2021 RHT Upper Tunnel
		Verify operation of exterior water flow alarm (if present)	N/A	N/A
		Verify alarm test valve alignment and tamper switch (if sealed or electrically supervised)	Yes	04/26/2019 RHT Upper Tunnel 06/25/2021 RHT Upper Tunnel
	Alarm valve and trim	Visually check the exterior of valves, gauges, trim alignment	Yes	04/26/2019 RHT Upper Tunnel 06/25/2021 RHT Upper Tunnel
		Verify valve pressure and legibility of the hydraulic nameplate	Yes	04/26/2019 RHT Upper Tunnel 06/25/2021 RHT Upper Tunnel
	Main drain	Conduct a main drain test to verify supply (valve position)	Yes	04/26/2019 RHT Upper Tunnel 06/25/2021 RHT Upper Tunnel
		Document static and residual pressure readings on a 3-inch by 5-inch tag and secure it to the system pressure gauge	Yes	04/26/2019 RHT Upper Tunnel 06/25/2021 RHT Upper Tunnel
		Compare results with results from previous main drain tests and original acceptance test	No	-
		Verify that the results are within acceptable limits or identify corrective measures	No	-
		Verify accessibility and condition	Yes	04/26/2019 RHT Upper Tunnel 06/25/2021 RHT Upper Tunnel

Frequency	Component	Task	Record of Completion	Date
	Fire department connection	If caps are removed or missing, check for obstructions	Yes	04/26/2019 RHT Upper Tunnel 06/25/2021 RHT Upper Tunnel
		Verify system check valve is not leaking	Yes	04/26/2019 RHT Upper Tunnel 06/25/2021 RHT Upper Tunnel
		Verify gaskets are present	Yes	04/26/2019 RHT Upper Tunnel 06/25/2021 RHT Upper Tunnel
		Lubricate if swivels do not rotate smoothly	Yes	04/26/2019 RHT Upper Tunnel 06/25/2021 RHT Upper Tunnel
		Verify proper operation of ball drip drain prior to the cold season	N/A	N/A
2 Years	Control Valves	Operate valve through entire travel to verify function	Yes	04/26/2019 RHT Upper Tunnel 06/25/2021 RHT Upper Tunnel
		Lubricate valves and stems to ensure operability	Yes	04/26/2019 RHT Upper Tunnel 06/25/2021 RHT Upper Tunnel
		Verify that valve supervisory switches detect a change in valve position	Yes	04/26/2019 RHT Upper Tunnel 06/25/2021 RHT Upper Tunnel
5 Years	Alarm Valve	Clean and inspect the interior to verify condition	The facility is not old enough nor have system modifications or repairs been made to have required this testing.	
	Strainers	Inspect internally and clean to good condition		
	Automatic Air Release	Confirm proper operation		
10 Years	Gauges	Calibrate or replace gauges		
20 Years	Fast response sprinklers and extra high temperature sprinklers	Replace all sprinklers		
50 Years and every 20 years thereafter	Standard sprinklers	Replace all sprinkler or test sample closed-head sprinklers to verify response characteristics *		

Frequency	Component	Task	Record of Completion	Date
Following system modification or repair	Main drain (following maintenance or repair action requiring the water supply to be shut off)	Conduct main drain test to verify supply (valve position)		
		Compare results with result from previous main drain tests and original acceptance test		
		Verify that the results are within acceptable limits or identify corrective measures		
		Document static and residual pressure readings on a 3-inch by 5-inch tag and secure it to the system pressure gauge		

* A representative sample of sprinklers for testing must consist of one (1) percent of the sprinklers installed of the same type, with a minimum of four (4) sprinklers sampled. Submit sprinklers to a recognized testing laboratory (NRTL) for these tests.

E. Site Water Supply

Frequency	Component	Task	Record of Completion	Date
Annually	Control valves (sealed, locked, or electrically supervised)	Verify proper valve position		
	Water Level (with remote electric supervision of water level)	Verify proper water level in tank.		
	Tank	Inspect exterior for condition, damage, corrosion, and accessibility		
	Cathodic Protection	Inspect to ensure proper operation		
2 Years	Control Valves	Operate valve through entire travel to verify function		
		Lubricate valves and stems to ensure operability		
		Verify that valve supervisory switches detect a change in valve position		
	Water Level Alarms and Level Indicators	Test water level alarms to verify operability and set points.		
	Automatic Fill Valve	Actuate valve automatically by lowering the water level in the tank		
		Measure refill rate and record data.		
	Tank Vent	Inspect and clean tank vents.		
3 Years	Tank (without cathodic protection)	Conduct internal tank inspection to determine condition and amount of corrosion.		
5 Years	Tanks (with cathodic protection)	Conduct internal tank inspection to determine condition and amount of corrosion.	The facility is not old enough nor have system modifications or repairs been made to have required this testing.	
	Pressure Gauges	Calibrate or replace gauges		
	Check Valves	Inspect interior of valves.		
	Level Indicator Test	Calibrate level indicator		

Frequency	Component	Task	Record of Completion	Date
	Automatic Fill Valve	Perform internal inspection of automatic fill valve.		

F. Fire Department Connections

Hose outlets and FDCs inspection, test and maintenance is conducted with the wet pipe sprinkler system. See Section C – Wet Pipe Sprinklers for more information

G. Fire Pump System

Fire Pump 1

Frequency	Component	Task	Record of Completion	Date	Issues
Monthly	Pump House	Inspect for proper condition, ventilation, and heating	Yes	08/20/2019 10/29/2019 11/21/2019 12/04/2019 01/09/2020 02/07/2020 03/20/2020 04/20/2020 05/06/2020 06/02/2020 08/10/2020 09/11/2020 10/21/2020 11/10/2020 12/07/2020 01/05/2021 02/09/2021 03/31/2021 05/18/2021 06/22/2021 07/02/2021 08/05/2021 09/08/2021 11/03/2021 12/01/2021 01/10/2022 RHT Fire Pump 1	05/06/2020 Pump started smoking 06/02/2020 Churn not performed 10/21/2020 Churn not performed 11/10/2020 Churn not performed 12/07/2020 Churn not performed 01/05/2021 Churn not performed 02/09/2021 Churn not performed 03/31/2021 Relief valves not operated Churn not performed 05/18/2021 Churn not performed 06/22/2021 Churn not performed 07/02/2021 Melted packing clogging drain Reducer is showing heavy signs of corrosion Noticeable vibrations and shavings after running. Brushing needs replacement Churn not performed 08/05/2021 Churn not performed 01/10/2022 Vibrations coming from pump on startup, unable to run for 10 minutes
	Pressure Gauges	Check reading and verify gauge operability	Yes		
	Controllers	Inspect electric connections	Yes		
		Operate manual and automatic starting methods	Yes		
		Verify that automatic controllers are in the automatic (AUTO) setting	Yes		
	Pumps	Start and churn to verify operability. (Where equipment permits, allow water to flow back to the source.) [Operate electric pumps for 10 minutes.]	Yes		
		Verify operation of relief valves	Yes		

Frequency	Component	Task	Record of Completion	Date	Issues
	Pump House	Check packing leakage for proper water lubrication			
		Verify proper drainage			
	Controllers	Resolve all trouble indications			
	Control valves	Verify proper valve position	Yes	08/20/2019 10/29/2019 11/21/2019 12/04/2019 01/09/2020 02/07/2020 03/20/2020 04/20/2020 05/06/2020 06/02/2020 08/10/2020 09/11/2020 10/21/2020 11/10/2020 12/07/2020 01/05/2021 02/09/2021 03/31/2021 05/18/2021 06/22/2021 07/02/2021 08/05/2021 09/08/2021 11/03/2021 12/01/2021 01/10/2022	

Frequency	Component	Task	Record of Completion	Date	Issues
				RHT Fire Pump 1	
Annually	Control Valves	Operate valve through entire travel to verify function	Yes	06/22/2021	
2 Years	Control Valves Pumps	Lubricate valves and stems to ensure operability	Yes	06/22/2021	
		Verify that valve supervisory switches detect a change in valve position			
		Check coupling alignment to ensure that the shaft is aligned			06/22/2021 Not performed
	Pumps Relief valves	Check pump shaft end play			06/22/2021 Not performed
		Lubricate bearings	Yes	06/22/2021	
		Calibrate valves			06/22/2021 Not performed
	Emergency power supply	Test to verify availability and capacity for pump motor	Yes	06/22/2021	
5 Years	Pump	Conduct flow test to verify pump output. Test may be through a flow meter returning the water to a storage reservoir or through the test header. Recirculation of water to the suction piping is not permitted. In a multi-pump installation, each pump may be tested separately at not less than 100 percent design capacity for 30 minutes.			Facility is not old enough to have required this testing.

Fire Pump 2

Frequency	Component	Task	Record of Completion	Date	Issues
Monthly	Pump House	Inspect for proper condition, ventilation, and heating	Yes	08/20/2019 11/21/2019 12/04/2019 01/09/2020 02/07/2020 04/20/2020 05/06/2020 07/02/2020 08/10/2020 09/11/2020 10/21/2020 11/10/2020 12/07/2020 01/05/2021 02/09/2021 03/31/2021 05/18/2021 07/02/2021 08/05/2021 09/08/2021 11/03/2021 12/01/2021 01/10/2022	01/09/2020 Pump smoking from bearings, further investigation needed, pump should not be run anymore, until issue is resolved. 02/07/2020 Churn not performed, Did not operate pump due to smoking issue, possible air leak in suction line or pump packing failure. 04/20/2020 Pump still smoking, after troubleshooting identified packing is overheating and not allowing water to cool the pump shaft. Recommend packing replacement. 05/06/2020 Pump still smoking, after troubleshooting identified packing is overheating and not allowing water to cool the pump shaft. Recommend packing replacement. 07/02/2020 28. Upon arrival placed system on test, & isolated Fire Pump #2. After previously reassembling packing & recharging system we turned Fire pump on & ran for the full 10 mins. Both Pumps need to be opened up, cleaned, & repacked so we can adjust packing to proper drip rate, & make adjustments as we run pump. After repacking recommend running weekly. Deficiencies: 1. Fire Pump needs to be cracked open cleaned & repacked to prevent further clogging drainage. 2. 1/2” x 1/4” reducer for Fire Pump #2 sensing line gauge above FP by 8” check valve has pin hole leak needs to replaced. 3. 2 Bolts for 8” check valve on Fire Pump #2 (Tyco CV-1) have rusted & need to be replaced 09/11/2020 Churn not performed 10/21/2020 Churn not performed 11/10/2020 Churn not performed
	Pressure Gauges	Check reading and verify gauge operability	Yes		
	Controllers	Inspect electric connections	Yes		
		Operate manual and automatic starting methods	Yes		
		Verify that automatic controllers are in the automatic (AUTO) setting	Yes		
	Pumps	Start and churn to verify operability. (Where equipment permits, allow water to flow back to the source.) [Operate electric pumps for 10 minutes.]	Yes		
		Verify operation of relief valves	Yes		

Frequency	Component	Task	Record of Completion	Date	Issues
					12/07/2020 Churn not performed 01/05/2021 Churn not performed 02/09/2021 Churn not performed 03/31/2021 1. 1/2" x 1/4" reducer for sensing line gauge above FP by 8" check valve has pin hole leak needs to replaced. 2. 2 Bolts for 8" check valve (Tyco CV-1) have rusted & need to be replaced. 05/18/2021 Churn not performed 07/02/2021 Churn not performed 08/05/2021 Churn not performed 2 bolts on check valve face plate need replacement due to heavy corrosion 09/08/2021 2 bolts on check valve face plate need replacement 11/03/20212 bolts on 8" check valve have rusted and need to be replaced 12/01/2021 Churn not performed 01/10/2022 Pump began smoking after 5 minutes Churn not performed
	Pump House	Check packing leakage for proper water lubrication			
		Verify proper drainage			
	Controllers	Resolve all trouble indications			
	Control valves	Verify proper valve position	Yes	08/20/2019 10/29/2019 11/21/2019 12/04/2019 01/09/2020 02/07/2020 03/20/2020	

Frequency	Component	Task	Record of Completion	Date	Issues
				04/20/2020 05/06/2020 06/02/2020 08/10/2020 09/11/2020 10/21/2020 11/10/2020 12/07/2020 01/05/2021 02/09/2021 03/31/2021 05/18/2021 07/02/2021 08/05/2021 09/08/2021 11/03/2021 12/01/2021 01/10/2022	
Annually	Control Valves	Operate valve through entire travel to verify function			No record of annual or 2-year test ever having been performed for this pump.
2 Years	Control Valves Pumps	Lubricate valves and stems to ensure operability			
		Verify that valve supervisory switches detect a change in valve position			
		Check coupling alignment to ensure that the shaft is aligned			
	Pumps Relief valves	Check pump shaft end play			
		Lubricate bearings			
		Calibrate valves			

Frequency	Component	Task	Record of Completion	Date	Issues
	Emergency power supply	Test to verify availability and capacity for pump motor			
5 Years	Pump	Conduct flow test to verify pump output. Test may be through a flow meter returning the water to a storage reservoir or through the test header. Recirculation of water to the suction piping is not permitted. In a multi-pump installation, each pump may be tested separately at not less than 100 percent design capacity for 30 minutes.			Facility is not old enough to have required this testing.

Foam Fire Pump 1

Frequency	Component	Task	Record of Completion	Date	Issues
Monthly	Pump House	Inspect for proper condition, ventilation, and heating	Yes	08/20/2019 11/21/2019 12/04/2019 01/09/2020 02/07/2020 03/20/2020 04/20/2020 05/06/2020 07/02/2020 08/10/2020 09/11/2020 11/10/2020 12/07/2020 01/05/2021 02/09/2021 03/31/2021 05/18/2021 06/22/2021 07/02/2021 08/05/2021 09/08/2021 11/03/2021 12/01/2021 01/10/2022	09/11/2020 Pump off due to underground leak 11/10/2020 Pump off due to underground leak 12/07/2020 Pump off due to underground leak 01/05/2021 Pump off due to underground leak 02/09/2021 Pump off due to underground leak 03/31/2021 Pump off due to underground leak 05/18/2021 Pump off due to underground leak 06/22/2021 AFFF solution seeping out of the 1" discharge line from jockey pump. 1" check valve may need replacement. AFFF is leaking from the pump, seals may need replacement that is rated for AFFF or equivalent Pump off due to underground leak 07/02/2021 AFFF solution seeping out of the 1" discharge line from jockey pump. 1" check valve may need replacement. AFFF is leaking from the pump, seals may need replacement that is rated for AFFF or equivalent Pump off due to underground leak 08/05/2021 AFFF solution seeping out of the 1" discharge line from jockey pump. 1" check valve may need replacement. AFFF is leaking from the pump, seals may need replacement that is rated for AFFF or equivalent Pump off due to underground leak 11/03/2021 Slight leak under pump recommend replacing seal. Pump off due to underground leak 12/01/2021 Slight leak under pump recommend replacing seal. Pump off due to underground leak 01/10/2022 Slight leak under pump recommend replacing seal. Pump off due to underground leak
	Pressure Gauges	Check reading and verify gauge operability	Yes		
	Controllers	Inspect electric connections	Yes		
		Verify that automatic controllers are in the automatic (AUTO) setting	Yes		
		Operate manual and automatic starting methods			
	Pumps	Start and churn to verify operability. (Where equipment permits, allow water to flow back to the source.) [Operate electric pumps for 10 minutes.]			
		Verify operation of relief valves			
	Controllers Batteries	Resolve all trouble indications	Yes		

Frequency	Component	Task	Record of Completion	Date	Issues
		Verify proper valve position	Yes	08/20/2019 11/21/2019 12/04/2019 01/09/2020 02/07/2020 03/20/2020 04/20/2020 05/06/2020 07/02/2020 08/10/2020 09/11/2020 11/10/2020 12/07/2020 01/05/2021 02/09/2021 03/31/2021 05/18/2021 06/22/2021 07/02/2021 08/05/2021 09/08/2021 11/03/2021 12/01/2021 01/10/2022	09/11/2020 Pump off due to underground leak 11/10/2020 Pump off due to underground leak 12/07/2020 Pump off due to underground leak 01/05/2021 Pump off due to underground leak 02/09/2021 Pump off due to underground leak 03/31/2021 Pump off due to underground leak 05/18/2021 Pump off due to underground leak 06/22/2021 AFFF solution seeping out of the 1" discharge line from jockey pump. 1" check valve may need replacement. AFFF is leaking from the pump, seals may need replacement that is rated for AFFF or equivalent Pump off due to underground leak 07/02/2021 AFFF solution seeping out of the 1" discharge line from jockey pump. 1" check valve may need replacement. AFFF is leaking from the pump, seals may need replacement that is rated for AFFF or equivalent Pump off due to underground leak 08/05/2021 AFFF solution seeping out of the 1" discharge line from jockey pump. 1" check valve may need replacement. AFFF is leaking from the pump, seals may need replacement that is rated for AFFF or equivalent Pump off due to underground leak 11/03/2021 Slight leak under pump recommend replacing seal. Pump off due to underground leak 12/01/2021 Slight leak under pump recommend replacing seal. Pump off due to underground leak 01/10/2022 Slight leak under pump recommend replacing seal. Pump off due to underground leak

Frequency	Component	Task	Record of Completion	Date	Issues
	Control valves	Operate valve through entire travel to verify function	Yes	06/22/2021	
	Control Valves	Lubricate valves and stems to ensure operability			06/22/2021 Not performed
Semi-Annually	Foam proportioning system/foam pumps	Test pump to ensure operability.			
		Inspect proportioning system for proper valve alignment and system condition			
		Flush pumps after operation			
Annually	Control valves	Verify that valve supervisory switches detect a change in valve position			
2 Years	Control Valves Pumps	Check coupling alignment to ensure that the shaft is aligned			06/22/2021 Not performed
		Check pump shaft end play			06/22/2021 Not performed
		Lubricate bearings	Yes	06/22/2021	
	Pumps Relief valves Emergency power supply	Calibrate valves			06/22/2021 Not performed
		Test to verify availability and capacity for pump motor			06/22/2021 Not performed
5 Years	Pump	Conduct flow test to verify pump output. Test may be through a flow meter returning the water to a storage reservoir or through the test header. Recirculation of water to the suction piping is not permitted. In a multi-pump installation, each pump may be			Facility is not old enough to have required this testing.

Frequency	Component	Task	Record of Completion	Date	Issues
		tested separately at not less than 100 percent design capacity for 30 minutes.			

Foam Fire Pump 2

Frequency	Component	Task	Record of Completion	Date	Issues
Monthly	Pump House	Inspect for proper condition, ventilation, and heating	Yes	08/20/2019 11/21/2019 12/04/2019 01/09/2020 02/07/2020 03/20/2020 04/20/2020 05/06/2020 07/02/2020 08/10/2020 09/11/2020 10/21/2020 11/10/2020 12/07/2020 01/05/2021 02/09/2021 03/31/2021 05/18/2021 06/22/2021 07/02/2021 08/05/2021 09/08/2021 11/03/2021 12/01/2021 01/10/2022	09/11/2020 Pump off due to underground leak 10/21/2020 Pump off due to underground leak 11/10/2020 Pump off due to underground leak 12/07/2020 Pump off due to underground leak 01/05/2021 Pump off due to underground leak 02/09/2021 AFFF build up found under pump, recommend replacing seal in pump rated for AFFF solution. Pump off due to underground leak 03/31/2021 AFFF build up found under pump, recommend replacing seal in pump rated for AFFF solution. Pump off due to underground leak 05/18/2021 AFFF build up found under pump, recommend replacing seal in pump rated for AFFF solution. Pump off due to underground leak 06/22/2021 AFFF build up found under pump, recommend replacing seal in pump rated for AFFF solution. Pump off due to underground leak 07/02/2021 AFFF buildup under pump. Left out of service
	Pressure Gauges	Check reading and verify gauge operability	Yes		
	Controllers	Inspect electric connections	Yes		
		Verify that automatic controllers are in the automatic (AUTO) setting	Yes		
		Operate manual and automatic starting methods			
	Pumps	Start and churn to verify operability. (Where equipment permits, allow water to flow back to the source.) [Operate electric pumps for 10 minutes.]			
		Verify operation of relief valves			

Frequency	Component	Task	Record of Completion	Date	Issues
					06/22/02021 AFFF build up found under pump, recommend replacing seal in pump rated for AFFF solution or equivalent. Left out of service 08/05/2021 Slight AFFF leak found below pump, recommend replacing seal for one rated for corrosive liquids. Left out of service 09/08/2021 Slight AFFF leak found below pump, recommend replacing seal for corrosive Liquids. Pump off due to underground leak 11/03/2021 Slight leak under pump recommend replacing seal. Pump off due to underground leak 12/01/2021 Slight leak under pump recommend replacing seal. Pump off due to underground leak 01/10/2022 Slight leak under pump recommend replacing seal. Pump off due to underground leak
	Controllers	Resolve all trouble indications			
Semi-Annually	Foam proportioning system/foam pumps	Test pump to ensure operability.			
		Inspect proportioning system for proper valve alignment and system condition			
		Flush pumps after operation			
Annually	Control valves	Verify proper valve position	Yes	08/20/2019 11/21/2019 12/04/2019 01/09/2020 02/07/2020 03/20/2020 04/20/2020 05/06/2020 07/02/2020 08/10/2020	09/11/2020 Pump off due to underground leak 10/21/2020 Pump off due to underground leak 11/10/2020 Pump off due to underground leak 12/07/2020 Pump off due to underground leak 01/05/2021 Pump off due to underground leak 02/09/2021 AFFF build up found under pump, recommend replacing seal in pump rated for AFFF solution. Pump off due to underground leak

Frequency	Component	Task	Record of Completion	Date	Issues
				09/11/2020 10/21/2020 11/10/2020 12/07/2020 01/05/2021 02/09/2021 03/31/2021 05/18/2021 06/22/2021 07/02/2021 08/05/2021 09/08/2021 11/03/2021 12/01/2021 01/10/2022	03/31/2021 AFFF build up found under pump, recommend replacing seal in pump rated for AFFF solution. Pump off due to underground leak 05/18/2021 AFFF build up found under pump, recommend replacing seal in pump rated for AFFF solution. Pump off due to underground leak 02/09/2021 AFFF build up found under pump, recommend replacing seal in pump rated for AFFF solution. Pump off due to underground leak 03/31/2021 AFFF build up found under pump, recommend replacing seal in pump rated for AFFF solution. Pump off due to underground leak 05/18/2021 AFFF build up found under pump, recommend replacing seal in pump rated for AFFF solution. Pump off due to underground leak 06/22/2021 AFFF build up found under pump, recommend replacing seal in pump rated for AFFF solution or equivalent. Pump off due to underground leak 07/02/2021 AFFF buildup under pump. Left out of service 06/22/02021 AFFF build up found under pump, recommend replacing seal in pump rated for AFFF solution or equivalent. Left out of service 08/05/2021 Slight AFFF leak found below pump, recommend replacing seal for one rated for corrosive liquids. Left out of service 09/08/2021 Slight AFFF leak found below pump, recommend replacing seal for corrosive Liquids. Pump off due to underground leak 11/03/2021 Slight leak under pump recommend replacing seal. Pump off due to underground leak

Frequency	Component	Task	Record of Completion	Date	Issues
					12/01/2021 Slight leak under pump recommend replacing seal. Pump off due to underground leak 01/10/2022 Slight leak under pump recommend replacing seal. Pump off due to underground leak
2 Years	Control Valves	Operate valve through entire travel to verify function	Yes	06/22/2021	
		Lubricate valves and stems to ensure operability			06/22/2021 Not performed
		Verify that valve supervisory switches detect a change in valve position			
	Pumps	Check coupling alignment to ensure that the shaft is aligned			06/22/2021 Not performed
		Check pump shaft end play			06/22/2021 Not performed
		Lubricate bearings	Yes	06/22/2021	
	Relief valves	Calibrate valves			06/22/2021 Not performed
	Emergency power supply	Test to verify availability and capacity for pump motor			06/22/2021 Not performed
5 Years	Pump	Conduct flow test to verify pump output. Test may be through a flow meter returning the water to a storage reservoir or through the test header. Recirculation of water to the suction piping is not permitted. In a multi-pump installation, each pump may be tested separately at not less than 100 percent design capacity for 30 minutes.			Facility is not old enough to have required this testing.

H. Fire Alarm and Mass Notification System

Mass Notification ITM items should be part of this summary (however these requirements are new to the October 2021 edition of UFC 3-601-02 and are shown shaded).

FLC Adit 1 Fire Alarm MNS Maintenance Summary

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
Annually	Control Panel and Annunciator Equipment (monitored)		Test to verify proper receipt of alarm, supervisory, and trouble signals (inputs, one of each type) and operation of notification appliances and auxiliary functions (outputs, one of each type).	Yes	12/20/2019 (FLC (b) (3) (A) Node 1 FA 19120), 12/27/2019 (FLC and Node 6 19120), 09/29/2020 (FLC Node 6 20122), 11/15/2021 (FLC Node 6 FA - Nov 15, 2021), 11/17/2021 (FLC Node 2), 11/17/2021 (FLC Node 1 FA),
			Verify that all lamps and LEDs are illuminated.	Yes	12/20/2019 (FLC (b) (3) (A) ode 1 FA 19120), 12/27/2019 (FLC and Node 6 19120), 09/29/2020 (FLC ode 6 20122), 11/15/2021 (FLC ode 6 FA - Nov 15, 2021), 11/17/2021 (FLC ode 2 FA), 11/17/2021 (FLC ode 1 FA),
			Load test backup batteries using a meter (when provided)	Yes	12/20/2019 (FLC ode 1 FA 19120), 12/27/2019 (FLC and Node 6 19120), 09/29/2020 (FLC ode 6 20122), Batteries for Nod P failed the load test. 11/15/2021 (FLC ode 6 FA - Nov 15, 2021), Batteries for Nod P failed the load test. 11/17/2021 (FLC ode 2 FA), 11/17/2021 (FLC ode 1 FA),
			Verify condition of power supplies and batteries.	Yes	12/20/2019 (FLC ode 1 FA 19120), 12/27/2019 (FLC and Node 6 19120), 09/29/2020 (FLC ode 6 20122),

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date (b) (3) (A)
					11/15/2021 (FLC ode 6 FA - Nov 15, 2021), 11/17/2021 (FLC ode 2 FA), 11/17/2021 (FLC ode 1 FA),
			Resolve any trouble indications		
	Remote Power Supplies and Notification Appliance Circuit Power Extenders		Verify that all lamps and LEDs are illuminated.	Yes	12/20/2019 (FLC ode 1 FA 19120), 12/27/2019 (FLC and Node 6 19120), 09/29/2020 (FLC ode 6 20122), 11/17/2021 (FLC ode 2 FA), 11/17/2021 (FLC ode 1 FA),
			Load test backup batteries using a meter (when provided)	Yes	12/20/2019 (FLC ode 1 FA 19120 Batteries Node 1 0 & PM-9 failed the load test. 12/27/2019 (FLC and Node 6 19120), 09/29/2020 (FLC 20122), 11/17/2021 (FLC ode 2 FA), 11/17/2021 (FLC ode 1 FA), Batteries in pow y N8 UGPH, CAB1B RPS 3, CHG120 RPS N1 gfisher IRAC-2 failed.
			Verify condition of power supplies and batteries.	Yes	12/20/2019 (FLC ode 1 FA 19120), 12/27/2019 (FLC and Node 6 19120), 09/29/2020 (FLC ode 6 20122), 11/17/2021 (FLC ode 2 FA), 11/17/2021 (FLC ode 1 FA),
	Initiating devices	Manual Fire Alarm Stations	Verify station is accessible (visual)	Yes	12/20/2019 (FLC ode 1 FA 19120), 12/27/2019 (FLC and Node 6 19120), 11/17/2021 (FLC ode 2 FA), 11/17/2021 (FLC ode 1 FA),
		Radiant Energy-Sensing Detectors (Optical Detectors)	If used for releasing service, inhibit releasing function	Yes	12/27/2019 (FLC and Node 6 19120), 09/29/2020 (FLC ode 6 20122), 11/15/2021 (FLC ode 6 FA - Nov 15, 2021),
			Test to verify alarm initiation and receipt	Yes	12/27/2019 (FLC and Node 6 19120), 09/29/2020 (FLC ode 6 20122),

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date (b) (3) (A)
					11/15/2021 (FLC Node 6 FA - Nov 15, 2021),
			Verify that no facility changes affect performance	Yes	12/27/2019 (FLC and Node 6 19120), 09/29/2020 (FLC Node 6 20122), 11/15/2021 (FLC Node 6 FA - Nov 15, 2021),
			Verify alignment of the positioning markings at all adjustment locations	No	
			If used for releasing service, configure system for automatic operation	Yes	12/27/2019 (FLC and Node 6 19120), 09/29/2020 (FLC Node 6 20122), 11/15/2021 (FLC Node 6 FA - Nov 15, 2021),
			If used for releasing service, restore to releasing service	Yes	12/27/2019 (FLC and Node 6 19120), 09/29/2020 (FLC Node 6 20122), 11/15/2021 (FLC Node 6 FA - Nov 15, 2021),
		Smoke Detectors (Single-station)	Test with manufacturer-approved smoke simulant to verify smoke entry and alarm initiation and receipt.	Yes	12/20/2019 (FLC Node 1 FA 19120), 12/27/2019 (FLC and Node 6 19120), 11/17/2021 (FLC Node 2 FA), 11/17/2021 (FLC Node 1 FA),
			Verify that no facility changes affects performance.		12/20/2019 (FLC Node 1 FA 19120), 12/27/2019 (FLC and Node 6 19120), 11/17/2021 (FLC Node 2 FA), 11/17/2021 (FLC Node 1 FA),
		Supervisory Devices	Test to verify initiation and receipt of supervisory alarm	Yes	12/20/2019 (FLC Node 1 FA 19120), 12/27/2019 (FLC and Node 6 19120),
	Notification Appliances and Voice Communication (telephone, speakers,		Test to verify operability	Yes	12/20/2019 (FLC Node 1 FA 19120), 12/27/2019 (FLC and Node 6 19120), 11/17/2021 (FLC Node 1 FA), A/Vs not tested.

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
	horns, and strobe lights)				
	Radio Alarm Transmitters and Receivers		Test to verify operability		12/20/2019 (FLC [redacted] Node 1 FA 19120), 12/27/2019 (FLC [redacted] and Node 6 19120), 09/29/2020 (FLC [redacted] Node 6 20122), 11/15/2021 (FLC [redacted] Node 6 FA - Nov 15, 2021), 11/17/2021 (FLC [redacted] Node 2 FA), Kingfisher transmitter not sending signals to RDC.
	Fire Alarm Control Panel with Integrated Mass Notification (FMCP)		Test to verify proper receipt of signals (inputs) from Local Operating Consoles (LOCs) and the Installation's site-wide system and operation of notification appliances and auxiliary functions (outputs).		
	LOCs		Verify station is accessible (visual).		
	Text Message Signs		Test to verify operability		
2 Years	Initiating Devices	Manual Fire Alarm Stations	Operate to verify alarm receipt	Yes	12/20/2019 (FLC [redacted] Node 1 FA 19120), 12/27/2019 (FLC [redacted] and Node 6 19120), 11/17/2021 (FLC [redacted] Node 2 FA) 11/17/2021 (FLC [redacted] Node 1 FA),
		Heat Detectors (restorable)	Test with a heat source to verify alarm initiating and receipt	Yes	12/20/2019 (FLC [redacted] Node 1 FA 19120), 12/27/2019 (FLC [redacted] and Node 6 19120), 11/17/2021 (FLC [redacted] Node 2 FA), 11/17/2021 (FLC [redacted] Node 1 FA),
			Verify that no facility changes affect performance	Yes	12/20/2019 (FLC [redacted] Node 1 FA 19120), 12/27/2019 (FLC [redacted] and Node 6 19120), 11/17/2021 (FLC [redacted] Node 2 FA),

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
					11/17/2021 (FLC [redacted] lode 1 FA),
		Smoke Detectors	Test with manufacturer-approved smoke simulant to verify smoke entry and alarm initiation and receipt	Yes	12/20/2019 (FLC [redacted] lode 1 FA 19120), 12/27/2019 (FLC [redacted] and Node 6 19120), 11/17/2021 (FLC [redacted] lode 2 FA), 11/17/2021 (FLC [redacted] lode 1 FA),
			Verify that no facility changes affect performance	Yes	12/20/2019 (FLC [redacted] lode 1 FA 19120), 12/27/2019 (FLC [redacted] and Node 6 19120), 11/17/2021 (FLC [redacted] lode 2 FA), 11/17/2021 (FLC [redacted] lode 1 FA),
		Supervisory Devices	Test to verify initiation and receipt of supervisory alarm	Yes	12/27/2019 (FLC [redacted] and Node 6 19120),
	FMCP and LOCs		Operate microphone to verify proper operation		
			Operate all pre-recorded message activation switches to verify proper operation.		
			Operate all notification zone selection switches, if provided, to verify proper operation.		
5 Years	Smoke Detectors		Test detector sensitivity to ensure that the detector has remained within its listed and marked sensitivity range (or 4 percent obscuration light gray smoke, if not marked)		Facility is not old enough to have required this testing.

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
10 Years	Initiating devices	Carbon Monoxide Detectors	Replace detectors		
		Radiant Energy-Sensing Detectors (Optical Detectors)	Verify manufacturer's service life for detection elements. UV detection element's normal service life is 10 years; others vary by manufacturer		
			Replace detectors which have exceeded manufacturer's recommended service life for detection elements.		
20 Years	Initiating devices	Smoke Detectors	Replace detectors		
		Air Sampling Smoke Detectors	Replace detection element		
	Control Panel and Annunciator Equipment (monitored)		Verify manufacturer's service life for control elements		
			Verify manufacturer has continued technical and parts support for the specific model		
			Replace control equipment that has exceeded manufacturer's recommended service life limits or if the manufacturer has ceased to provide technical and parts support		

FLC Adit 2 Fire Alarm MNS Maintenance Summary

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date (b) (3) (A)
Annually	Control Panel and Annunciator Equipment (monitored)		Test to verify proper receipt of alarm, supervisory, and trouble signals (inputs, one of each type) and operation of notification appliances and auxiliary functions (outputs, one of each type).	Yes	05/13/2019 (FL Node11), 01/09/2020 (FL Node11 19120), 11/30/2020 (FL Node11 20122 - November 30, 2020), 02/11/2022 (FL Node 11 FA)
			Verify that all lamps and LEDs are illuminated.	Yes	05/13/2019 (FL Node11), 01/09/2020 (FL Node11 19120), 11/30/2020 (FL Node11 20122 - November 30, 2020), 02/11/2022 (FL Node 11 FA),
			Load test backup batteries using a meter (when provided)	Yes	05/13/2019 (FL Node11), 01/09/2020 (FL Node11 19120), 11/30/2020 (FL Node11 20122 - November 30, 2020),
			Verify condition of power supplies and batteries.	Yes	05/13/2019 (FL Node11), 01/09/2020 (FL Node11 19120), 11/30/2020 (FL Node11 20122 - November 30, 2020)
			Resolve any trouble indications		
	Remote Power Supplies and Notification Appliance		Verify that all lamps and LEDs are illuminated.	Yes	05/13/2019 (FL Node11), 01/09/2020 (FL Node11 19120), 11/30/2020 (FL Node11 20122 - November 30, 2020), 02/11/2022 (FL Node 11 FA),

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
	Circuit Power Extenders		Load test backup batteries using a meter (when provided)	Yes	05/13/2019 (FLC [redacted] Node11), 01/09/2020 (FLC [redacted] Node11 19120), 11/30/2020 (FLC [redacted] Node11 20122 -November 30, 2020),
			Verify condition of power supplies and batteries.	Yes	05/13/2019 (FLC [redacted] Node11), 01/09/2020 (FLC [redacted] Node11 19120), 11/30/2020 (FLC [redacted] Node11 20122 - November 30, 2020),
	Initiating devices	Manual Fire Alarm Stations	Verify station is accessible (visual)	Yes	05/13/2019 (FLC [redacted] Node11), 01/09/2020 (FLC [redacted] Node11 19120), 11/30/2020 (FLC [redacted] Node11 20122 - November 30, 2020), 02/11/2022 (FLC [redacted] Node 11 FA),
	Notification Appliances and Voice Communication (telephone, speakers, horns, and strobe lights)		Test to verify operability	Yes	05/13/2019 (FLC [redacted] Node11), 01/09/2020 (FLC [redacted] Node11 19120), 11/30/2020 (FLC [redacted] Node11 20122 - November 30, 2020),
	Radio Alarm Transmitters and Receivers		Test to verify operability		05/13/2019 (FLC [redacted] Node11), 01/09/2020 (FLC [redacted] Node11 19120), 11/30/2020 (FLC [redacted] Node11 20122 - November 30, 2020), Kingfisher transmitter not sending signals to RDC.
	Fire Alarm Control Panel with Integrated Mass		Test to verify proper receipt of signals (inputs) from Local Operating Consoles (LOCs) and the Installation's site-wide		

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
	Notification (FMCP)		system and operation of notification appliances and auxiliary functions (outputs).		
	LOCs		Verify station is accessible (visual).		
	Text Message Signs		Test to verify operability		(b) (3) (A)
2 Years	Initiating Devices	Manual Fire Alarm Stations	Operate to verify alarm receipt	Yes	05/13/2019 (FLC [redacted] Node11), 01/09/2020 (FLC [redacted] Node11 19120), 11/30/2020 (FLC [redacted] Node11 20122 - November 30, 2020), 02/11/2022 (FLC [redacted] Node 11 FA),
		Heat Detectors (restorable)	Test with a heat source to verify alarm initiating and receipt	Yes	05/13/2019 (FLC [redacted] Node11), 01/09/2020 (FLC [redacted] Node11 19120), 11/30/2020 (FLC [redacted] Node11 20122 - November 30, 2020), 02/11/2022 (FLC [redacted] Node 11 FA),
			Verify that no facility changes affect performance	Yes	05/13/2019 (FLC [redacted] Node11), 01/09/2020 (FLC [redacted] Node11 19120), 11/30/2020 (FLC [redacted] Node11 20122 - November 30, 2020), 02/11/2022 (FLC [redacted] Node 11 FA)
	FMCP and LOCs		Operate microphone to verify proper operation		
			Operate all pre-recorded message activation switches to verify proper operation.		
			Operate all notification zone selection switches, if		

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
			provided, to verify proper operation.		
5 Years	Smoke Detectors		Test detector sensitivity to ensure that the detector has remained within its listed and marked sensitivity range (or 4 percent obscuration light gray smoke, if not marked)		Facility is not old enough to have required this testing.
10 Years	Initiating devices	Radiant Energy-Sensing Detectors (Optical Detectors)	Verify manufacturer's service life for detection elements. UV detection element's normal service life is 10 years; others vary by manufacturer		
		Radiant Energy-Sensing Detectors (Optical Detectors)	Replace detectors which have exceeded manufacturer's recommended service life for detection elements.		
		Smoke Detectors	Replace detectors		
20 Years	Initiating devices		Verify manufacturer's service life for control elements		
	Control Panel and Annunciator Equipment (monitored)		Verify manufacturer has continued technical and parts support for the specific model		
			Replace control equipment that has exceeded manufacturer's		

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
			recommended service life limits or if the manufacturer has ceased to provide technical and parts support		

FLC Adit 3 Fire Alarm MNS Maintenance Summary

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
Annually	Control Panel and Annunciator Equipment (monitored)		Test to verify proper receipt of alarm, supervisory, and trouble signals (inputs, one of each type) and operation of notification appliances and auxiliary functions (outputs, one of each type).	Yes	05/24/2019 (FLC [redacted] Node 33 and Node 37), 03/27/2020 (FLC [redacted] Node 33 and Node 37 19120), 04/30/2021 (FLC [redacted] Node 33 and Node 37 20122)
			Verify that all lamps and LEDs are illuminated.	Yes	05/24/2019 (FLC [redacted] Node 33 and Node 37), 03/27/2020 (FLC [redacted] Node 33 and Node 37 19120), 04/30/2021 (FLC [redacted] Node 33 and Node 37 20122)
			Load test backup batteries using a meter (when provided)	Yes	05/24/2019 (FLC [redacted] Node 33 and Node 37), 03/27/2020 (FLC [redacted] Node 33 and Node 37 19120), 04/30/2021 (FLC [redacted] Node 33 and Node 37 20122)
			Verify condition of power supplies and batteries.	Yes	05/24/2019 (FLC [redacted] Node 33 and Node 37), 03/27/2020 (FLC [redacted] Node 33 and Node 37 19120), 04/30/2021 (FLC [redacted] Node 33 and Node 37 20122)
			Resolve any trouble indications		
	Remote Power Supplies and Notification Appliance Circuit Power Extenders		Verify that all lamps and LEDs are illuminated.	Yes	05/24/2019 (FLC [redacted] Node 33 and Node 37), 03/27/2020 (FLC [redacted] Node 33 and Node 37 19120), 04/30/2021 (FLC [redacted] Node 33 and Node 37 20122)
			Load test backup batteries using a meter (when provided)	Yes	05/24/2019 (FLC [redacted] Node 33 and Node 37), 03/27/2020 (FLC [redacted] Node 33 and Node 37 19120), 04/30/2021 (FLC [redacted] Node 33 and Node 37 20122)
			Verify condition of power supplies and batteries.	Yes	05/24/2019 (FLC [redacted] Node 33 and Node 37), 03/27/2020 (FLC [redacted] Node 33 and Node 37 19120), 04/30/2021 (FLC [redacted] Node 33 and Node 37 20122)

(b) (3) (A)

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
	Initiating devices	Manual Fire Alarm Stations	Verify station is accessible (visual)	Yes	05/24/2019 (FLC [redacted] Node 33 and Node 37), 03/27/2020 (FLC [redacted] Node 33 and Node 37 19120), 04/30/2021 (FLC [redacted] Node 33 and Node 37 20122),
	Notification Appliances and Voice Communication (telephone, speakers, horns, and strobe lights)		Test to verify operability	Yes	05/24/2019 (FLC [redacted] Node 33 and Node 37), 03/27/2020 (FLC [redacted] Node 33 and Node 37 19120), 04/30/2021 (FLC [redacted] Node 33 and Node 37 20122)
	Radio Alarm Transmitters and Receivers		Test to verify operability	Yes	05/24/2019 (FLC [redacted] Node 33 and Node 37), 03/27/2020 (FLC [redacted] Node 33 and Node 37 19120), Kingfisher transm [redacted] d not transmit signals to RDC. 04/30/2021 (FLC [redacted] Node 33 and Node 37 20122)
	Fire Alarm Control Panel with Integrated Mass Notification (FMCP)		Test to verify proper receipt of signals (inputs) from Local Operating Consoles (LOCs) and the Installation's site-wide system and operation of notification appliances and auxiliary functions (outputs).		
	LOCs		Verify station is accessible (visual).		
	Text Message Signs		Test to verify operability		
2 Years	Initiating Devices	Manual Fire Alarm Stations	Operate to verify alarm receipt	Yes	05/24/2019 (FLC [redacted] Node 33 and Node 37), 03/27/2020 (FLC [redacted] Node 33 and Node 37 19120), 04/30/2021 (FLC [redacted] Node 33 and Node 37 20122)

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
		Heat Detectors (restorable)	Test with a heat source to verify alarm initiating and receipt	Yes	05/24/2019 (FLC [redacted] Node 33 and Node 37), FHD N37L2M53 d[redacted]activate. 03/27/2020 (FLC [redacted] Node 33 and Node 37 19120), 04/30/2021 (FLC [redacted] Node 33 and Node 37 20122)
			Verify that no facility changes affect performance	Yes	05/24/2019 (FLC [redacted] Node 33 and Node 37), 03/27/2020 (FLC [redacted] Node 33 and Node 37 19120), 04/30/2021 (FLC [redacted] Node 33 and Node 37 20122)
		Supervisory Devices	Test to verify initiation and receipt of supervisory alarm	Yes	05/24/2019 (FLC [redacted] Node 33 and Node 37), 03/27/2020 (FLC [redacted] Node 33 and Node 37 19120), 04/30/2021 (FLC [redacted] Node 33 and Node 37 20122)
	FMCP and LOCs		Operate microphone to verify proper operation		
			Operate all pre-recorded message activation switches to verify proper operation.		
			Operate all notification zone selection switches, if provided, to verify proper operation.		
5 Years	Smoke Detectors		Test detector sensitivity to ensure that the detector has remained within its listed and marked sensitivity range (or 4 percent obscuration light gray smoke, if not marked)		Facility is not old enough to have required this testing.
	Initiating Devices	Radiant Energy-Sensing Detectors	Verify manufacturer's service life for detection elements. UV detection element's normal service		

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
		(Optical Detectors)	life is 10 years; others vary by manufacturer		
			Replace detectors which have exceeded manufacturer's recommended service life for detection elements.		
20 Years	Initiating devices	Smoke Detectors	Replace detectors		
	Control Panel and Annunciator Equipment (monitored)		Verify manufacturer's service life for control elements		
			Verify manufacturer has continued technical and parts support for the specific model		
			Replace control equipment that has exceeded manufacturer's recommended service life limits or if the manufacturer has ceased to provide technical and parts support		

FLC Adit 6 fire Alarm MNS Maintenance Summary

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date (b) (3) (A)
Annually	Control Panel and Annunciator Equipment (monitored)		Test to verify proper receipt of alarm, supervisory, and trouble signals (inputs, one of each type) and operation of notification appliances and auxiliary functions (outputs, one of each type).	Yes	11/05/2019 (FLC Node 53 19120), 10/30/2020 (FLC Node 53 20122), 11/30/2020 (FLC Node 53 FA - Nove 19, 2021)
			Verify that all lamps and LEDs are illuminated.	Yes	11/05/2019 (FLC Node 53 53 19120), 10/30/2020 (FLC Node 53 20122), 11/19/2021 (FLC Node 53 FA - Nove 19, 2021)
			Load test backup batteries using a meter (when provided)	Yes	11/05/2019 (FLC Node 53 19120), Batteries for Gam FACP failed the load test. 10/30/2020 (FLC Node 53 20122), 11/19/2021 (FLC Node 53 FA - Nove 19, 2021) Batteries for Nod ACP failed the load test
			Verify condition of power supplies and batteries.	Yes	11/05/2019 (FLC Node 53 19120), 10/30/2020 (FLC Node 53 20122), 11/19/2021 (FLC Node 53 FA - Nove 19, 2021)
			Resolve any trouble indications		
	Remote Power Supplies and Notification Appliance Circuit Power Extenders		Verify that all lamps and LEDs are illuminated.	Yes	11/05/2019 (FLC Node 53 19120), 10/30/2020 (FLC Node 53 20122), 11/19/2021 (FLC Node 53 FA - Nove 19, 2021)
			Load test backup batteries using a meter (when provided)	Yes	11/05/2019 (FLC Node 53 19120), 10/30/2020 (FLC Node 53 20122), 11/19/2021 (FLC Node 53 FA - Nove 19, 2021)
			Verify condition of power supplies and batteries.	Yes	11/05/2019 (FLC Node 53 19120), 10/30/2020 (FLC Node 53 20122), 11/19/2021 (FLC Node 53 FA - Nove 19, 2021)

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
	Initiating devices	Manual Fire Alarm Stations	Verify station is accessible (visual)	Yes	11/05/2019 (FLC [redacted] lode 53 19120), 10/30/2020 (FLC [redacted] lode 53 20122), 11/19/2021 (FLC [redacted] lode 53 FA - Nove 19, 2021)
	Notification Appliances and Voice Communication (telephone, speakers, horns, and strobe lights)		Test to verify operability	Yes	11/05/2019 (FLC [redacted] lode 53 19120), 10/30/2020 (FLC [redacted] lode 53 20122),
	Radio Alarm Transmitters and Receivers		Test to verify operability	Yes	11/05/2019 (FLC [redacted] Node 53 19120), Radio transmitter [redacted] t transmit signals to RDC. 10/30/2020 (FLC [redacted] lode 53 20122), Radio transmitter [redacted] t transmit signals to RDC. 11/30/2020 (FLC [redacted] lode 53 FA - Nove 19, 2021)
	Fire Alarm Control Panel with Integrated Mass Notification (FMCP)		Test to verify proper receipt of signals (inputs) from Local Operating Consoles (LOCs) and the Installation's site-wide system and operation of notification appliances and auxiliary functions (outputs).		
	LOCs		Verify station is accessible (visual).		
	Text Message Signs		Test to verify operability		

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
2 Years	Initiating Devices	Manual Fire Alarm Stations	Operate to verify alarm receipt	Yes	11/05/2019 (FLC [redacted] Node 53 19120), 10/30/2020 (FLC [redacted] Node 53 20122), 11/19/2021 (FLC [redacted] Node 53 FA - Nove 19, 2021)
		Heat Detectors (restorable)	Test with a heat source to verify alarm initiating and receipt	Yes	11/05/2019 (FLC [redacted] Node 53 19120), 10/30/2020 (FLC [redacted] Node 53 20122), 11/19/2021 (FLC [redacted] Node 53 FA - Nove 19, 2021) FHD N53L1M41 c [redacted] activate.
			Verify that no facility changes affect performance	Yes	11/05/2019 (FLC [redacted] Node 53 19120), 10/30/2020 (FLC [redacted] Node 53 20122), 11/19/2021 (FLC [redacted] Node 53 FA - Nove 19, 2021)
		Supervisory Devices	Test to verify initiation and receipt of supervisory alarm	Yes	11/05/2019 (FLC [redacted] Node 53 19120), 10/30/2020 (FLC [redacted] Node 53 20122),
	FMCP and LOCs		Operate microphone to verify proper operation		
			Operate all pre-recorded message activation switches to verify proper operation.		
			Operate all notification zone selection switches, if provided, to verify proper operation.		
5 Years	Smoke Detectors		Test detector sensitivity to ensure that the detector has remained within its listed and marked sensitivity range (or 4 percent obscuration light gray smoke, if not marked)		Facility is not old enough to have required this testing.

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
		Radiant Energy-Sensing Detectors (Optical Detectors)	Verify manufacturer's service life for detection elements. UV detection element's normal service life is 10 years; others vary by manufacturer		
			Replace detectors which have exceeded manufacturer's recommended service life for detection elements.		
20 Years	Initiating devices	Smoke Detectors	Replace detectors		
	Control Panel and Annunciator Equipment (monitored)		Verify manufacturer's service life for control elements		
			Verify manufacturer has continued technical and parts support for the specific model		
			Replace control equipment that has exceeded manufacturer's recommended service life limits or if the manufacturer has ceased to provide technical and parts support		

FLC Harbor Tunnel Fire Alarm MNS Maintenance Summary

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
Annually	Control Panel and Annunciator Equipment (monitored)		Test to verify proper receipt of alarm, supervisory, and trouble signals (inputs, one of each type) and operation of notification appliances and auxiliary functions (outputs, one of each type).	Yes	02/11/2020 (FLC Node 21 Harbor Tunnel 19120), 03/02/2020 (FLC Node 31 Harbor Tunnel 19120), 01/29/2021 (FLC Node 21 Harbor Tunnel 20122), 02/04/2021 (FLC Node 31 Harbor Tunnel 20122), 02/15/2022 (FLC Harbor Tunnel Node 21 FA), 02/16/2022 (FLC Harbor Tunnel Node 31 FA),
			Verify that all lamps and LEDs are illuminated.	Yes	02/11/2020 (FLC Node 21 Harbor Tunnel 19120), 03/02/2020 (FLC Node 31 Harbor Tunnel 19120), 01/29/2021 (FLC Node 21 Harbor Tunnel 20122), 02/04/2021 (FLC Node 31 Harbor Tunnel 20122), 02/15/2022 (FLC Harbor Tunnel Node 21 FA), 02/16/2022 (FLC Harbor Tunnel Node 31 FA),
			Load test backup batteries using a meter (when provided)	Yes	02/11/2020 (FLC Node 21 Harbor Tunnel 19120), 03/02/2020 (FLC Node 31 Harbor Tunnel 19120), 01/29/2021 (FLC Node 21 Harbor Tunnel 20122), 02/04/2021 (FLC Node 31 Harbor Tunnel 20122),
			Verify condition of power supplies and batteries.	Yes	02/11/2020 (FLC Node 21 Harbor Tunnel 19120), 03/02/2020 (FLC Node 31 Harbor Tunnel 19120), 01/29/2021 (FLC Node 21 Harbor Tunnel 20122), 02/04/2021 (FLC Node 31 Harbor Tunnel 20122), 02/15/2022 (FLC Harbor Tunnel Node 21 FA), 02/16/2022 (FLC Harbor Tunnel Node 31 FA),
			Resolve any trouble indications		
	Remote Power Supplies and Notification		Verify that all lamps and LEDs are illuminated.	Yes	02/11/2020 (FLC Node 21 Harbor Tunnel 19120), 03/02/2020 (FLC Node 31 Harbor Tunnel 19120), 01/29/2021 (FLC Node 21 Harbor Tunnel 20122), 02/04/2021 (FLC Node 31 Harbor Tunnel 20122),

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
	Appliance Circuit Power Extenders				02/15/2022 (FLC Harbor Tunnel Node 21 FA), 02/16/2022 (FLC Harbor Tunnel Node 31 FA),
			Load test backup batteries using a meter (when provided)	Yes	03/02/2020 (FLC Node 31 Harbor Tunnel 19120), 01/29/2021 (FLC Node 21 Harbor Tunnel 20122), 02/04/2021 (FLC Node 31 Harbor Tunnel 20122), 02/15/2022 (FLC Harbor Tunnel Node 21 FA), Batteries failed equipment Cabinet #22. 02/16/2022 (FLC Harbor Tunnel Node 31 FA), Batteries leaking acid equipment cabinet #40. Batteries not tested cabinet #38.
			Verify condition of power supplies and batteries.	Yes	02/11/2020 (FLC Node 21 Harbor Tunnel 19120), 03/02/2020 (FLC Node 31 Harbor Tunnel 19120), 01/29/2021 (FLC Node 21 Harbor Tunnel 20122), 02/04/2021 (FLC Node 31 Harbor Tunnel 20122), 02/15/2022 (FLC Harbor Tunnel Node 21 FA), 02/16/2022 (FLC Harbor Tunnel Node 31 FA),
	Initiating devices	Manual Fire Alarm Stations	Verify station is accessible (visual)	Yes	02/11/2020 (FLC Node 21 Harbor Tunnel 19120), 03/02/2020 (FLC Node 31 Harbor Tunnel 19120), 01/29/2021 (FLC Node 21 Harbor Tunnel 20122), 02/04/2021 (FLC Node 31 Harbor Tunnel 20122), 02/15/2022 (FLC Harbor Tunnel Node 21 FA), 02/16/2022 (FLC Harbor Tunnel Node 31 FA),
	Notification Appliances and Voice Communication (telephone, speakers, horns, and strobe lights)		Test to verify operability	Yes	02/11/2020 (FLC Node 21 Harbor Tunnel 19120), 03/02/2020 (FLC Node 31 Harbor Tunnel 19120), 01/29/2021 (FLC Node 21 Harbor Tunnel 20122), 02/04/2021 (FLC Node 31 Harbor Tunnel 20122), 02/15/2022 (FLC Harbor Tunnel Node 21 FA), Two MPS with incorrect printed label noted. 02/16/2022 (FLC Harbor Tunnel Node 31 FA), A/V devices not tested.

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
	Radio Alarm Transmitters and Receivers		Test to verify operability		02/11/2020 (FLC Node 21 Harbor Tunnel 19120), 03/02/2020 (FLC Node 31 Harbor Tunnel 19120), 01/29/2021 (FLC Node 21 Harbor Tunnel 20122), 02/04/2021 (FLC Node 31 Harbor Tunnel 20122), 02/15/2022 (FLC Harbor Tunnel Node 21 FA), Kingfisher transmitter did not transmit signals to RDC. 02/16/2022 (FLC Harbor Tunnel Node 31 FA), Kingfisher transmitter did not transmit signals to RDC.
	Fire Alarm Control Panel with Integrated Mass Notification (FMCP)		Test to verify proper receipt of signals (inputs) from Local Operating Consoles (LOCs) and the Installation's site-wide system and operation of notification appliances and auxiliary functions (outputs).		
	LOCs		Verify station is accessible (visual).		
	Text Message Signs		Test to verify operability		
2 Years	Initiating Devices	Manual Fire Alarm Stations	Operate to verify alarm receipt	Yes	02/11/2020 (FLC Node 21 Harbor Tunnel 19120), 03/02/2020 (FLC Node 31 Harbor Tunnel 19120), 01/29/2021 (FLC Node 21 Harbor Tunnel 20122), 02/04/2021 (FLC Node 31 Harbor Tunnel 20122), 02/15/2022 (FLC Harbor Tunnel Node 21 FA), 02/16/2022 (FLC Harbor Tunnel Node 31 FA),
		Heat Detectors (restorable)	Test with a heat source to verify alarm initiating and receipt	Yes	02/11/2020 (FLC Node 21 Harbor Tunnel 19120), 03/02/2020 (FLC Node 31 Harbor Tunnel 19120), 01/29/2021 (FLC Node 21 Harbor Tunnel 20122), 02/04/2021 (FLC Node 31 Harbor Tunnel 20122),

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
					02/15/2022 (FLC Harbor Tunnel Node 21 FA), 02/16/2022 (FLC Harbor Tunnel Node 31 FA),
			Verify that no facility changes affect performance	Yes	02/11/2020 (FLC Node 21 Harbor Tunnel 19120), 03/02/2020 (FLC Node 31 Harbor Tunnel 19120), 01/29/2021 (FLC Node 21 Harbor Tunnel 20122), 02/04/2021 (FLC Node 31 Harbor Tunnel 20122), 02/15/2022 (FLC Harbor Tunnel Node 21 FA), 02/16/2022 (FLC Harbor Tunnel Node 31 FA),
		Supervisory Devices	Test to verify initiation and receipt of supervisory alarm	Yes	02/11/2020 (FLC Node 21 Harbor Tunnel 19120), 03/02/2020 (FLC Node 31 Harbor Tunnel 19120), 01/29/2021 (FLC Node 21 Harbor Tunnel 20122), 02/04/2021 (FLC Node 31 Harbor Tunnel 20122), 02/15/2022 (FLC Harbor Tunnel Node 21 FA), 02/16/2022 (FLC Harbor Tunnel Node 31 FA),
	FMCP and LOCs		Operate microphone to verify proper operation		
			Operate all pre-recorded message activation switches to verify proper operation.		
			Operate all notification zone selection switches, if provided, to verify proper operation.		
5 Years	Smoke Detectors		Test detector sensitivity to ensure that the detector has remained within its listed and marked sensitivity range (or 4 percent obscuration light gray smoke, if not marked)		Facility is not old enough to have required this testing.

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
10 Years	Initiating devices	Radiant Energy-Sensing Detectors (Optical Detectors)	Verify manufacturer's service life for detection elements. UV detection element's normal service life is 10 years; others vary by manufacturer		
			Replace detectors which have exceeded manufacturer's recommended service life for detection elements.		
20 Years	Initiating devices	Smoke Detectors	Replace detectors		
	Control Panel and Annunciator Equipment (monitored)		Verify manufacturer's service life for control elements		
			Verify manufacturer has continued technical and parts support for the specific model		
			Replace control equipment that has exceeded manufacturer's recommended service life limits or if the manufacturer has ceased to provide technical and parts support		

FLC Lower Tunnel (Gauger Station) Fire Alarm MNS Maintenance Summary

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
Annually	Control Panel and Annunciator Equipment (monitored)		Test to verify proper receipt of alarm, supervisory, and trouble signals (inputs, one of each type) and operation of notification appliances and auxiliary functions (outputs, one of each type).	Yes	03/14/2019 (FA report Lower Tunnel), 04/02/2020 (FLC Lower Tunnel N44 and Node 23 19120),
			Verify that all lamps and LEDs are illuminated.	Yes	03/14/2019 (FA report Lower Tunnel), 04/02/2020 (FLC Lower Tunnel N44 and Node 23 19120),
			Load test backup batteries using a meter (when provided)	Yes	03/14/2019 (FA report Lower Tunnel), 04/02/2020 (FLC Lower Tunnel N44 and Node 23 19120),
			Verify condition of power supplies and batteries.	Yes	03/14/2019 (FA report Lower Tunnel), 04/02/2020 (FLC Lower Tunnel N44 and Node 23 19120),
			Resolve any trouble indications		
	Remote Power Supplies and Notification Appliance Circuit Power Extenders		Verify that all lamps and LEDs are illuminated.	Yes	03/14/2019 (FA report Lower Tunnel), 04/02/2020 (FLC Lower Tunnel N44 and Node 23 19120),
			Load test backup batteries using a meter (when provided)	Yes	03/14/2019 (FA report Lower Tunnel), 04/02/2020 (FLC Lower Tunnel N44 and Node 23 19120), Batteries in cabinets #58, #61, #65, #68, #69, #71 & #72 failed.
			Verify condition of power supplies and batteries.	Yes	03/14/2019 (FA report Lower Tunnel), 04/02/2020 (FLC Lower Tunnel N44 and Node 23 19120),
	Initiating devices	Manual Fire Alarm Stations	Verify station is accessible (visual)	Yes	03/14/2019 (FA report Lower Tunnel), 04/02/2020 (FLC Lower Tunnel N44 and Node 23 19120),
		Radiant Energy-Sensing Detectors	If used for releasing service, inhibit releasing function		03/14/2019 (FA report Lower Tunnel), 04/02/2020 (FLC Lower Tunnel N44 and Node 23 19120),

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
		(Optical Detectors)	Test to verify alarm initiation and receipt		03/14/2019 (FA report Lower Tunnel), UV/IR detector N23L2M99 did not activate. 04/02/2020 (FLC Lower Tunnel N44 and Node 23 19120), UV/IR detector N23L2M99 did not activate
			Verify that no facility changes affect performance		03/14/2019 (FA report Lower Tunnel), 04/02/2020 (FLC Lower Tunnel N44 and Node 23 19120),
			Verify alignment of the positioning markings at all adjustment locations		
			If used for releasing service, configure system for automatic operation		
			If used for releasing service, restore to releasing service		
	Notification Appliances and Voice Communication (telephone, speakers, horns, and strobe lights)		Test to verify operability	Yes	03/14/2019 (FA report Lower Tunnel), 04/02/2020 (FLC Lower Tunnel N44 and Node 23 19120), Speaker Circuit with 6 speakers from cabinet \$59 did not activate.
	Radio Alarm Transmitters and Receivers		Test to verify operability	Yes	03/14/2019 (FA report Lower Tunnel), 04/02/2020 (FLC Lower Tunnel N44 and Node 23 19120), Kingfisher transmitter did not transmit signal to RDC.
	Fire Alarm Control Panel with Integrated		Test to verify proper receipt of signals (inputs) from Local Operating Consoles (LOCs) and the		

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
	Mass Notification (FMCP)		Installation's site-wide system and operation of notification appliances and auxiliary functions (outputs).		
	LOCs		Verify station is accessible (visual).		
	Text Message Signs		Test to verify operability		
2 Years	Initiating Devices	Manual Fire Alarm Stations	Operate to verify alarm receipt	Yes	03/14/2019 (FA report Lower Tunnel), 04/02/2020 (FLC Lower Tunnel N44 and Node 23 19120),
		Heat Detectors (restorable)	Test with a heat source to verify alarm initiating and receipt		03/14/2019 (FA report Lower Tunnel), 04/02/2020 (FLC Lower Tunnel N44 and Node 23 19120), FHD N44L2M132 and N44L2M133 did not activate.
			Verify that no facility changes affect performance		03/14/2019 (FA report Lower Tunnel), 04/02/2020 (FLC Lower Tunnel N44 and Node 23 19120),
		Smoke Detectors (Single-station)	Test with manufacturer-approved smoke simulant to verify smoke entry and alarm initiation and receipt.		03/14/2019 (FA report Lower Tunnel), FSD elevator 72 did not activate 04/02/2020 (FLC Lower Tunnel N44 and Node 23 19120), FSD elevator 72 did not activate
			Verify that no facility changes affects performance.		03/14/2019 (FA report Lower Tunnel), 04/02/2020 (FLC Lower Tunnel N44 and Node 23 19120),
		Supervisory Devices	Test to verify initiation and receipt of supervisory alarm	Yes	03/14/2019 (FA report Lower Tunnel), 04/02/2020 (FLC Lower Tunnel N44 and Node 23 19120),
	FMCP and LOCs		Operate microphone to verify proper operation		
			Operate all pre-recorded message activation		

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
			switches to verify proper operation.		
			Operate all notification zone selection switches, if provided, to verify proper operation.		
5 Years	Smoke Detectors		Test detector sensitivity to ensure that the detector has remained within its listed and marked sensitivity range (or 4 percent obscuration light gray smoke, if not marked)		Facility is not old enough to have required this testing.
10 Years	Initiating devices	Radiant Energy-Sensing Detectors (Optical Detectors)	Verify manufacturer's service life for detection elements. UV detection element's normal service life is 10 years; others vary by manufacturer		
			Replace detectors which have exceeded manufacturer's recommended service life for detection elements.		
20 Years	Initiating devices	Smoke Detectors	Replace detectors		
		Air Sampling Smoke Detectors	Replace detection element		
	Control Panel and Annunciator		Verify manufacturer's service life for control elements		

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
	Equipment (monitored)		Verify manufacturer has continued technical and parts support for the specific model		
			Replace control equipment that has exceeded manufacturer's recommended service life limits or if the manufacturer has ceased to provide technical and parts support		

FLC Upper Pumphouse Fire Alarm MNS Maintenance Summary

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
Annually	Control Panel and Annunciator Equipment (monitored)		Test to verify proper receipt of alarm, supervisory, and trouble signals (inputs, one of each type) and operation of notification appliances and auxiliary functions (outputs, one of each type).	Yes	04/03/2019 (FLC Upper Pump House N50), 10/19/2019 (FLC Upper Pump House N50 19120), 10/29/2020 (FLC Upper Pump House N50 20122),
			Verify that all lamps and LEDs are illuminated.	Yes	04/03/2019 (FLC Upper Pump House N50), 10/19/2019 (FLC Upper Pump House N50 19120), 10/29/2020 (FLC Upper Pump House N50 20122),
			Load test backup batteries using a meter (when provided)	Yes	04/03/2019 (FLC Upper Pump House N50), 10/19/2019 (FLC Upper Pump House N50 19120), 10/29/2020 (FLC Upper Pump House N50 20122),
			Verify condition of power supplies and batteries.	Yes	04/03/2019 (FLC Upper Pump House N50), 10/19/2019 (FLC Upper Pump House N50 19120), Batteries for Gamewell FACP failed. 10/29/2020 (FLC Upper Pump House N50 20122),
			Resolve any trouble indications		
	Remote Power Supplies and Notification Appliance Circuit Power Extenders		Verify that all lamps and LEDs are illuminated.	Yes	04/03/2019 (FLC Upper Pump House N50), 10/19/2019 (FLC Upper Pump House N50 19120), 10/29/2020 (FLC Upper Pump House N50 20122),
			Load test backup batteries using a meter (when provided)	Yes	04/03/2019 (FLC Upper Pump House N50), Batteries Equipment Cab #111 replaced. 10/19/2019 (FLC Upper Pump House N50 19120), 10/29/2020 (FLC Upper Pump House N50 20122),
			Verify condition of power supplies and batteries.	Yes	04/03/2019 (FLC Upper Pump House N50), 10/19/2019 (FLC Upper Pump House N50 19120), 10/29/2020 (FLC Upper Pump House N50 20122),
	Initiating devices	Manual Fire Alarm Stations	Verify station is accessible (visual)	Yes	04/03/2019 (FLC Upper Pump House N50), 10/19/2019 (FLC Upper Pump House N50 19120), 10/29/2020 (FLC Upper Pump House N50 20122),
	Notification Appliances and		Test to verify operability	Yes	04/03/2019 (FLC Upper Pump House N50),

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
	Voice Communication (telephone, speakers, horns, and strobe lights)				10/19/2019 (FLC Upper Pump House N50 19120), 10/29/2020 (FLC Upper Pump House N50 20122),
	Radio Alarm Transmitters and Receivers		Test to verify operability	Yes	04/03/2019 (FLC Upper Pump House N50), 10/19/2019 (FLC Upper Pump House N50 19120), Kingfisher transmitter did not transmit signals to RDC. 10/29/2020 (FLC Upper Pump House N50 20122),
	Fire Alarm Control Panel with Integrated Mass Notification (FMCP)		Test to verify proper receipt of signals (inputs) from Local Operating Consoles (LOCs) and the Installation's site-wide system and operation of notification appliances and auxiliary functions (outputs).		
	LOCs		Verify station is accessible (visual).		
	Text Message Signs		Test to verify operability		
2 Years	Initiating Devices	Manual Fire Alarm Stations	Operate to verify alarm receipt	Yes	04/03/2019 (FLC Upper Pump House N50), 10/19/2019 (FLC Upper Pump House N50 19120), 10/29/2020 (FLC Upper Pump House N50 20122),
		Smoke Detectors	Test with manufacturer-approved smoke simulant to verify smoke entry and alarm initiation and receipt	Yes	04/03/2019 (FLC Upper Pump House N50), 10/19/2019 (FLC Upper Pump House N50 19120), 10/29/2020 (FLC Upper Pump House N50 20122),
			Verify that no facility changes affect performance	Yes	04/03/2019 (FLC Upper Pump House N50), 10/19/2019 (FLC Upper Pump House N50 19120), 10/29/2020 (FLC Upper Pump House N50 20122),

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
		Supervisory Devices	Test to verify initiation and receipt of supervisory alarm	Yes	04/03/2019 (FLC Upper Pump House N50), 10/19/2019 (FLC Upper Pump House N50 19120), 10/29/2020 (FLC Upper Pump House N50 20122),
	FMCP and LOCs		Operate microphone to verify proper operation		
			Operate all pre-recorded message activation switches to verify proper operation.		
			Operate all notification zone selection switches, if provided, to verify proper operation.		
5 Years	Smoke Detectors		Test detector sensitivity to ensure that the detector has remained within its listed and marked sensitivity range (or 4 percent obscuration light gray smoke, if not marked)		Facility is not old enough to have required this testing.
10 Years	Initiating devices	Radiant Energy-Sensing Detectors (Optical Detectors)	Verify manufacturer's service life for detection elements. UV detection element's normal service life is 10 years; others vary by manufacturer		
			Replace detectors which have exceeded manufacturer's recommended service life for detection elements.		
20 Years	Initiating devices	Smoke Detectors	Replace detectors		

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
	Control Panel and Annunciator Equipment (monitored)		Verify manufacturer's service life for control elements		
			Verify manufacturer has continued technical and parts support for the specific model		
			Replace control equipment that has exceeded manufacturer's recommended service life limits or if the manufacturer has ceased to provide technical and parts support		

FLC Upper Tunnel Fire Alarm MNS Maintenance Summary

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
Annually	Control Panel and Annunciator Equipment (monitored)		Test to verify proper receipt of alarm, supervisory, and trouble signals (inputs, one of each type) and operation of notification appliances and auxiliary functions (outputs, one of each type).	Yes	06/08/2020 (FLC Upper Tunnel N5 and Node 60 19120), 06/11/2021 (FLC Upper Tunnel N5 and Node 60 20122),
			Verify that all lamps and LEDs are illuminated.	Yes	06/08/2020 (FLC Upper Tunnel N5 and Node 60 19120), 06/11/2021 (FLC Upper Tunnel N5 and Node 60 20122),
			Load test backup batteries using a meter (when provided)	Yes	06/08/2020 (FLC Upper Tunnel N5 and Node 60 19120), Batteries failed load test Cabinet #101 & #104. 06/11/2021 (FLC Upper Tunnel N5 and Node 60 20122), Batteries failed load test Cabinet #101 & #104.
			Verify condition of power supplies and batteries.	Yes	06/08/2020 (FLC Upper Tunnel N5 and Node 60 19120), 06/11/2021 (FLC Upper Tunnel N5 and Node 60 20122),
			Resolve any trouble indications		
	Remote Power Supplies and Notification Appliance Circuit Power Extenders		Verify that all lamps and LEDs are illuminated.	Yes	06/08/2020 (FLC Upper Tunnel N5 and Node 60 19120), 06/11/2021 (FLC Upper Tunnel N5 and Node 60 20122),
			Load test backup batteries using a meter (when provided)	Yes	06/08/2020 (FLC Upper Tunnel N5 and Node 60 19120), 06/11/2021 (FLC Upper Tunnel N5 and Node 60 20122),
			Verify condition of power supplies and batteries.	Yes	06/08/2020 (FLC Upper Tunnel N5 and Node 60 19120), 06/11/2021 (FLC Upper Tunnel N5 and Node 60 20122),
	Initiating devices	Manual Fire Alarm Stations	Verify station is accessible (visual)	Yes	06/08/2020 (FLC Upper Tunnel N5 and Node 60 19120), 06/11/2021 (FLC Upper Tunnel N5 and Node 60 20122),
	Notification Appliances and Voice		Test to verify operability	Yes	06/08/2020 (FLC Upper Tunnel N5 and Node 60 19120), 06/11/2021 (FLC Upper Tunnel N5 and Node 60 20122),

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
	Communication (telephone, speakers, horns, and strobe lights)				
	Radio Alarm Transmitters and Receivers		Test to verify operability	Yes	06/08/2020 (FLC Upper Tunnel N5 and Node 60 19120), Kingfisher transmitter did not transmit signals to RDC. 06/11/2021 (FLC Upper Tunnel N5 and Node 60 20122), Kingfisher transmitter did not transmit signals to RDC.
	Fire Alarm Control Panel with Integrated Mass Notification (FMCP)		Test to verify proper receipt of signals (inputs) from Local Operating Consoles (LOCs) and the Installation's site-wide system and operation of notification appliances and auxiliary functions (outputs).		
	LOCs		Verify station is accessible (visual).		
	Text Message Signs		Test to verify operability		
2 Years	Initiating Devices	Manual Fire Alarm Stations	Operate to verify alarm receipt	Yes	06/08/2020 (FLC Upper Tunnel N5 and Node 60 19120), 06/11/2021 (FLC Upper Tunnel N5 and Node 60 20122),
		Heat Detectors (restorable)	Test with a heat source to verify alarm initiating and receipt	Yes	06/08/2020 (FLC Upper Tunnel N5 and Node 60 19120), Heat Detector N60L1M66 did not activate. 06/11/2021 (FLC Upper Tunnel N5 and Node 60 20122), Heat Detectors N5L1M54, N5L1M64 & N5L1M84 did not activate.

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
			Verify that no facility changes affect performance	Yes	06/08/2020 (FLC Upper Tunnel N5 and Node 60 19120), 06/11/2021 (FLC Upper Tunnel N5 and Node 60 20122),
		Supervisory Devices	Test to verify initiation and receipt of supervisory alarm	Yes	06/08/2020 (FLC Upper Tunnel N5 and Node 60 19120), 06/11/2021 (FLC Upper Tunnel N5 and Node 60 20122),
	FMCP and LOCs		Operate microphone to verify proper operation		
			Operate all pre-recorded message activation switches to verify proper operation.		
			Operate all notification zone selection switches, if provided, to verify proper operation.		
5 Years	Smoke Detectors		Test detector sensitivity to ensure that the detector has remained within its listed and marked sensitivity range (or 4 percent obscuration light gray smoke, if not marked)		Facility is not old enough to have required this testing.
		Radiant Energy-Sensing Detectors (Optical Detectors)	Verify manufacturer's service life for detection elements. UV detection element's normal service life is 10 years; others vary by manufacturer		
			Replace detectors which have exceeded		

Frequency	Component	Sub-component (if applicable)	Task	Record of Completion	Date
			manufacturer's recommended service life for detection elements.		
20 Years	Initiating devices	Smoke Detectors	Replace detectors		
	Control Panel and Annunciator Equipment (monitored)		Verify manufacturer's service life for control elements		
			Verify manufacturer has continued technical and parts support for the specific model		
			Replace control equipment that has exceeded manufacturer's recommended service life limits or if the manufacturer has ceased to provide technical and parts support		

I. AFFF Retention System

There are no UFC 3-601-02 Fire Protection System Inspection, Testing and Maintenance requirements for the retention system.

J. Maintenance Records Summary of Findings

The review of the maintenance records highlighted the following issues:

1. For most systems annual inspections are not being performed annually, typically these inspections are happening on a 2-year cycle.

2. Items identified in an annual report as requiring repair were often re-identified in a follow-on annual report (typically performed ~2 years later)– meaning that repairs were not made for more than 2-years.

3. The Kingfisher Radio transmitter was identified on 11 annual test reports as not transmitting to the Regional Dispatch Center. These incidents occurred on tests occurring over the period 10/19/2019 through 02/16/2022 – with 2 incidents in late 2019, 5 incidents in 2020, 2 incidents in 2021 and 2 incidents in early 2022. During this same period there were 11 fire alarm tests on other days in which signals were reported as being received at the RDC – 2 tests in late 2019, 5 tests during 2020, and 4 tests in 2021. Based on these results there appears to be only a 50% success rate in transmitting signals to the RDC.

4. The testing documentation and tests being performed are based on NFPA 72 requirements, rather than on the requirements of UFC 3-601-02.

5. To date no testing of Mass Notification specific panels has been incorporated into the testing program. This is a new requirement of the October 2021 edition of UFC 3-601-02.

PART 2 – SUMMARY OF FINDINGS

1. FIRE PROTECTION SYSTEMS

Findings/recommendations for fire protection system repairs are as follows:

1. The hose valves are provided with pressure-regulating devices but were not provided with a valved outlet for a pressure gauge to be connected. A valved outlet should be provided for each location with a pressure-regulating device so a pressure gauge can be attached to verify the required pressure is being provided.

2. Significant external pipe degradation was observed in the riser for Preaction System 3 due to the constant dripping of ground water seepage into the riser closet and onto the piping. A ceiling should be constructed in this room, like the metal ceiling constructed in other areas of the Lower Tunnel, to stop water dripping in this room and the degraded riser piping should be replaced.

3. The fire department connections were not provided with signs indicating the system they served, and the operating pressures required. An appropriate sign should be provided at each fire department connection.

4. A significant number of fire alarm visual notification devices were over-spaced creating code deficient conditions. These devices are spaced beyond the maximum distance allowed by NFPA 72 of 100 feet. This occurs at several intervals, where a device will be spaced 110 – 120 feet from the previous device, and then 70 – 80 feet to the next device. There did not appear to be any field conditions which would contribute to the extended spacing. Spacing of these devices should be corrected so they are within the code required spacing.

5. There are also numerous fire alarm system device label errors, mostly of single, isolated devices, that should be corrected.

6. All the explosion-proof fire alarm strobes located in the Tank Farm portion of the Lower Tunnel are obstructed and violate NFPA 72. The code requires strobes to be visible by direct concentrated viewing (i.e., you must be able to see the actual strobe lens from all parts of the corridor) to use corridor spacing of minimum 15cd strobes mounted up to 100 feet apart. The strobes in this section of the tunnel are mounted with the bottom of the strobe lens well above the adjacent pipe stand structure and pipes. Personnel on the actual walking portion of the tunnel do not have a direct line of sight to the strobes. The location of these devices should be corrected to allow viewing by tunnel users.

7. The fire alarm Kingfisher Radio transmitter appears to be non-functional an inordinate amount of the time. Further investigation is required to determine why the Kingfisher transmitter is not

continuously communicating with the Regional dispatch center. Design improvements/repairs are required to ensure continuity of fire alarm signal transmission.

8. The sequence of operations of the fire protection and AFFF retention system is complex and there is no operations manual that clearly illustrates the interrelation between these two systems. An operations manual should be developed so that tunnel operators understand the operation of the systems. To ensure the correct sequence of operations of these systems the fire protection and AFFF retention systems should be recommissioned to confirm these systems are operating per the requirements of the final sequence of operations.

If the facility were to be maintained in operational condition for continued fuel operations, then the following additional items would be recommended:

1. In numerous specific instances the as-built drawings do not accurately represent the installed conditions. The as-built drawings across all disciplines should be updated to match actual installed conditions.

2. There were also inaccuracies associated with equipment shown on the as built drawings not being installed, or installed in a different orientation (i.e., mounting on wall instead of ceiling, or vice-versa). Many of these examples involved duct-mounted smoke detection at smoke dampers, usually where installation of this type of device was not possible. However, there was no documentation indicating the required detection was exempted nor was spot detection provided at the damper. Some of this may be attributable to the fact the drawings provided and reviewed would not necessarily reflect changes associated with Revisions R and S (dated 21 June 2018) of the design drawings, some of which affected systems monitored by the fire alarm and mass notification system. The as-built drawings be updated to match installed conditions.

2. RETENTION SYSTEM

There are numerous improvements that could be recommended to the operation of the retention system. However, at this stage with the established goal of ultimately taking the fuel storage tanks out of service within the next 2-3 years any recommendations for significant alterations to the retention system do not appear to be warranted. Confirmation of the correct sequence of operation of the system, as recommended in item 8 above, should be performed.

3. FIRE PROTECTION SYSTEM MAINTENANCE

1. A complete overhaul of the fire protection system maintenance program to align it with UFC 3-601-02 requirements and better oversight to confirm timely ITM is being provided could be recommended. However, at this stage with the established goal of ultimately taking the fuel storage tanks out of service within the next 2-3 years any recommendations for significant alterations to the fire protection ITM program does not appear warranted.

PART 3 – RECOMMENDED BETTERMENTS

If the facility was to remain as an operational fuel storage facility our recommendations for betterments are as follows:

1. Upgrades the AFFF retention system to permit the collection of effluent in the area outside [redacted] under gravity flow should be made.

3. Establish a standalone ITM program for Red Hill. Due to the critical nature of this facility this program should be funded and directly overseen by the Red Hill Facility managers independent of any other ITM programs on the base.

The Scope of work listed achieving faster response by fire detection/protection systems as a potential betterment. However, this would not appear to be warranted. The flame detection system installed is reasonable quick with an adequate false activation rejection rate. There appears to be no significant benefit, or obvious candidate, for a faster detection and fire protection activation.

APPENDICES TABLE OF CONTENTS

APPENDIX A. SITE SURVEY NOTES CLASS I STANDPIPE, WET PIPE SPRINKLER, FIRE DEPARTMENT CONNECTIONS SYSTEM

FIRE PROTECTION GENERAL NOTES

1. INSTALLATION SHALL CONFORM TO NFPA 13 2013 .
2. ALL MATERIALS INSTALLED SHALL BE NEW, UL LISTED AND/ OR F.M. "APPROVED" FOR FIRE PROTECTION USE.
3. SWAY BRACING TO BE PER NFPA 13, 2013 EDITION.
   - LATERAL BRACING MAY BE OMITTED FROM PIPES INDIVIDUALLY SUPPORTED BY RODS LESS THEN 6" LONG.
   - THE DISTANCE BETWEEN THE LAST BRACE AND THE END OF THE PIPE SHALL NOT EXCEED 6'-0"
   - THE LAST LENGTH OF PIPE AT THE END OF A FEED OR CROSS MAIN SHALL BE PROVIDED WITH A LATERAL BRACE.
   - LATERAL BRACES MAY ACT AS LONGITUDINAL BRACES ONLY WHEN INSTALLED WITHIN 2'-0" OF THE PIPE BEING BRACED LONGITUDINALLY.
   - THE FOUR WAY BRACE SHALL BE ATTACHED ABOVE THE FLEXIBLE CONNECTION REQUIRED FOR THE RISER, AND TO THE WALL STRUCTURE.
   - THE END SPRINKLER ON A BRANCH LINE SHALL BE RESTRAINED AGAINST EXCESSIVE MOVEMENT BY USE OF A WRAP AROUND U-HOOK OR OTHER APPROVED MEANS.
   - ALL BRACES ARE CALCULATED. SEE CALCULATION AND DETAIL SHEET FP-4.

3b. THE SYSTEM IS OVER 100 PSI AND MUST HAVE THE LAST HANGER ON THE END OF BRANCHLINES SUPPLYING PENDENT SPRINKLERS AT DROPPED CEILINGS INSTALLED WITHIN 12" OF THE END OF THE LINE PER 9.2.3.4.4.

4. ALL SPRINKLER SYSTEM CONTROL VALVES SHALL BE PROVIDED WITH TAMPER SWITCHES. ALL SYSTEMS SHALL BE EQUIPPED WITH A FLOW SWITCH. ALL TAMPERS AND FLOW SWITCHES SHALL BE MONITORED BY AN OFF-SITE PROPRIETARY STATION , U.L. LISTED AND/ OR F.M. APPROVED AND INSTALLED BY OTHERS.
5. ALL GROOVED COUPLINGS INSTALLED SHALL BE RIGID TYPE. (U.N.O.)
6. THE USE OF GROOVED FITTINGS WILL BE LIMITED TO PIPES HAVING A NOMINAL DIAMETERS OF 1 ¼ INCHES OR LARGER.
7. COUPLINGS AND FITTINGS MAY BE CAST IRON, MALLEABLE IRON OR DUCTILE IRON.
8. GENERAL CONTRACTOR SHALL MAKE PIPING ABOVE SUSPENDED CEILINGS ACCESSIBLE FOR VISUAL INSPECTION AS A CONDITION OF FINAL APPROVAL.
9. ALL NEW ABOVEGROUND PIPING WILL BE BLK SCH 40 EXCEPT FOR FOAM CONCENTRATE PIPING THAT SHALL BE STAINLESS STEEL AND PVC DRAIN LINES.
10. ALL NEW SYSTEMS SHALL BE HYDROSTATICALLY TESTED AT 200 PSI OR 50 PSI IN EXCESS OF THE MAXIMUM PRESSURE, WHEN THE MAXIMUM PRESSURE TO BE MAINTAINED IN EXCESS OF 150 PSI.
11. FLEXIBLE COUPLINGS TO BE INSTALLED WITHIN 12" OF EITHER SIDE OF MASONRY OR CONCRETE WALLS. FLEXIBLE COUPLINGS TO BE INSTALLED WITHIN 12"ABOVE AND WITHIN 24" BELOW FLOORS. A FLEXIBLE COUPLING TO BE INSTALLED ON RISERS MORE THAN 3' & LESS THAN 7'. IN RISERS MORE THAN 7', FLEXIBLE COUPLINGS TO BE INSTALLED WITHIN 24" OF THE TOP AND BOTTOM OF THE RISER.
12. SPRINKLER HEADS IN CEILING TILES ARE NOT REQUIRED TO BE CENTER OF TILE. SPRINKLERS TO BE AT LEAST 6" FROM CEILING GRID.
14. ALL PIPING PENETRATIONS IN FIRE RATED WALLS/FLOORS OTHER THAN MASONRY/CONCRETE SHALL BE SIZED AS FOLLOWS:
   - NOMINALLY 2" LARGER THAN PIPE FOR 1" TO 3" NOMINAL PIPE DIAMETERS.
   - FOR PIPING 4" AND LARGER, THE HOLE DIAMETER IS TO BE 4" LARGER THAN NOMINAL PIPE DIAMETER.

   NO CLEARANCE IS REQUIRED FOR NON-FIRE RATED WALLS/FLOORS OTHER THAN MASONRY/CONCRETE.
15. ALL PREACTION SYSTEM MAIN PIPING TO BE SLOPED AS THE NATURAL SLOPE OF THE TUNNELS ALLOW. LINEE PIPING TO BE SLOPED PER NFPA-13.

FIRE PROTECTION DESIGN CRITERIA

THE FIRE PROTECTION SYSTEM SHALL BE HYDRAULICALLY DESIGNED AND INSTALLED IN ACCORDANCE WITH THE FOLLOWING CRITERIA:

UPPER TUNNEL (TANKS COMPARTMENT)
DESIGN DENSITY: 0.4 GPM/SF [NFPA 13: EXTRA HAZARD GROUP 2]
DESIGN AREA: 2,500 SF (UPPER TUNNEL UP TO ADIT 5 DOOR AND ADIT 4 DOOR.)
HOSE STREAM: 500 GPM DURATION: 90 MINUTES

THE ZONES TO BE COVERED ARE SHOWN ON THE LAYOUTS.

UPPER TUNNEL STANDPIPE
FLOW DEMAND: 1000 GPM
PRESSURE: MIN 100 PSI AT NOZZLE
DURATION: 90 MINUTES

LOWER TUNNEL (TANKS COMPARTMENTS)
DESIGN DENSITY: 0.16 GPM/SF [NFPA 16, SINGLE INTERLOCK ELECTRIC RELEASE PRE-ACTION SYSTEM. 3% AFFF MIL-F 24385 PREACTION AFFF SYSTEMS ARE ACTUATED BY CROSSE-ZONE TRIPLE IR DETECTION]
DESIGN AREA: COMPARTMENT AREA (APPROXIMATELY 10,000 SF)
HOSE STREAM: 1000 GPM
DURATION: 15 MINUTES OF FOAM [NFPA 30]/ 60 MINUTES OF WATER
THE ZONES TO BE COVERED ARE SHOWN ON THE LAYOUTS.
TESTING TO BE DONE AT THE PROPORTIONER'S MINIMUM FLOW RATE AND AT A FLOW RATE OF 4 TIMES THE MINIMUM PER SPECIFICATION. PERFORM THIS IN ACCORDANCE W./NFPA 16.

LOWER TUNNEL (GAUGER OFFICE AND ELECTRICAL ROOM)
DESIGN DENSITY: .0.2 GPM/SF [NFPA 13 : ORDINARY HAZARD GROUP 2]
DESIGN AREA: 1,500 SF
HOSE STREAM: 250 GPM
DURATION: 60 MINUTES
THE ZONE TO BE COVERED IS SHOWN ON THE LAYOUT

LOWER TUNNEL STANDPIPE
FLOW DEMAND: 1000 GPM
PRESSURE: MIN 100 PSI AT VALVE
DURATION: 60 MINUTES

FIRE PUMP BUILDING (ELECTRICAL ROOM, FIRE PUMP ROOM, AND AFFF PUMP ROOM, GENERATOR ROOM)
DESIGN DENSITY: 0.2 GPM/SF [NFPA 13 : ORDINARY HAZARD GROUP 2]
DESIGN AREA: 1,500 SF
HOSE STREAM: 250 GPM
DURATION: 60 MINUTES

CONTRACT DEVIATIONS & COORDINATION

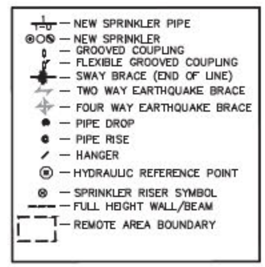
1) THE CONTRACT DOCUMENTS SHOW 2 JOCKEY PUMPS. NFPA REQUIRES ONLY ONE. TOTAL FIRE SYSTEMS, INC. WILL SUPPLY AND PROVIDE THE SECOND JOCKEY PUMP / CONTROLLER AS A SPARE AND NOT INSTALL IT AS SHOWN. THEY WILL BE LEFT IN THE LOCATION AS DIRECTED.

2) WE HAVE DELETED THE INDIVIDUAL PRV'S FOR THE FHV'S AND SPRINKLER RISER'S AND INSTALLING A MASTER PRV WITH BACKUP FOR BOTH THE LOWER AND UPPER TUNNEL. NFPA REQUIRES TESTING OF THESE DEVICES BOTH AT THE PROJECT COMPLETION AND ANNUALLY. THERE ARE NO PROVISIONS FOR THEIR TESTING SHOWN AND OR CALLED FOR. THE DESIGN USING MASTER PRV'S WILL REDUCE THE FUTURE MAINTENANCE AND WILL IMPROVE THE SYSTEM OVERALL.

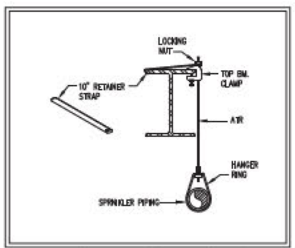
3) DELETION OF THE FDC AND ITS PIPING AS SHOWN FOR THE AFFF FOAM SYSTEMS. NFPA PROHIBITS THE FDC TO BE SUPPLIED ABOVE THE SHUT OFF ON MULTIPLE RISER SYSTEMS AS SHOWN. FURTHER THE FDC'S SUPPLYING THE 8" SUPPLY HAVE AN FDC SHOWN AT ADIT'S 3, 4, 5, & 6 AS REQUIRED BY NFPA BELOW THE CONTROL VALVE.

4) REDESIGN OF THE FIRE PUMP ROOM DUE TO THE PIPING BEING RUN OVERHEAD HAS RESULTED IN CHANGES TO THE FLOOR DRAIN, ALLOWABLE LIGHT FIXTURE LOCATIONS, POWER HOOKUP LOCATIONS, AND WATER SERVICE ENTRY LOCATION AND CONFIGURATION. OTHER TRADES WILL NEED TO MODIFY THEIR SCOPE OF WORK TO ACCOMMODATE THIS RECONFIGURATION.

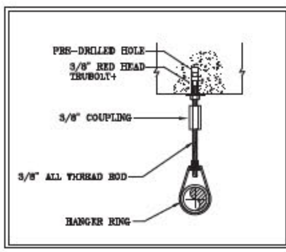
5) EXTERIOR BACKFLOW PREVENTORS (IN SITE CONTRACTOR'S SCOPE) HAVE BEEN ELIMINATED AND ARE NOT INCLUDED IN OUR HYDRAULIC CALCULATIONS ON THE DISCHARGE SIDE OF THE PUMP. ONE BACKFLOW IN THE LINE FROM THE TANK TO THE FIRE PUMP HAS BEEN ACCOUNTED FOR BY REDUCING THE AVAILABLE WATER FROM THE CALCULATED WAT3ER FLOW TEST BY 12 PSI REFLECTED IN THE SUBSEQUENT CALCULATIONS FOR UPPER AND LOWER TUNNELS.



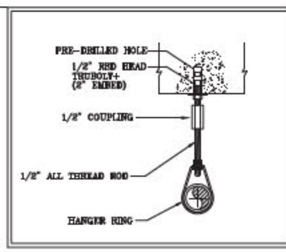
SPRINKLER SYMBOL LEGEND



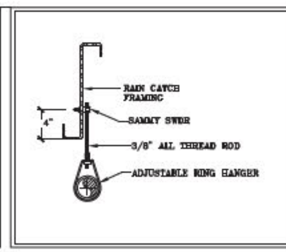
HANGER DETAIL - TOP BEAM CLAMP
N.T.S.
USE ONLY WHERE HANGING TO EXISTING I-BEAM STRUCTURE WITHIN TUNNEL



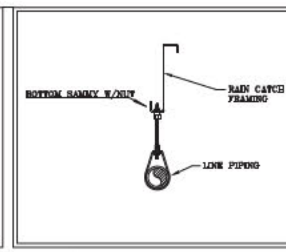
HANGER DETAIL - UP TO 4" PIPE
N.T.S.
TYP. FOR BRANCHLINES AND SMALL MAINS



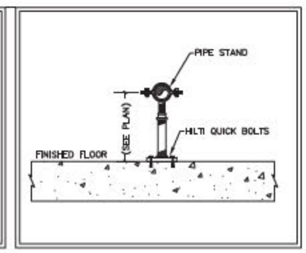
HANGER DETAIL - UP TO 6"-8" PIPE
N.T.S.
TYP. FOR 6" AND 8" MAINS (10" AND 12" SIM. BUT WITH NFPA REQ'D ATR)



HANGER DETAIL #52 - SIDE SAMMY
N.T.S.
TYP. FOR BRANCHLINES UNDER RAIN CATCH CEILING AREAS



HANGER DETAIL #51 - BOTTOM SAMMY
N.T.S.
ALTERNATE FOR BRANCHLINES UNDER RAIN CATCH CEILING AREAS



PIPE STAND DETAIL
N.T.S.

AS BUILT

SYM	DESCRIPTION	DATE
5	AS BUILT	10-18-17
4	FINAL EXTERIOR PRV STATION REVISIONS	10-9-17
3	REV - ADDED ON THE FOAM PUMP RELIEF	9-28-17
2	REV - ADDED MORE MISC PARTS TO ITEM	8-14-17
1	REV - ADDED AIR MAINT. FOAM TANK CHECK	7-20-17
N/A	FOR INSTALLATION	5-8-16

NAVFAC

I [redacted] THAT THIS DRAWING WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION.

CPI
CRITCHFIELD PACIFIC, INC.
HONOLULU, HAWAII

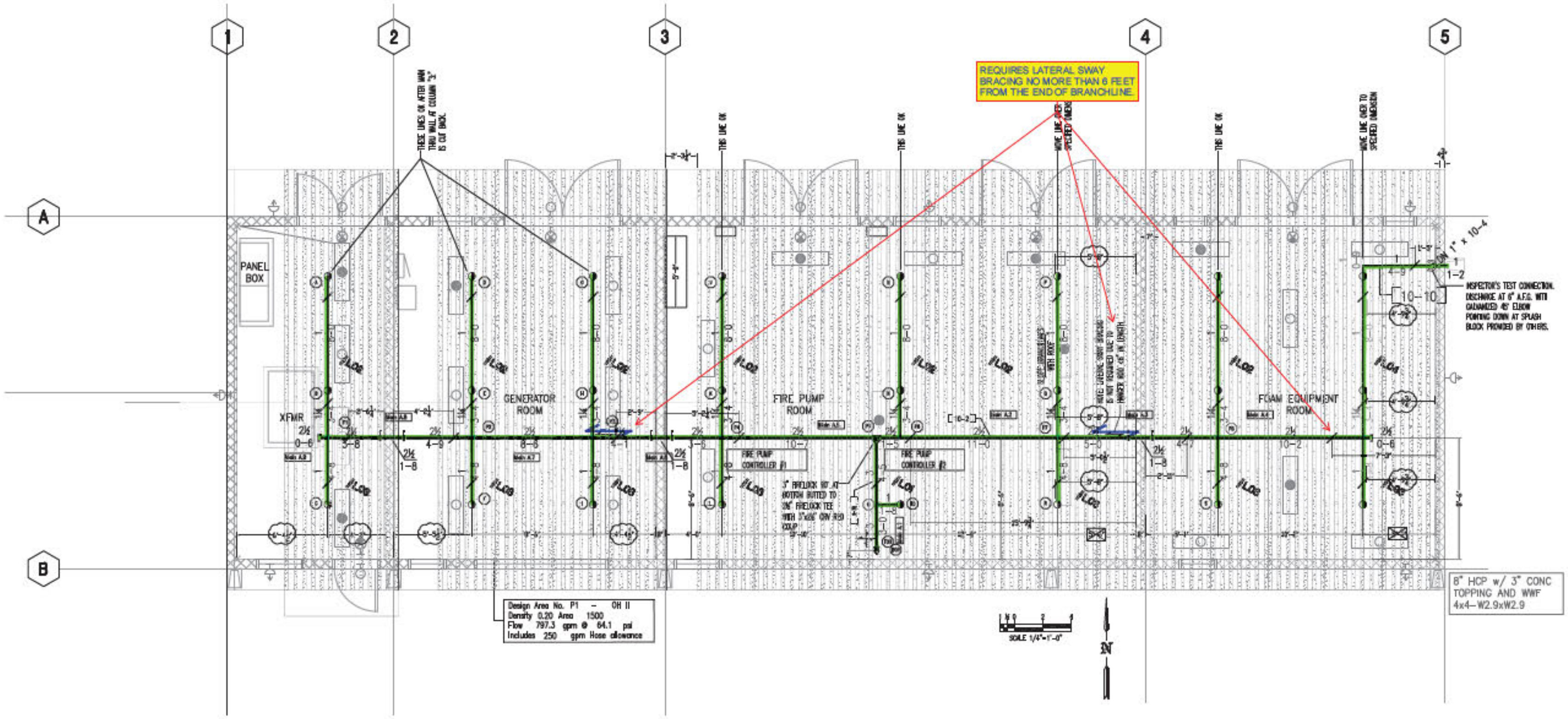
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FIRE PROTECTION GENERAL NOTES

SCALE:
EPROJECT NO: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

F-001

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AM[redacted]E VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INS[redacted]HE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT - USE GRAPHIC SCALES



PUMP HOUSE OVERHEAD FIRE SPRINKLER SYSTEM

AS BUILT

SPRINKLER HEAD LEGEND :	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
QUICK RESP PENDENT w/OUT PLATE	◐	VK302	1/2"	5.6	BRASS	NONE	175°	24
							TOTAL SPRINKLERS THIS LEVEL	24

NAVFAC

CPI

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION
AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

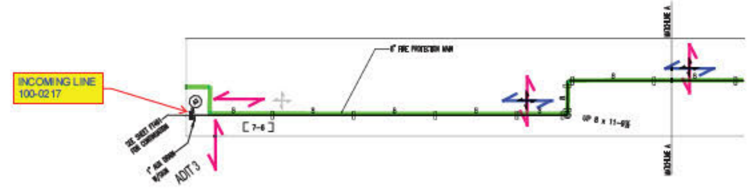
FIRE PROTECTION OVERHEAD SPRINKLER PLAN
NEW FIRE PUMP BUILDING

PROJECT NO.: 1306143

FB101A

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES



PARTIAL FIRE PROTECTION NEW PLAN - AREA 79 - LOWER LEVEL (b) (3) (A) [redacted]

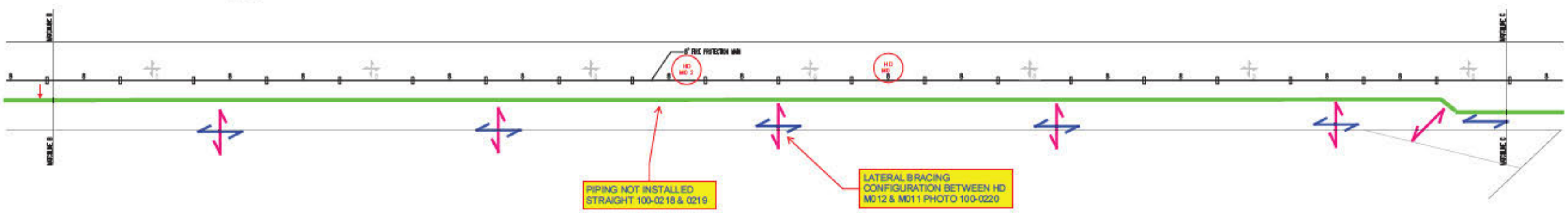
1 FD100 FT134

SCALE 1/8" 1' 0"

PARTIAL FIRE PROTECTION NEW PLAN - AREA 79 - LOWER LEVEL (b) (3) (A) [redacted]

1 FD100 FT134

SCALE 1/8" 1' 0"

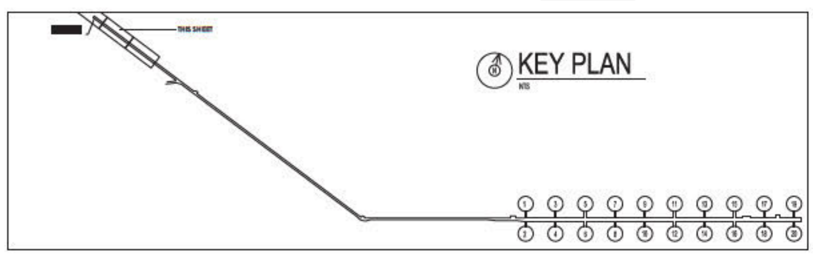


SEE SHEET FT129 FOR CONTINUATION

PARTIAL FIRE PROTECTION NEW PLAN - AREA 78 - LOWER LEVEL (b) (3) (A) [redacted]

1 FD100 FT134

SCALE 1/8" 1' 0"



AS BUILT

SCALE: 1/8" = 1' 0"

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	●	VK100	1/2	5.6	BRASS	N/A	175°	5
STANDARD RESP UPRIGHT	○	VK100	1/2	5.6	BRASS	N/A	286°	135
STANDARD RESP UPRIGHT ON SPRIG	⊗	VK100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP PENDENT w/PLATE	◉	VK102	1/2	5.6	BRASS	2PC CHR	175°	4
STAN RESP HORIZONTAL SIDEWALL	◁	TY3311	1/2	5.6	BRASS	NONE	175°	2
TOTAL SPRINKLERS THIS LEVEL								617

THE [redacted] TRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMON[redacted]E VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

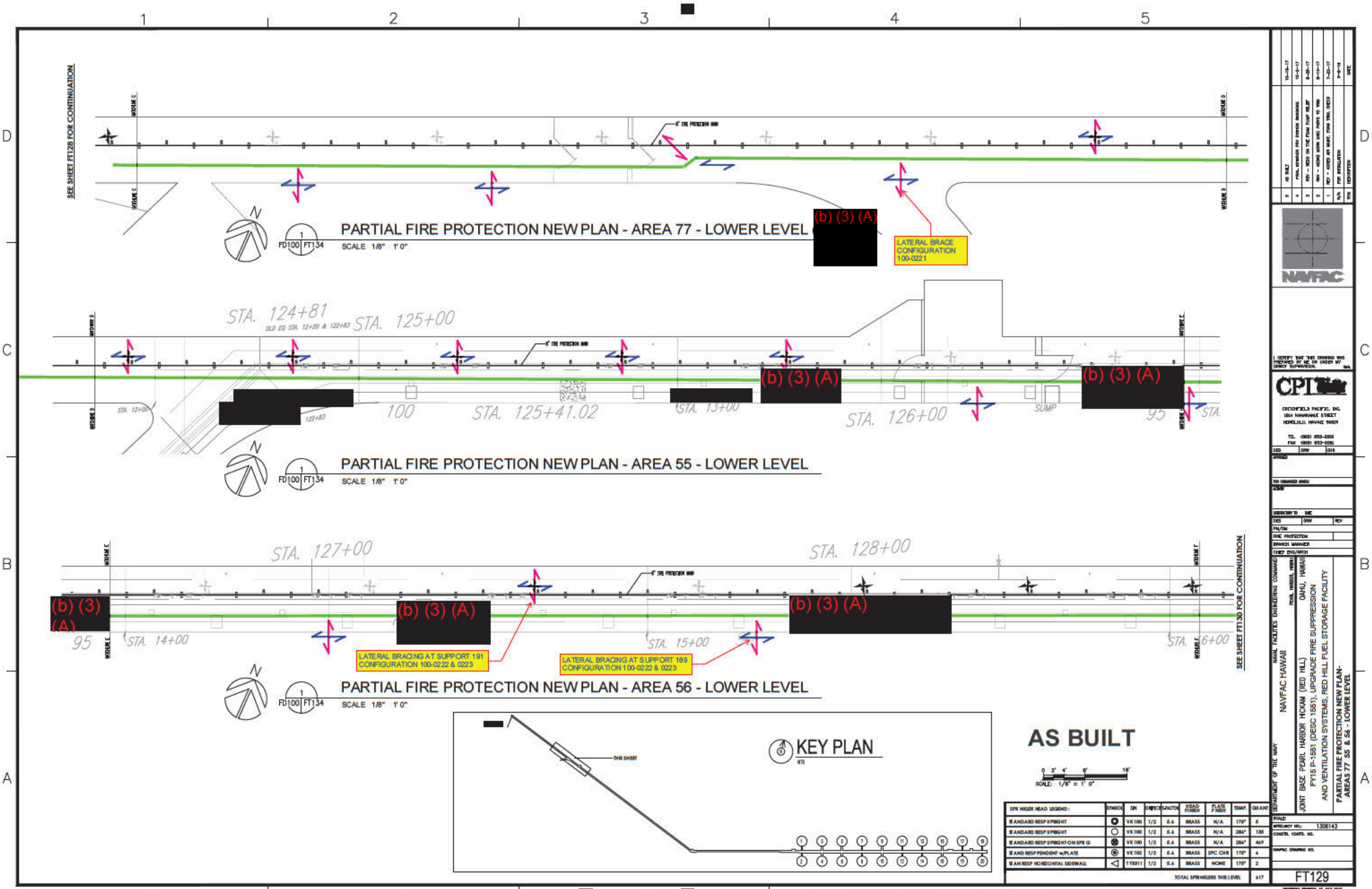
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

PARTIAL FIRE PROTECTION NEW PLAN-AREA 78 & 79 - LOWER LEVEL (ADIT 3)

SCALE:
EPROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

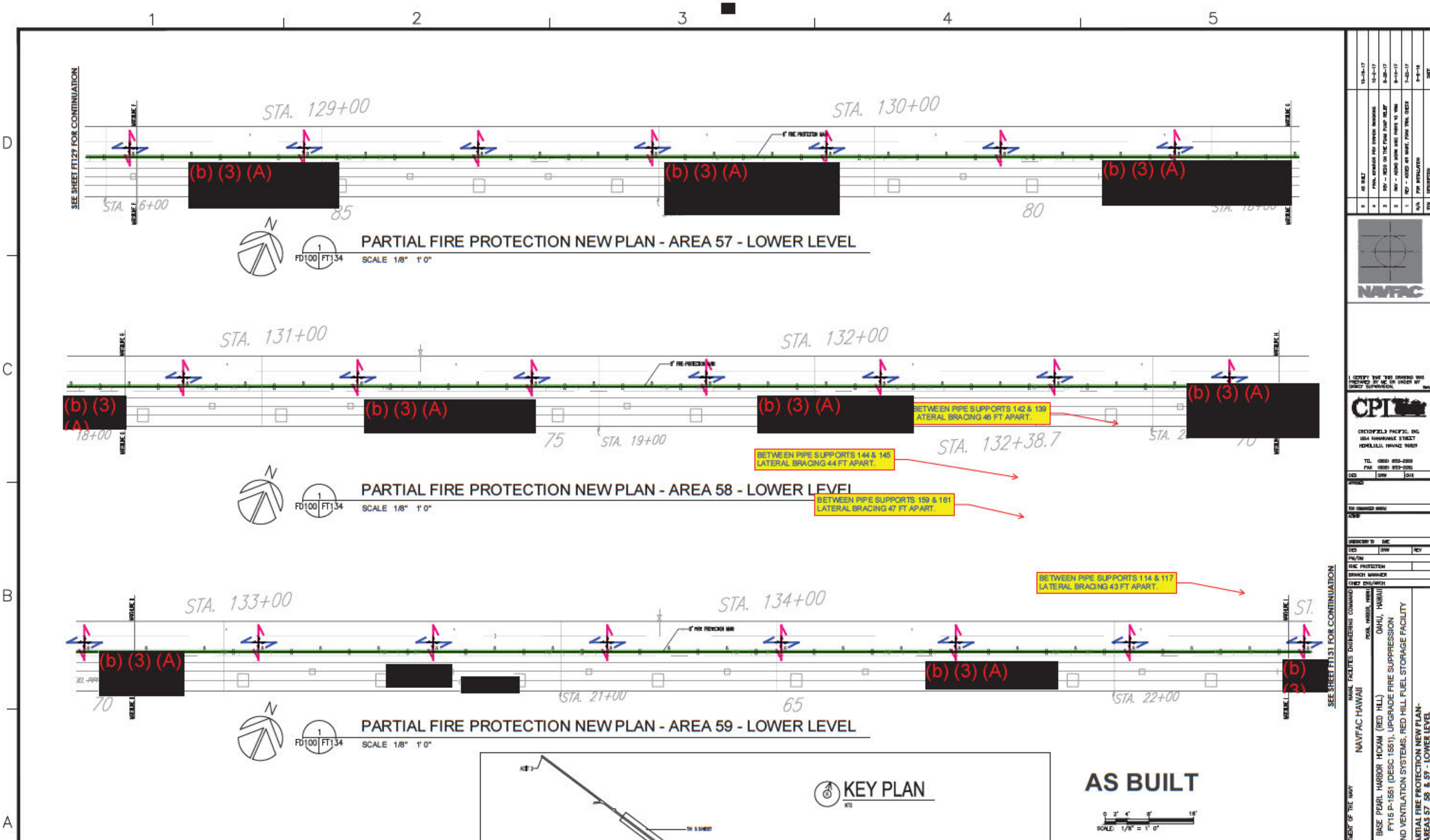
FT128

CRITCHFIELD PACIFIC, INC.



THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

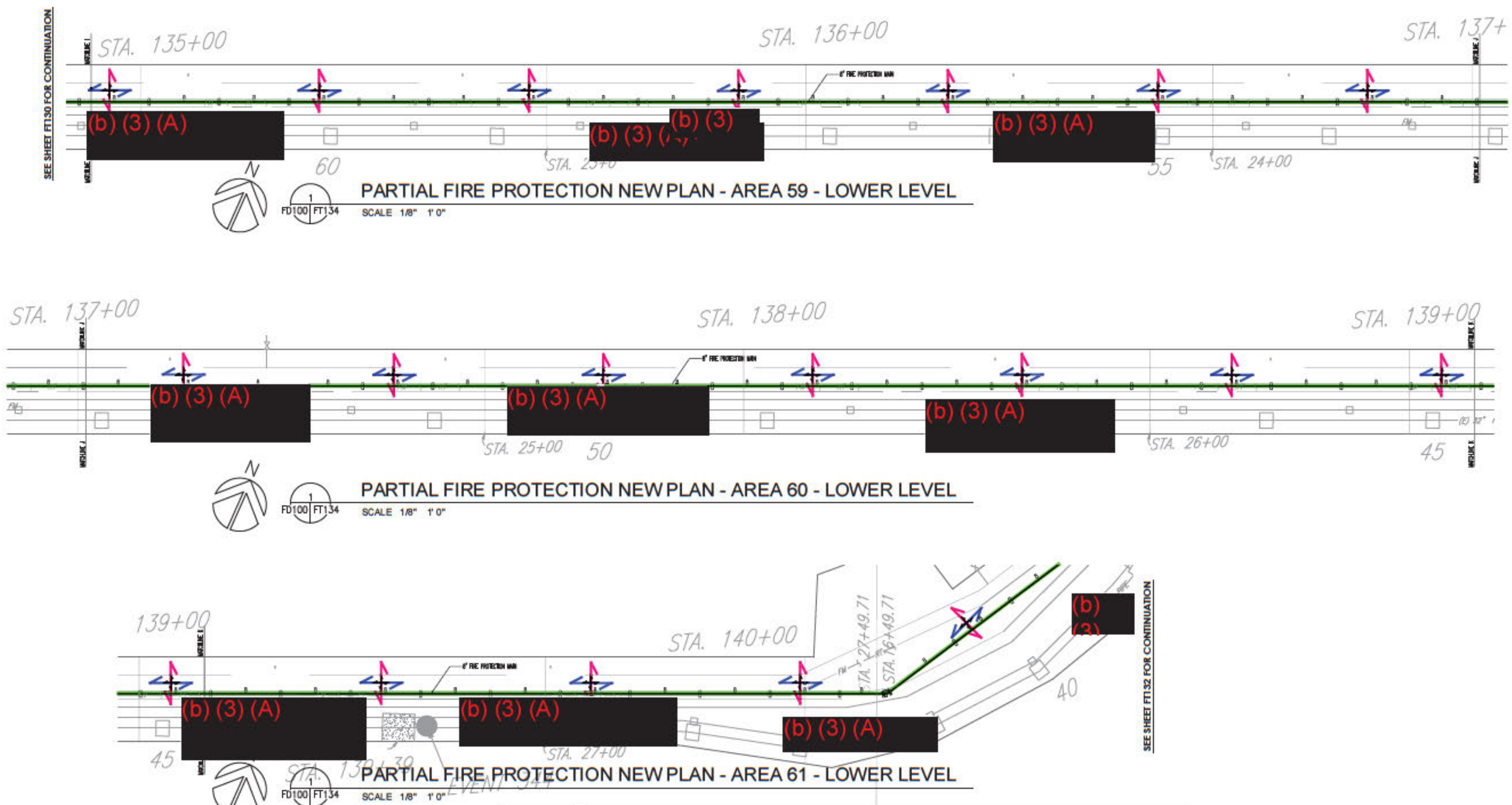
IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

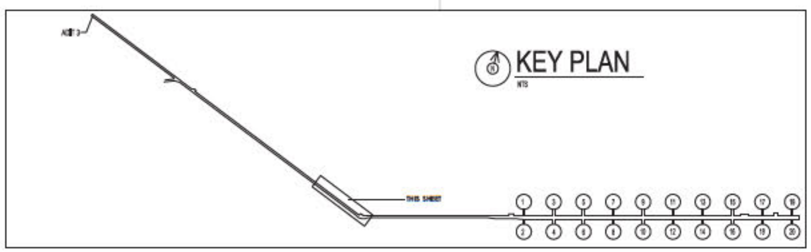


SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	●	VK100	1/2	5.6	BRASS	N/A	175°	6
STANDARD RESP UPRIGHT	○	VK100	1/2	5.6	BRASS	N/A	286°	136
STANDARD RESP UPRIGHT ON SPRIG	⊗	VK100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP PENDENT w/PLATE	◉	VK102	1/2	5.6	BRASS	2PC CHR	175°	6
STAN RESP HORIZONTAL SIDEWALL	◁	TY3311	1/2	5.6	BRASS	NONE	175°	2
TOTAL SPRINKLERS THIS LEVEL								617

THE [redacted] ACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG [redacted] VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES





AS BUILT

SCALE: 1/8" = 1' 0"

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	●	VK100	1/2	5.6	BRASS	N/A	175°	6
STANDARD RESP UPRIGHT	○	VK100	1/2	5.6	BRASS	N/A	286°	138
STANDARD RESP UPRIGHT ON SPRIG	⊗	VK100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP PENDENT w/PLATE	◉	VK102	1/2	5.6	BRASS	2PC CHR	175°	4
STAN RESP HORIZONTAL SIDEWALL	◁	TY3311	1/2	5.6	BRASS	NONE	175°	2
							TOTAL SPRINKLERS THIS LEVEL	617

THE [redacted] ACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

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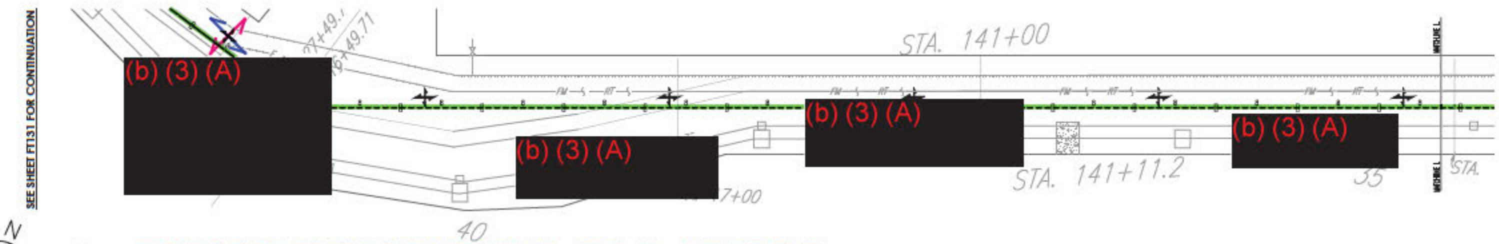
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

PARTIAL FIRE PROTECTION NEW PLAN-AREAS 59 60 & 61 - LOWER LEVEL

PROJECT NO.: 1306143

FT131

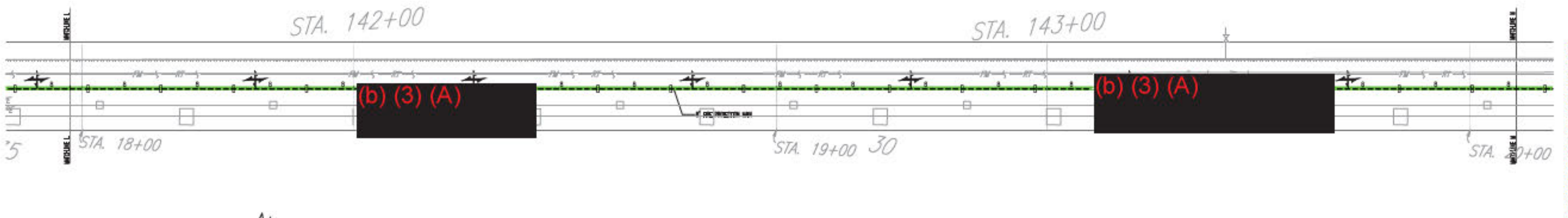
1 2 3 4 5



PARTIAL FIRE PROTECTION NEW PLAN - AREA 62 - LOWER LEVEL

1 FD100 FT134

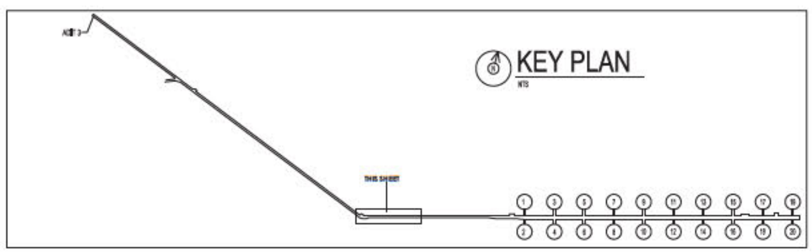
SCALE 1/8" 1' 0"



PARTIAL FIRE PROTECTION NEW PLAN - AREA 63 - LOWER LEVEL

1 FD100 FT134

SCALE 1/8" 1' 0"



AS BUILT

SCALE: 1/8" = 1' 0"

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	●	VK100	1/2	5.6	BRASS	N/A	175°	6
STANDARD RESP UPRIGHT	○	VK100	1/2	5.6	BRASS	N/A	286°	135
STANDARD RESP UPRIGHT ON SPR G	⊗	VK100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP PENDENT w/PLATE	◉	VK102	1/2	5.6	BRASS	2PC CHR	175°	4
STAN RESP HORIZONTAL SIDEWALL	◁	TY3311	1/2	5.6	BRASS	NONE	175°	2
TOTAL SPRINKLERS THIS LEVEL								617

DEPARTMENT OF THE NAVY
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PEARL HARBOR, HAWAII

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FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

PARTIAL FIRE PROTECTION NEW PLAN-AREAS 62 & 63 - LOWER LEVEL

NAVFAC

CPI

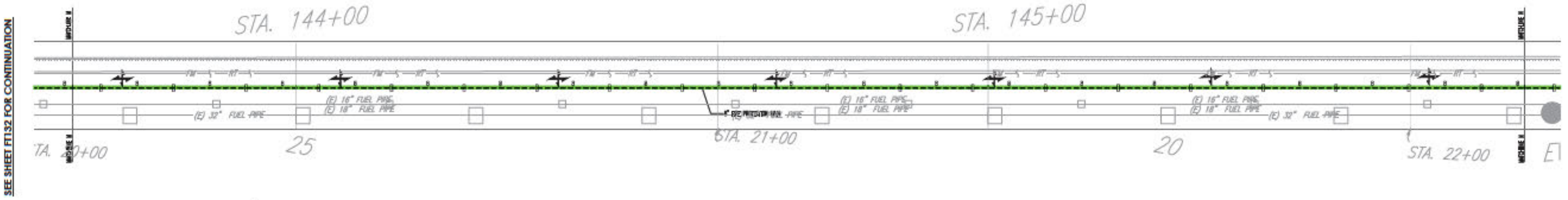
EPROJECT NO.: 1306143

FT132

THE [redacted]ACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG [redacted] VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

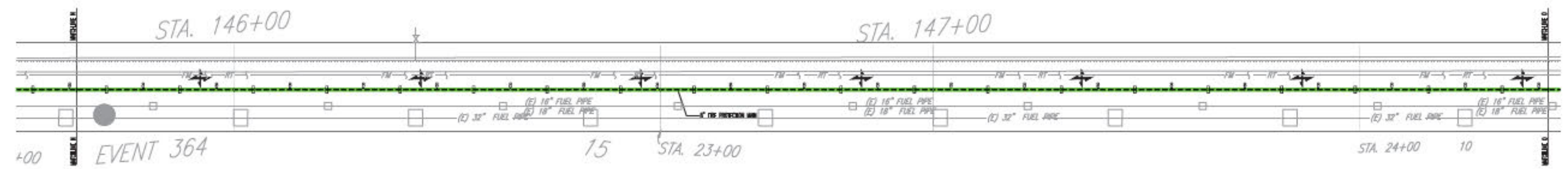
IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

1 2 3 4



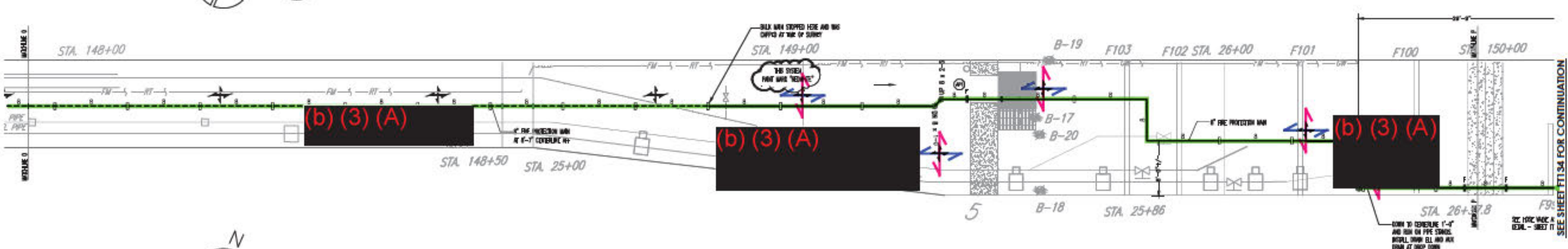
PARTIAL FIRE PROTECTION NEW PLAN - AREA 64 - LOWER LEVEL

SCALE 1/8" 1' 0"



PARTIAL FIRE PROTECTION NEW PLAN - AREA 65 - LOWER LEVEL

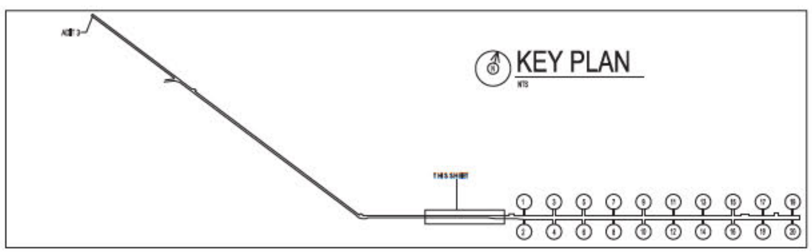
SCALE 1/8" 1' 0"



[redacted]

PARTIAL FIRE PROTECTION NEW PLAN - AREA 66 - LOWER LEVEL

SCALE 1/8" 1' 0"



AS BUILT

SCALE: 1/8" = 1' 0"

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	⭘	VK100	1/2	5.6	BRASS	N/A	175°	6
STANDARD RESP UPRIGHT	○	VK100	1/2	5.6	BRASS	N/A	286°	135
STANDARD RESP UPRIGHT ON SPRIG	⊗	VK100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP PENDENT w/PLATE	◉	VK102	1/2	5.6	BRASS	2PC CHR	175°	4
STAN RESP HORIZONTAL SIDEWALL	◁	TY3311	1/2	5.6	BRASS	NONE	175°	2
						TOTAL SPRINKLERS THIS LEVEL		617

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

PARTIAL FIRE PROTECTION NEW PLAN- AREAS 62 & 63 - LOWER LEVEL

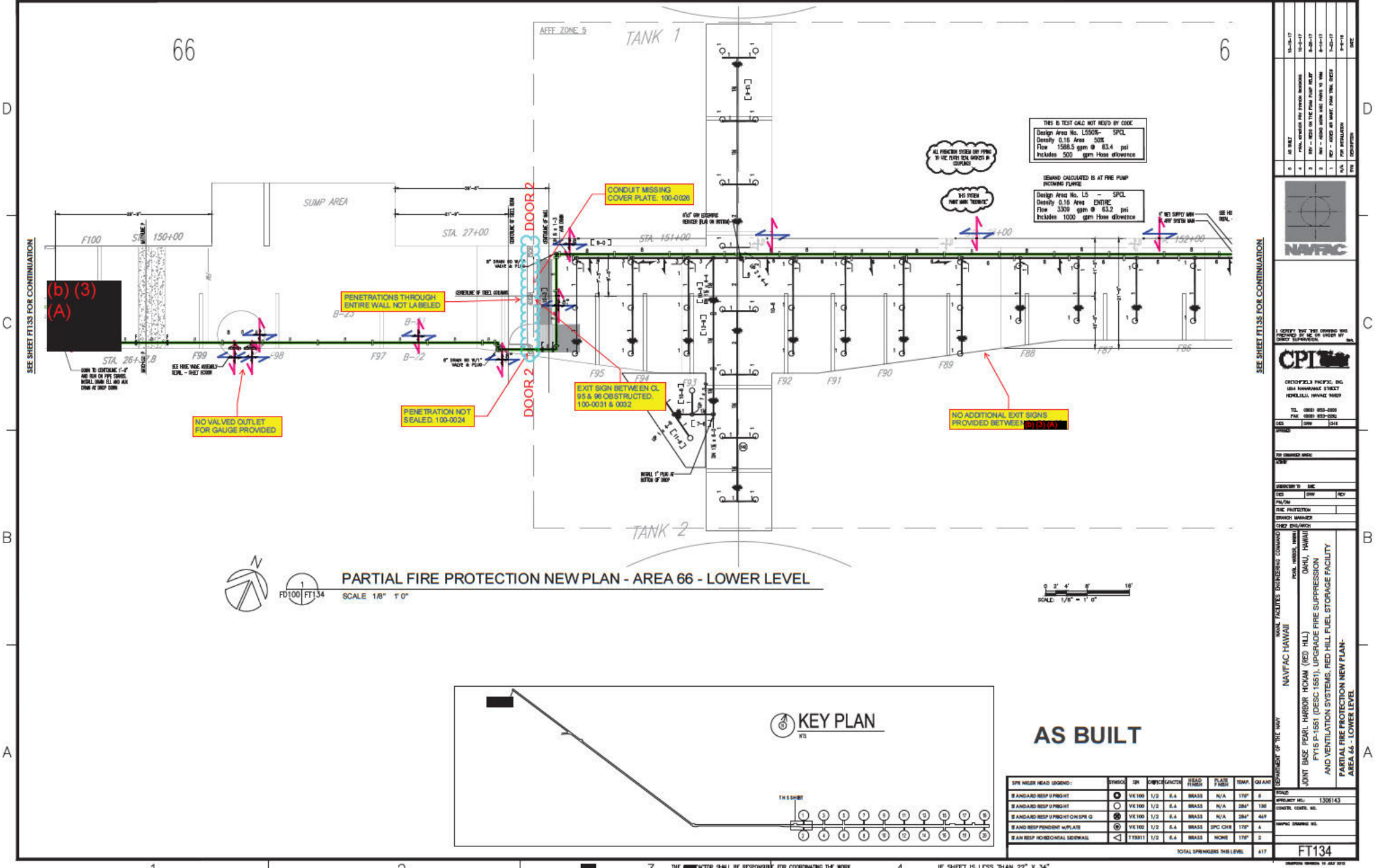
SCALE:
PROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

FT133

CPI
CRITCHFIELD PACIFIC, INC.
HONOLULU, HAWAII

THE [redacted]ACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG [redacted] VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES



PARTIAL FIRE PROTECTION NEW PLAN - AREA 66 - LOWER LEVEL

SCALE 1/8" 1'0"

KEY PLAN

AS BUILT

SPR HEAD LEGEND :	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT		VK100	1/2	5.6	BRASS	N/A	175°	8
STANDARD RESP UPRIGHT		VK100	1/2	5.6	BRASS	N/A	286°	136
STANDARD RESP UPRIGHT ON SPR Q		VK100	1/2	5.6	BRASS	N/A	286°	469
STANDARD RESP PENDENT w/PLATE		VK100	1/2	5.6	BRASS	2PC CHR	175°	4
STANDARD RESP HORIZONTAL SIDEWALL		TY3811	1/2	5.6	BRASS	NONE	175°	2
						TOTAL SPRINKLERS THIS LEVEL		617

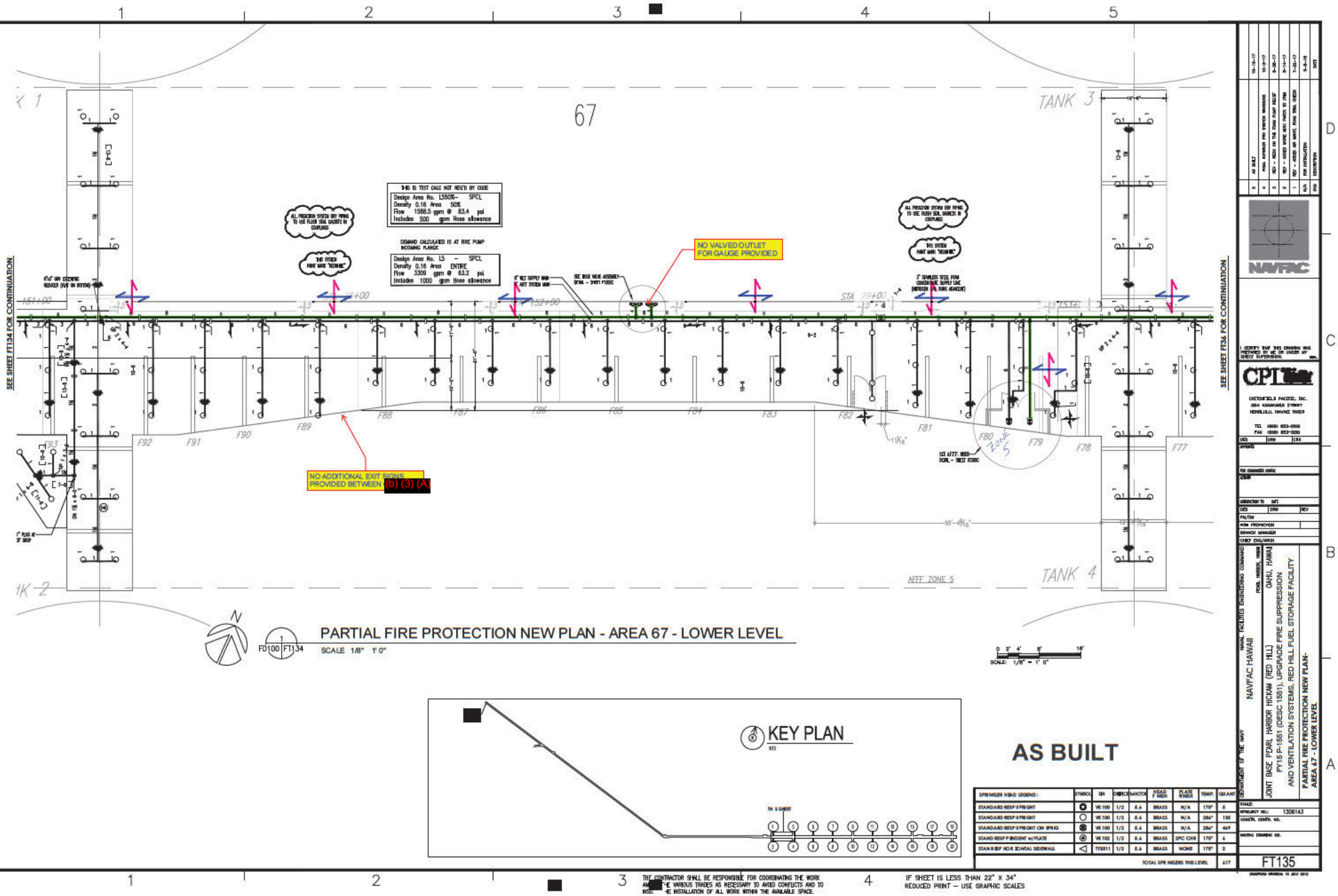
DEPARTMENT OF THE NAVY
NAVFAC HAWAII
NAVAL FACILITIES ENGINEERING COMMAND
PEARL HARBOR, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1561 (DESC 1561), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FIRE PROTECTION NEW PLAN- AREA 66 - LOWER LEVEL

SCALE:
SPECIFICATION NO. 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

FT134

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES



PARTIAL FIRE PROTECTION NEW PLAN - AREA 67 - LOWER LEVEL

SCALE 1/8" 1'0"

AS BUILT

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD F'NISH	PLATE F'NISH	TEMP.	QUANT.
STANDARD RESP'D PENDENT		VK100	1/2	5.6	BRASS	N/A	175°	8
STANDARD RESP'D PENDENT		VK100	1/2	5.6	BRASS	N/A	286°	135
STANDARD RESP'D PENDENT ON SPRIG		VK100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP'D PENDENT w/PLATE		VK102	1/2	5.6	BRASS	SPC CHR	175°	4
STAN RESP HOR ZONTAL SIDEWALL		TY3811	1/2	5.6	BRASS	NONE	175°	2
						TOTAL SPR NKLERS THIS LEVEL		617

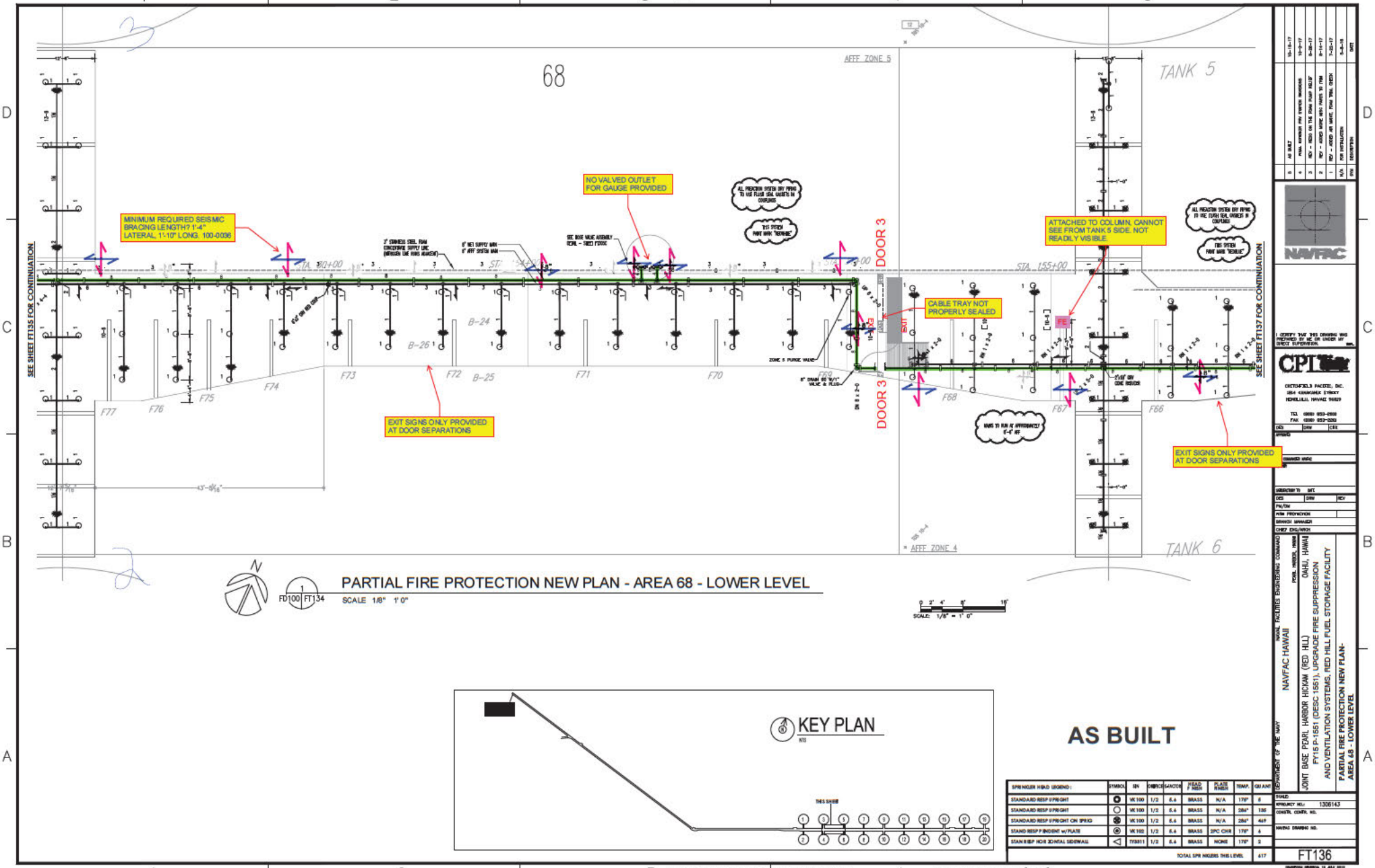
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
PY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FIRE PROTECTION NEW PLAN- AREA 67 - LOWER LEVEL

DRAWING NO. 1306143

FT135

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

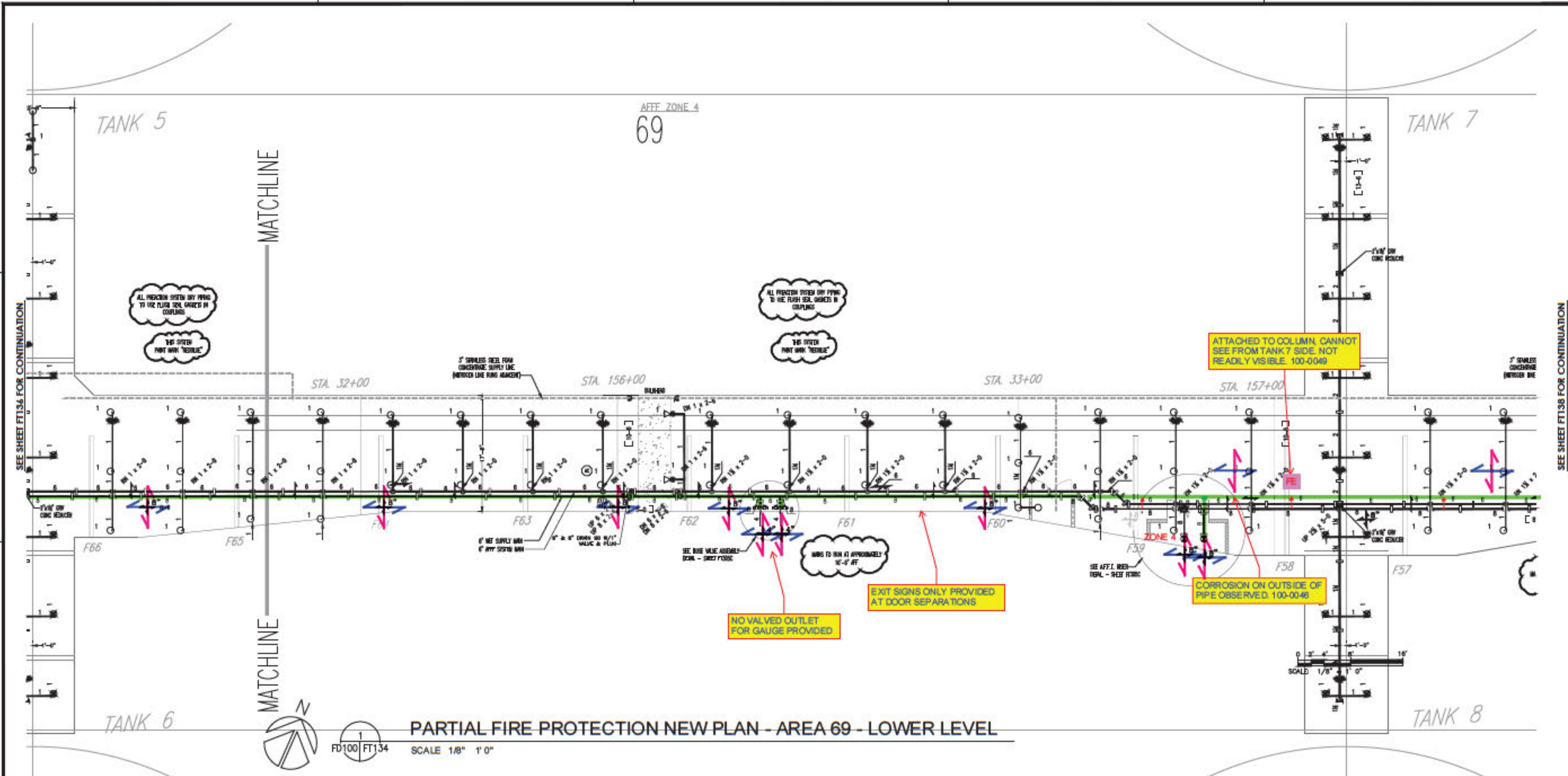
IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES



SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT.
STANDARD RESP U PRIGHT		VK100	1/2	5.6	BRASS	N/A	175°	8
STANDARD RESP U PRIGHT		VK100	1/2	5.6	BRASS	N/A	286°	135
STANDARD RESP U PRIGHT ON SPRIG		VK100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP PENDENT w/PLATE		VK102	1/2	5.6	BRASS	SPC CHR	175°	4
STAN RESP HOR SIDWALL		TY3311	1/2	5.6	BRASS	NONE	175°	2
						TOTAL SPR HEADS THIS LEVEL		617

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

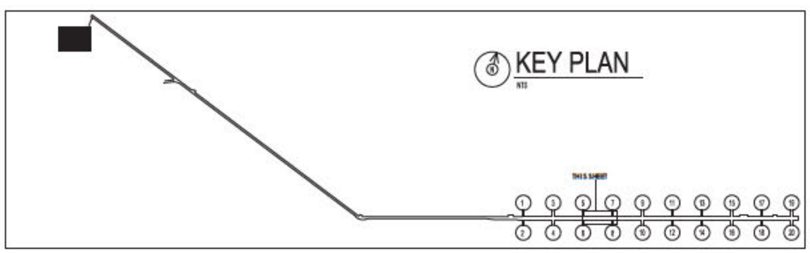
IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES



PARTIAL FIRE PROTECTION NEW PLAN - AREA 69 - LOWER LEVEL

FD100 | FT134

SCALE 1/8" 1' 0"



AS BUILT

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	⊙	VK100	1/2	5.6	BRASS	N/A	175°	6
STANDARD RESP UPRIGHT	○	VK100	1/2	5.6	BRASS	N/A	286°	135
STANDARD RESP UPRIGHT ON SPRIG	⊗	VK100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP PENDENT w/PLATE	◉	VK102	1/2	5.6	BRASS	2PC CHR	175°	6
STAN RESP HORIZONTAL SIDEWALL	◁	TY3311	1/2	5.6	BRASS	NONE	175°	2
							TOTAL SPRINKLERS THIS LEVEL	617

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

NAVFAC

I CERTIFY THAT THIS DRAWING WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION.

CPT

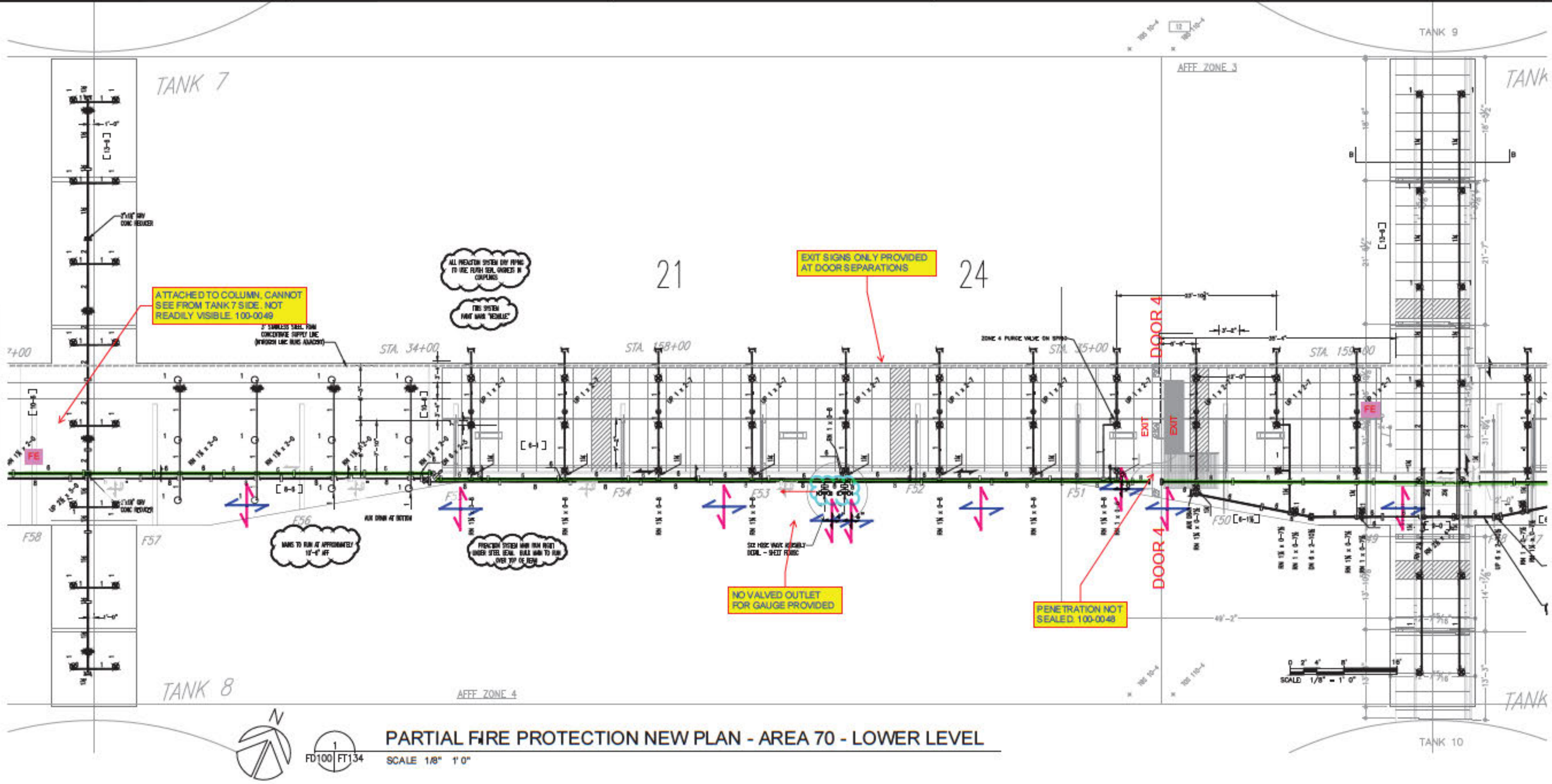
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

PARTIAL FIRE PROTECTION NEW PLAN- AREA 69 - LOWER LEVEL

SCALE:
PROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

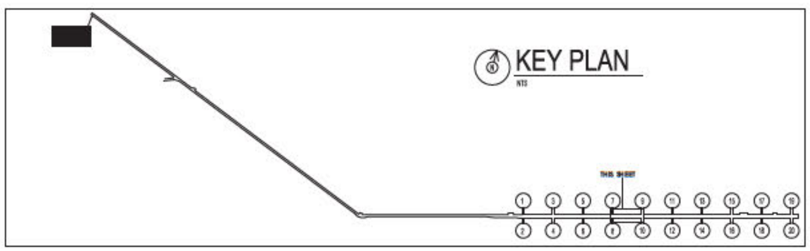
FT137



PARTIAL FIRE PROTECTION NEW PLAN - AREA 70 - LOWER LEVEL

FD100 | FT134

SCALE 1/8" 1' 0"



AS BUILT

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	⊙	VK100	1/2	5.6	BRASS	N/A	175°	5
STANDARD RESP UPRIGHT	○	VK100	1/2	5.6	BRASS	N/A	286°	135
STANDARD RESP UPRIGHT ON SPRIG	⊛	VK100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP PENDENT w/PLATE	◉	VK102	1/2	5.6	BRASS	2PC CHR	175°	4
STAN RESP HORIZONTAL SIDEWALL	◁	TY3311	1/2	5.6	BRASS	NONE	175°	2
TOTAL SPRINKLERS THIS LEVEL								617

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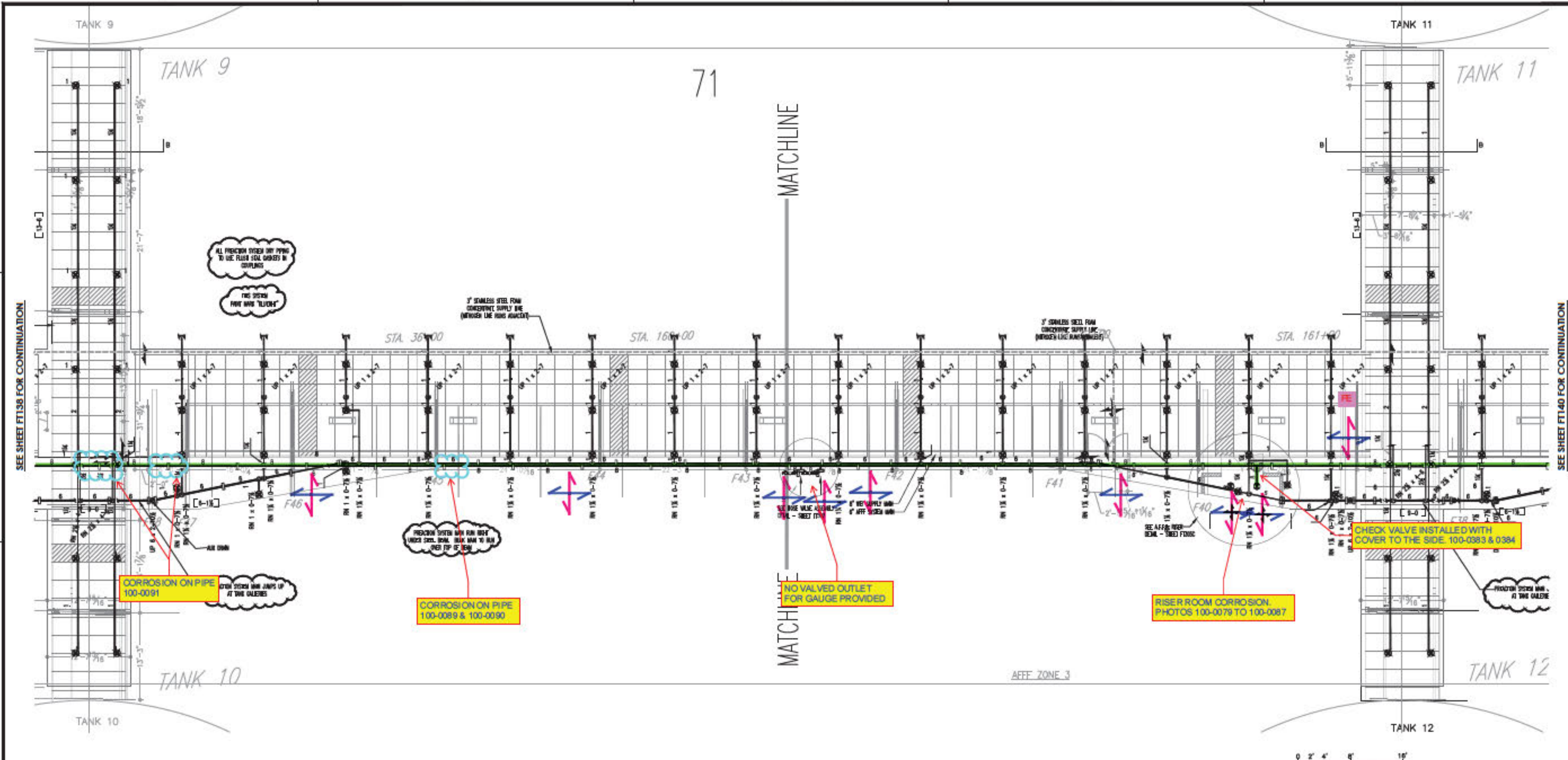
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FIRE PROTECTION NEW PLAN-AREA 70 - LOWER LEVEL

SCALE:
PROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

FT138

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK A[redacted]HE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INS[redacted]HE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

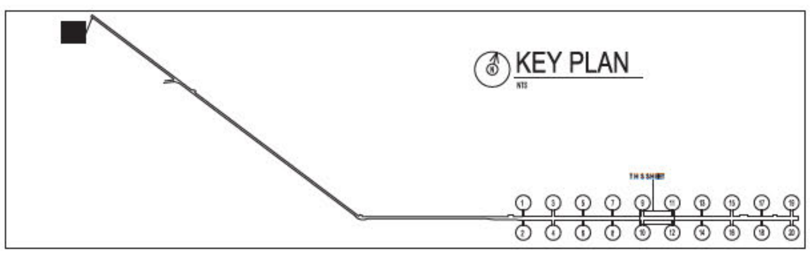
IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES



PARTIAL FIRE PROTECTION NEW PLAN - AREA 71 - LOWER LEVEL

1 FD100 FT134

SCALE 1/8" 1' 0"



AS BUILT

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	◉	VK100	1/2	5.6	BRASS	N/A	175°	5
STANDARD RESP UPRIGHT	○	VK100	1/2	5.6	BRASS	N/A	286°	135
STANDARD RESP UPRIGHT ON SPRIG	⊗	VK100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP PENDENT w/PLATE	⦿	VK102	1/2	5.6	BRASS	2PC CHR	175°	6
STAN RESP HORIZONTAL SIDEWALL	◁	TY3311	1/2	5.6	BRASS	NONE	175°	2
							TOTAL SPRINKLERS THIS LEVEL	617

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK A[redacted]E VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INS[redacted]E INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

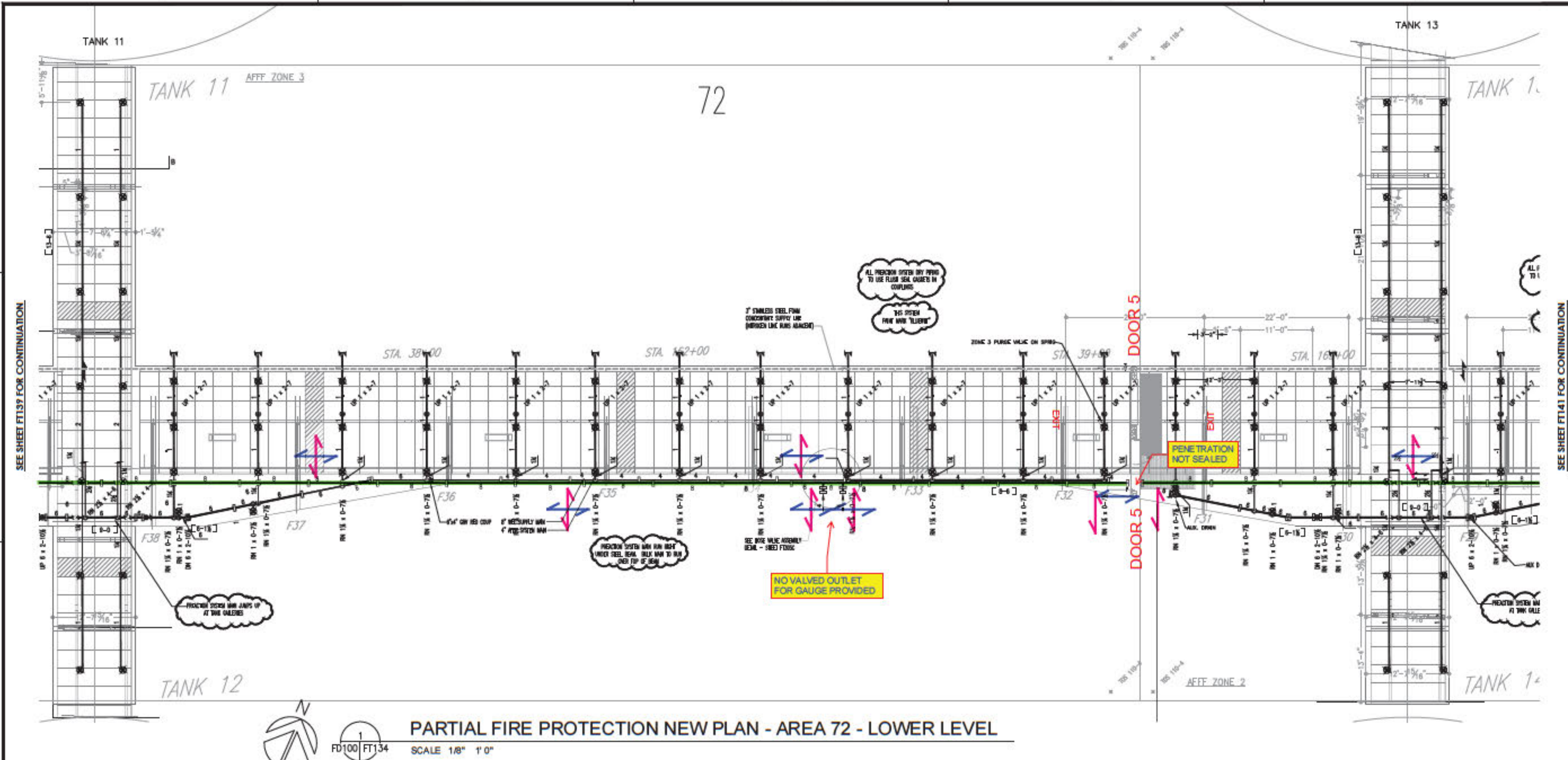
IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

CPT CROSSFIELD PACIFIC, INC.

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FIRE PROTECTION NEW PLAN- AREA 71 - LOWER LEVEL

EPROJECT NO.: 1306143

FT139

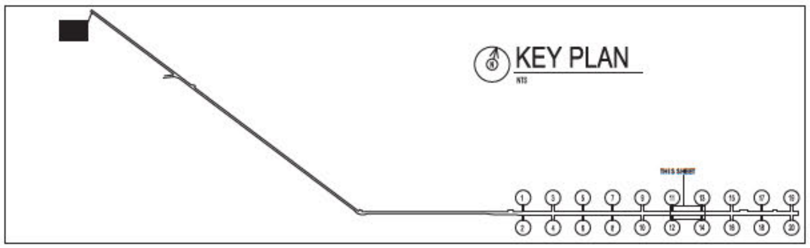


PARTIAL FIRE PROTECTION NEW PLAN - AREA 72 - LOWER LEVEL

FD100 | FT134

SCALE 1/8" 1' 0"

SCALE: 1/8" = 1' 0"



AS BUILT

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	◉	VK100	1/2	5.6	BRASS	N/A	175°	5
STANDARD RESP UPRIGHT	○	VK100	1/2	5.6	BRASS	N/A	286°	135
STANDARD RESP UPRIGHT ON SPRIG	⊗	VK100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP PENDENT w/PLATE	⊙	VK102	1/2	5.6	BRASS	2PC CHR	175°	4
STAN RESP HORIZONTAL SIDEWALL	◁	TY3511	1/2	5.6	BRASS	NONE	175°	2
						TOTAL SPRINKLERS THIS LEVEL		617

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AM[redacted]HE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSU[redacted]HE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

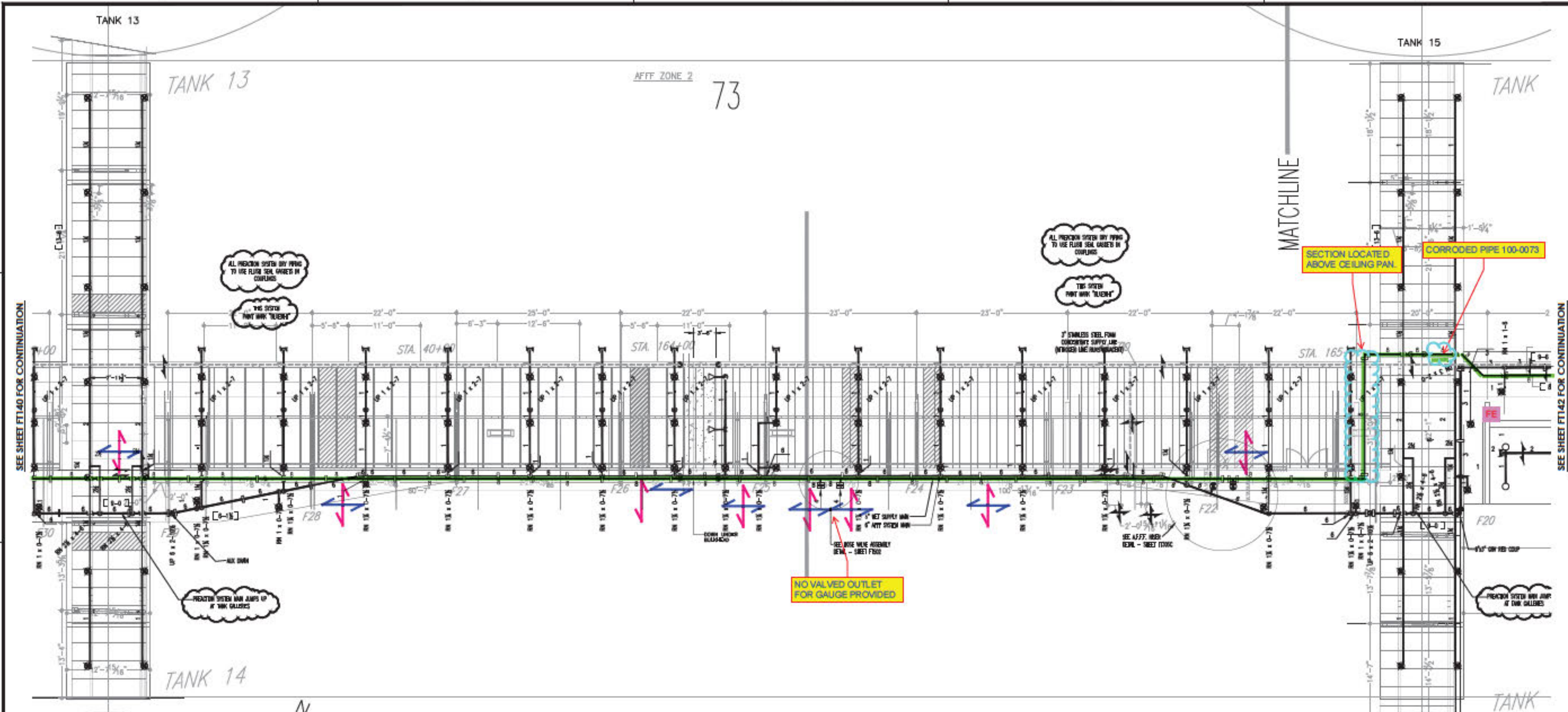
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

PARTIAL FIRE PROTECTION NEW PLAN- AREA 72 - LOWER LEVEL

SCALE:
PROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

FT140

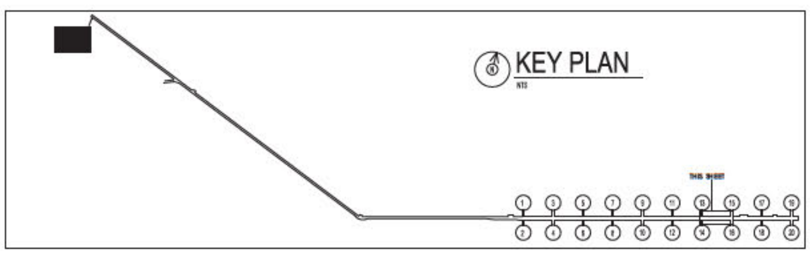


PARTIAL FIRE PROTECTION NEW PLAN - AREA 73 - LOWER LEVEL

FD100 | FT134 — 1

SCALE 1/8" 1' 0"

SCALE: 1/8" = 1' 0"



AS BUILT

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	⦿	VK100	1/2	5.6	BRASS	N/A	175°	5
STANDARD RESP UPRIGHT	○	VK100	1/2	5.6	BRASS	N/A	286°	135
STANDARD RESP UPRIGHT ON SPRIG	⊗	VK100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP PENDENT w/PLATE	◉	VK102	1/2	5.6	BRASS	2PC CHR	175°	6
STAN RESP HORIZONTAL SIDEWALL	◁	TY3511	1/2	5.6	BRASS	NONE	175°	2
						TOTAL SPRINKLERS THIS LEVEL		617

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AM[redacted]E VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INS[redacted]HE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

SYM	DESCRIPTION	DATE
5	AS BUILT	10-18-17
4	FINAL EXTERIOR FRV STATION REVISIONS	10-2-17
3	REV - RESD ON THE FOAM PUMP RELIEF	8-28-17
2	REV - ADDED MORE MISC PARTS TO FRM	8-14-17
1	REV - ADDED AIR MAINT. FOAM TRIAL CHECK	7-25-17
N/A	FOR INSTALLATION	5-8-16

NAVFAC

I CERTIFY THAT THIS DRAWING WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION.

CPI

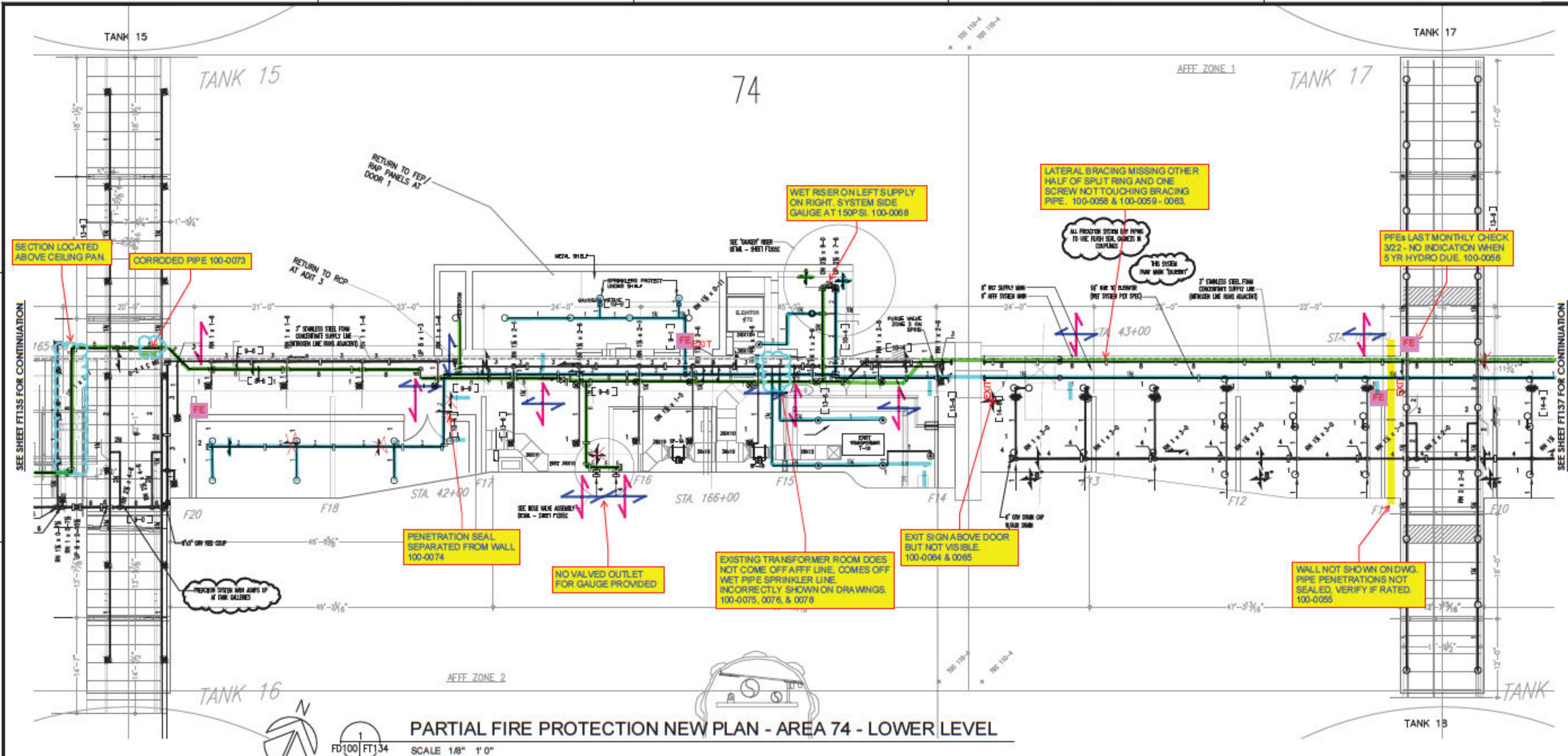
CRITCHFIELD PACIFIC, INC.
1664 KAHANAMOKU STREET
HONOLULU, HAWAII 96819
TEL (808) 853-0500
FAX (808) 853-0263

DES | DRW | CHK
APPROVED
FOR COMMANDER NAVFAC
SATISFACTORY TO | DATE
DES | DRW | REV
PM/DM
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FIRE PROTECTION NEW PLAN- AREA 73 - LOWER LEVEL

SCALE:
EPROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

FT141

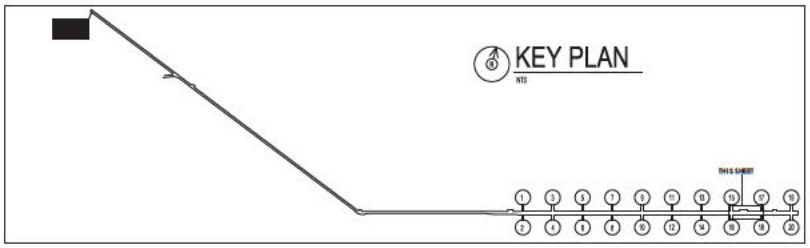


PARTIAL FIRE PROTECTION NEW PLAN - AREA 74 - LOWER LEVEL

1 FD100 FT134

SCALE 1/8" 1' 0"

SCALE: 1/8" = 1' 0"



AS BUILT

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	●	VK100	1/2	5.6	BRASS	N/A	175°	5
STANDARD RESP UPRIGHT	○	VK100	1/2	5.6	BRASS	N/A	286°	135
STANDARD RESP UPRIGHT ON SPRIG	⊗	VK100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP PENDENT w/PLATE	◉	VK102	1/2	5.6	BRASS	2PC CHR	175°	4
STAN RESP HORIZONTAL SIDEWALL	◁	TY3311	1/2	5.6	BRASS	NONE	175°	2
TOTAL SPRINKLERS THIS LEVEL								617

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AM[redacted]E VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INS[redacted]E INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

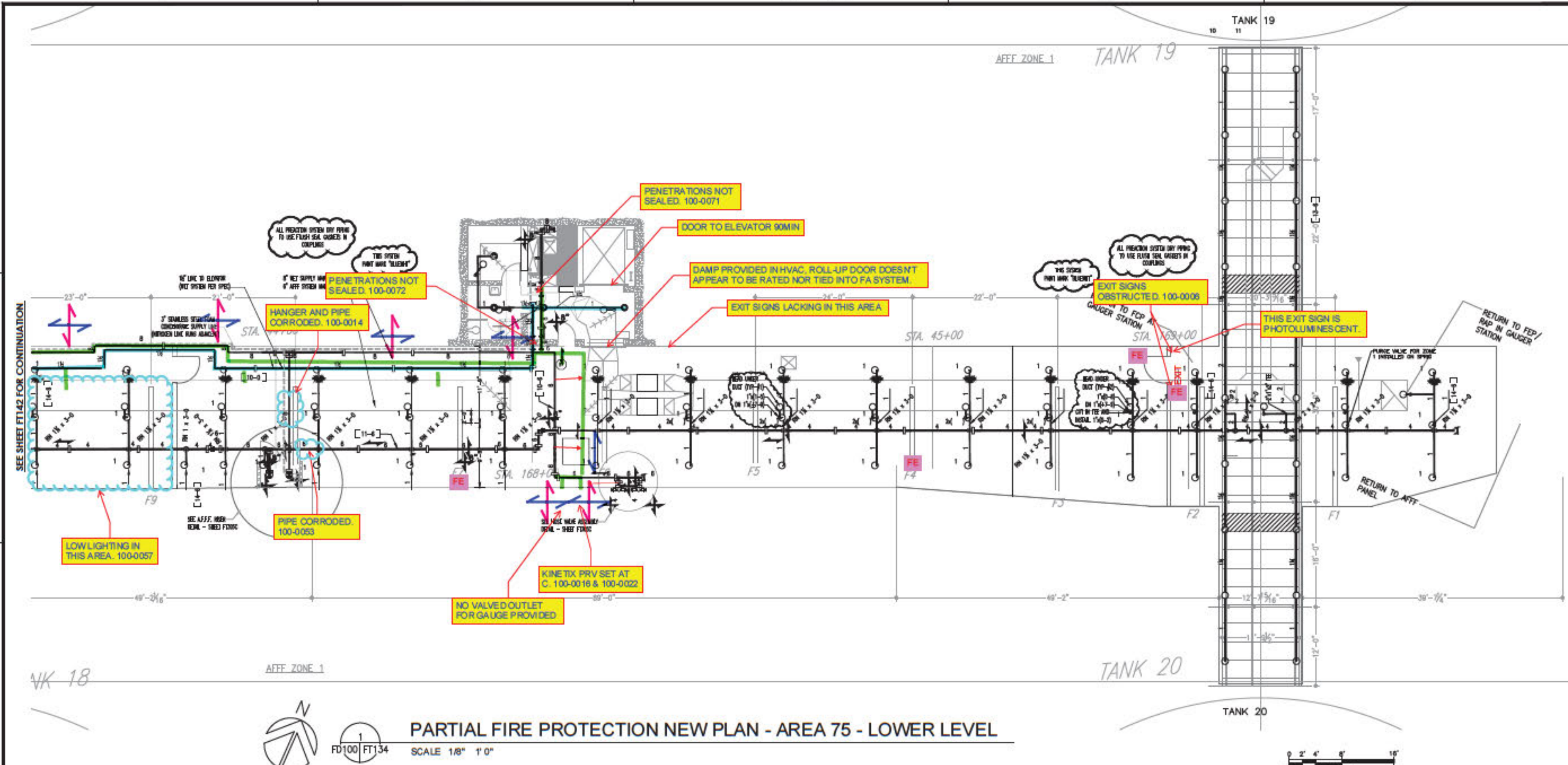
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

PARTIAL FIRE PROTECTION NEW PLAN- AREA 74 - LOWER LEVEL

SCALE:
PROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

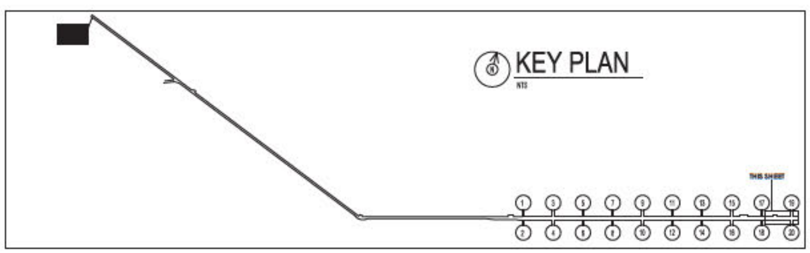
FT142



PARTIAL FIRE PROTECTION NEW PLAN - AREA 75 - LOWER LEVEL

FD100 | FT134

SCALE 1/8" 1' 0"



AS BUILT

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	●	VK100	1/2	5.6	BRASS	N/A	175°	5
STANDARD RESP UPRIGHT	○	VK100	1/2	5.6	BRASS	N/A	286°	135
STANDARD RESP UPRIGHT ON SPRIG	⊗	VK100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP PENDENT w/PLATE	◉	VK102	1/2	5.6	BRASS	2PC CHR	175°	6
STAN RESP HORIZONTAL SIDEWALL	◁	TY3311	1/2	5.6	BRASS	NONE	175°	2
						TOTAL SPRINKLERS THIS LEVEL		617

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK A[redacted]HE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INS[redacted]E INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

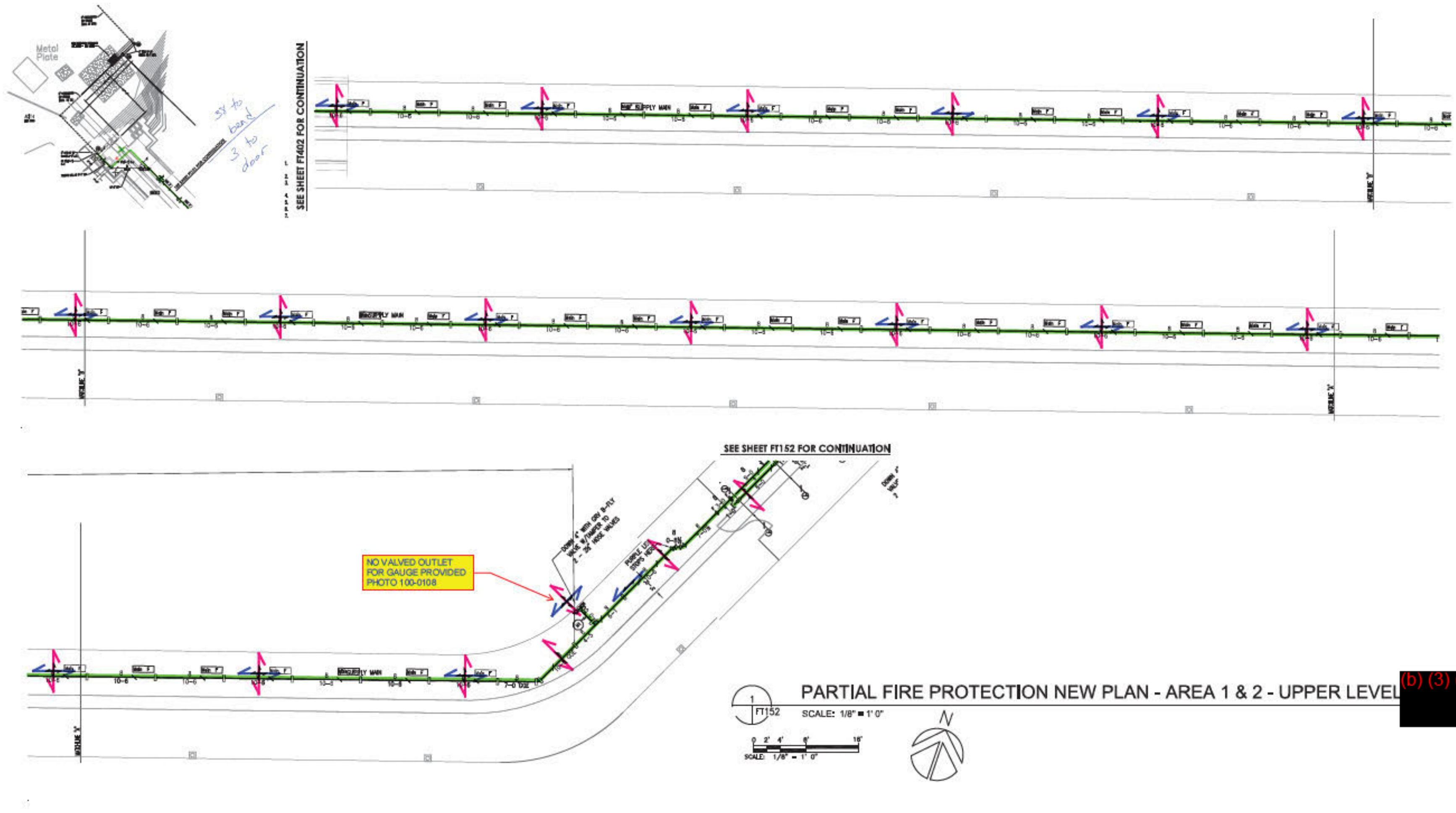
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

PARTIAL FIRE PROTECTION NEW PLAN- AREA 75 - LOWER LEVEL

CRITCHFIELD PACIFIC, INC.

EPROJECT NO.: 1306143

FT143

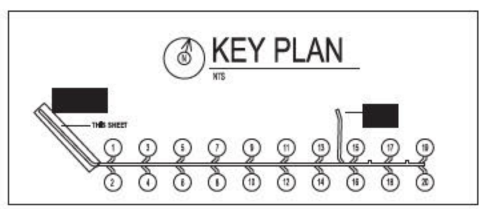


PARTIAL FIRE PROTECTION NEW PLAN - AREA 1 & 2 - UPPER LEVEL (b) (3) (A) [redacted]

1 / FT152

SCALE: 1/8" = 1' 0"

SCALE: 1/8" = 1' 0"



AS BUILT

SPRINKLER HEAD LEGEND :	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	○	VK100	1/2"	5.6	BRASS	N/A	286°	5
STANDARD RESP UPRIGHT ON SPRIG	⊘	VK630	3/4"	11.2	BRASS	N/A	286°	721
QUICK RESP PENDENT	◉	VK302	1/2"	5.6	BRASS	2PC CHR	155°	-
TOTAL SPRINKLERS THIS LEVEL								726

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

SYM	DESCRIPTION	DATE
5	AS BUILT	10-18-17
4	FINAL EXTERIOR FW REVIEW REVISIONS	10-9-17
3	REV – ADDED ON THE FOAM PUMP RELIEF	8-28-17
2	REV – ADDED MORE MISC PARTS TO TRIM	8-14-17
1	REV – ADDED AIR MAINT., FOAM TRIM, CHECK	3-22-17
N/A	FOR INSTALLATION	5-5-16

NAVFAC

I CERTIFY THAT THIS DRAWING WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION.

CPI

CRITCHFIELD PACIFIC, INC.
1804 KAHANAHUE STREET
HONOLULU, HAWAII 96819
TEL (808) 853-2830
FAX (808) 853-2891

DES | DRW | CHK
APPROVED
FOR COMMANDER NAVFAC
SATISFACTORY TO | DATE
DES | DRW | RAV
PM/DM
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII — PEARL HARBOR, HAWAII

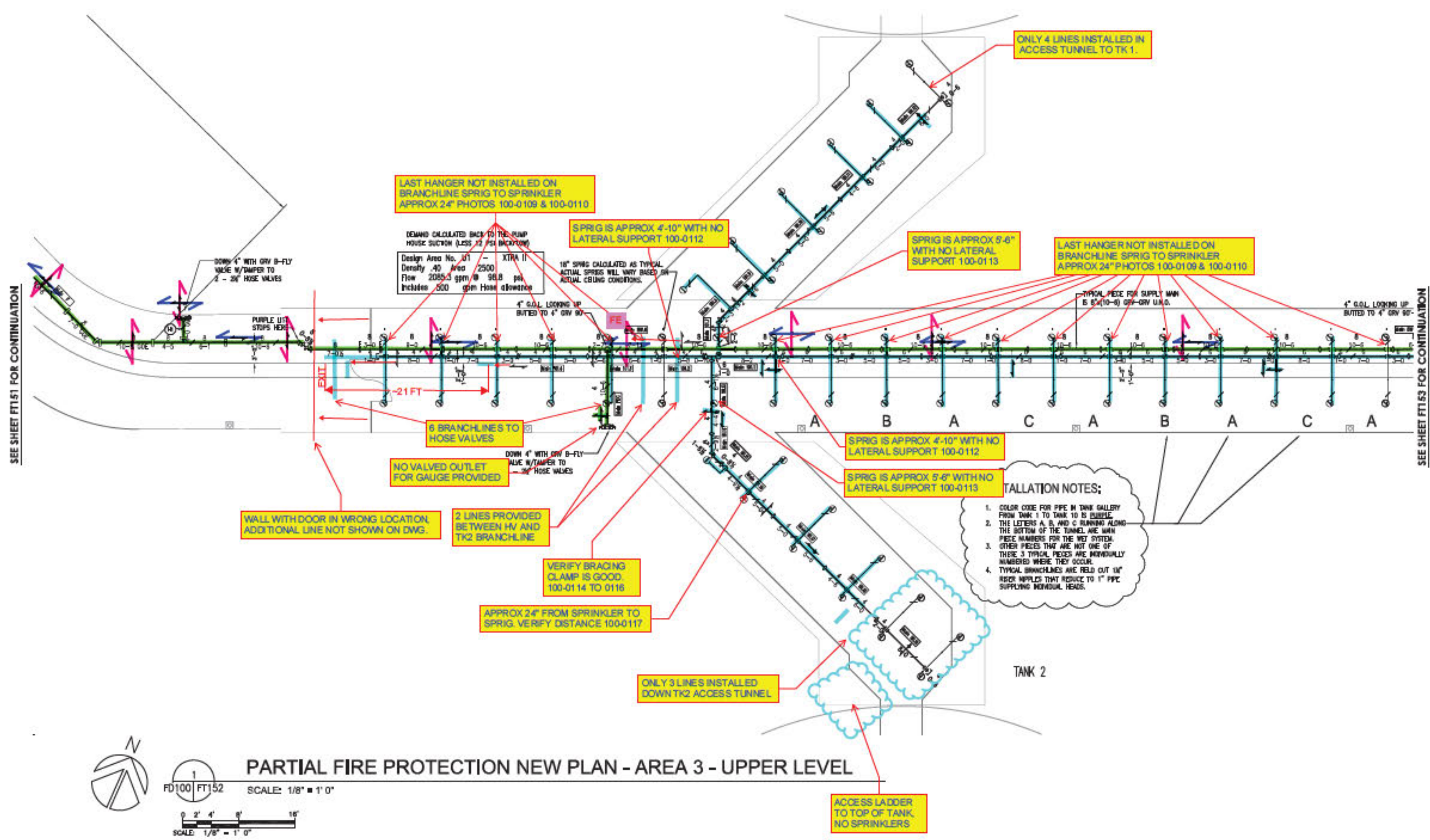
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

PARTIAL FIRE PROTECTOIN NEW PLAN- AREA 1 & 2 - UPPER LEVEL - ADIT 4

SCALE:
PROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

FT151

DRAWFORM REVISION: 19 JULY 2012



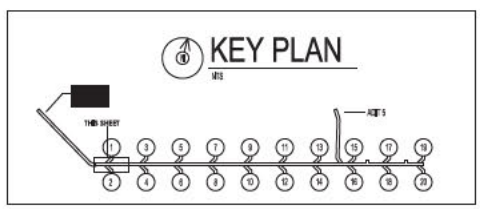
INSTALLATION NOTES:

1. COLOR CODE FOR PIPE IN TANK GALLERY FROM TANK 1 TO TANK 10 IS PURPLE.
2. THE LETTERS A, B, AND C RUNNING ALONG THE BOTTOM OF THE TUNNEL ARE MAIN PIECE NUMBERS FOR THE WET SYSTEM.
3. OTHER PIECES THAT ARE NOT ONE OF THERE 3 TYPICAL PIECES ARE INDIVIDUALLY NUMBERED WHERE THEY OCCUR.
4. TYPICAL BRANCHLINES ARE FIELD CUT 1¼" RISER NIPPLES THAT REDUCE TO 1" PIPE SUPPLYING INDIVIDUAL HEADS.

PARTIAL FIRE PROTECTION NEW PLAN - AREA 3 - UPPER LEVEL

FD100 | FT152

SCALE: 1/8" = 1' 0"



AS BUILT

SPRINKLER HEAD LEGEND :	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	○	VK100	1/2"	5.6	BRASS	N/A	286°	5
STANDARD RESP UPRIGHT ON SPRIG	⊘	VK530	3/4"	11.2	BRASS	N/A	286°	721
QUICK RESP PENDENT	◉	VK302	1/2"	5.6	BRASS	2PC CHR	155°	-
TOTAL SPRINKLERS THIS LEVEL								726

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT - USE GRAPHIC SCALES

SYM	DESCRIPTION	DATE
5	AS BUILT	10-18-17
4	FINAL EXTERIOR FPR REVIEW REVISIONS	10-2-17
3	REV - RECD ON THE FOAM PUMP HOLES	8-28-17
2	REV - ADDED MORE MISC PARTS TO TRM	8-11-17
1	REV - ADDED AIR MAINT, FOAM TRIAL CHECK	3-22-17
N/A	FOR INSTALLATION	2-8-16

NAVFAC

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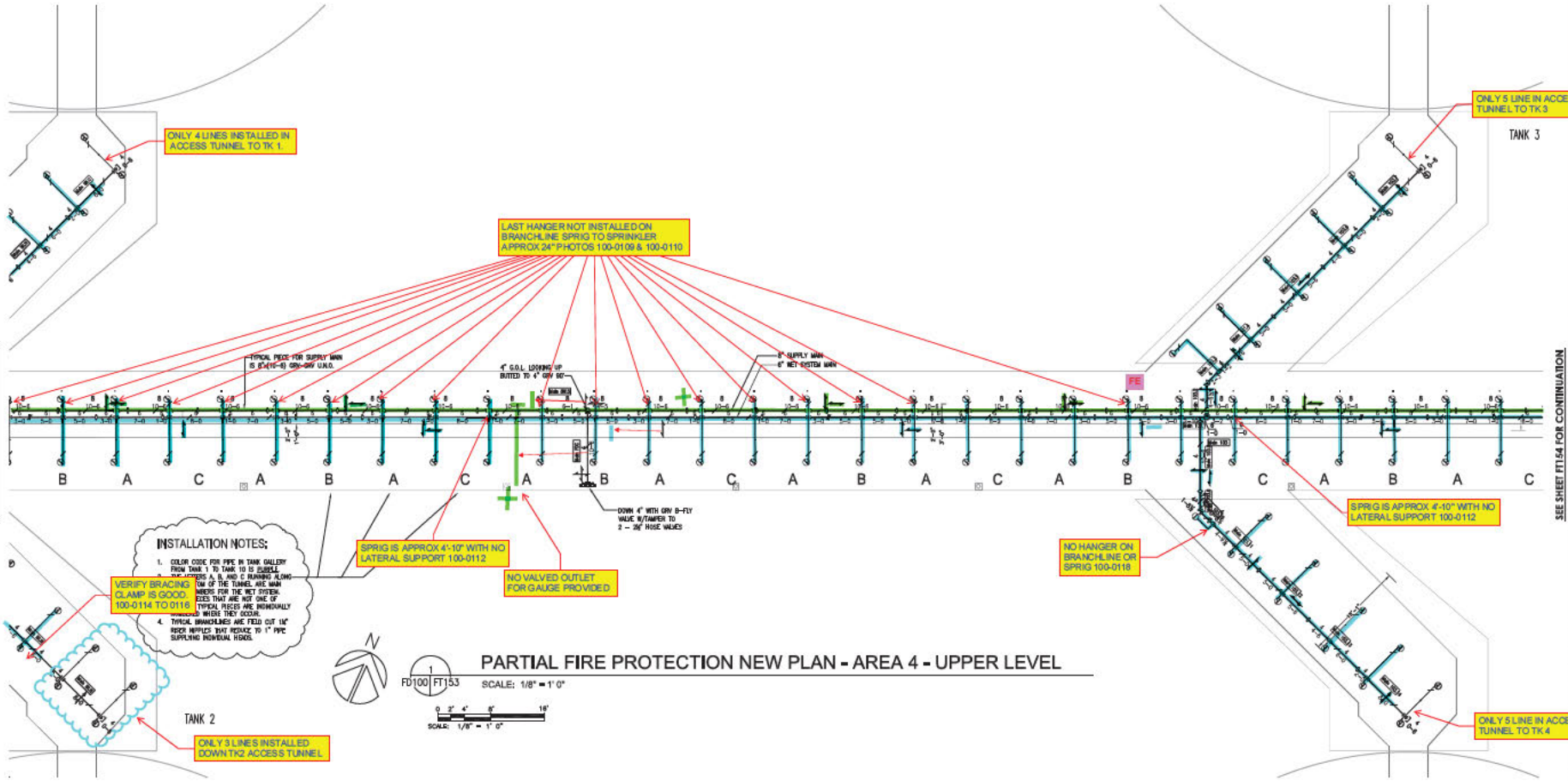
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FIRE PROTECTION NEW PLAN - AREA 3 - UPPER LEVEL

PROJECT NO. 1306143

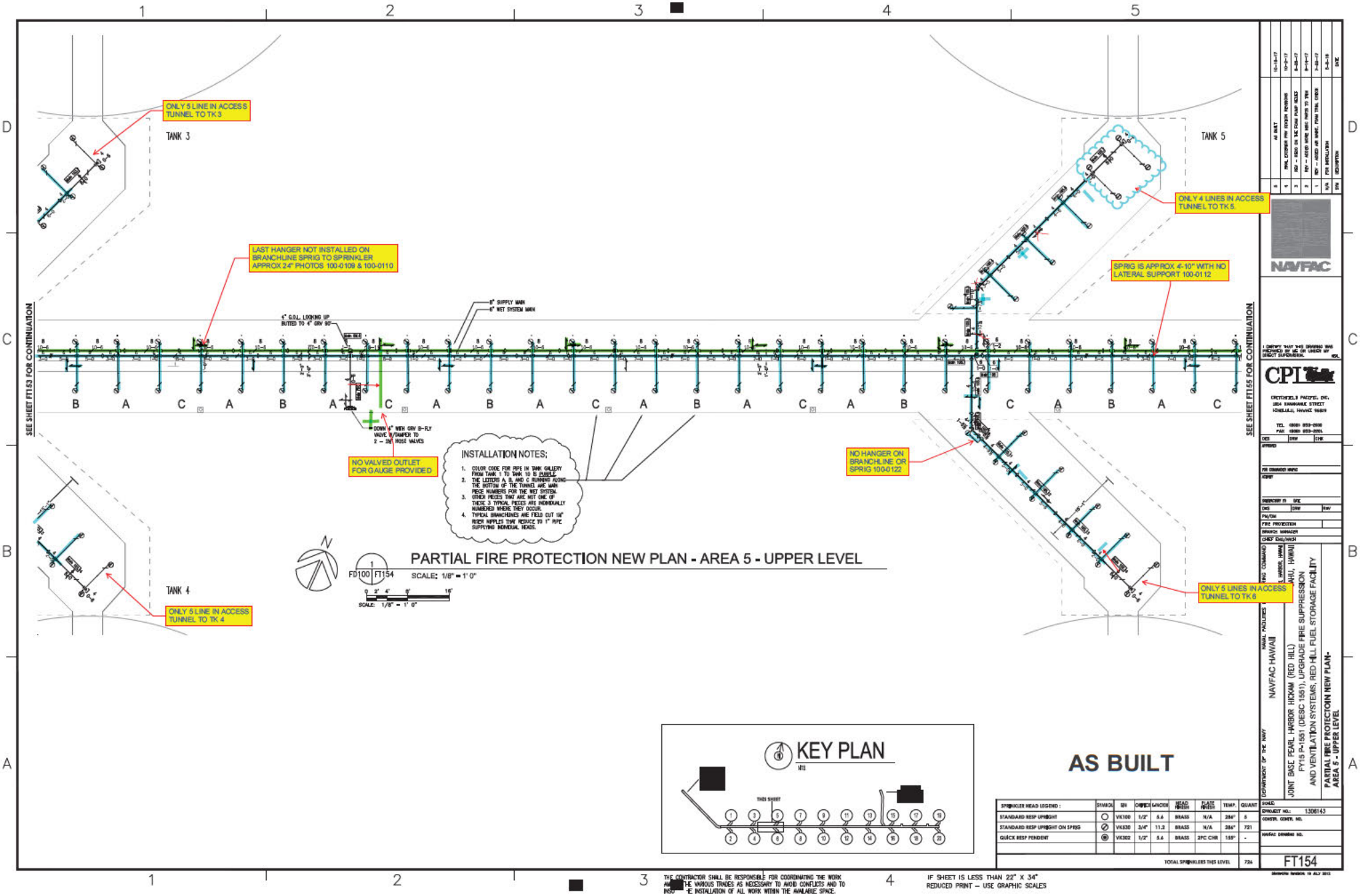
FT152

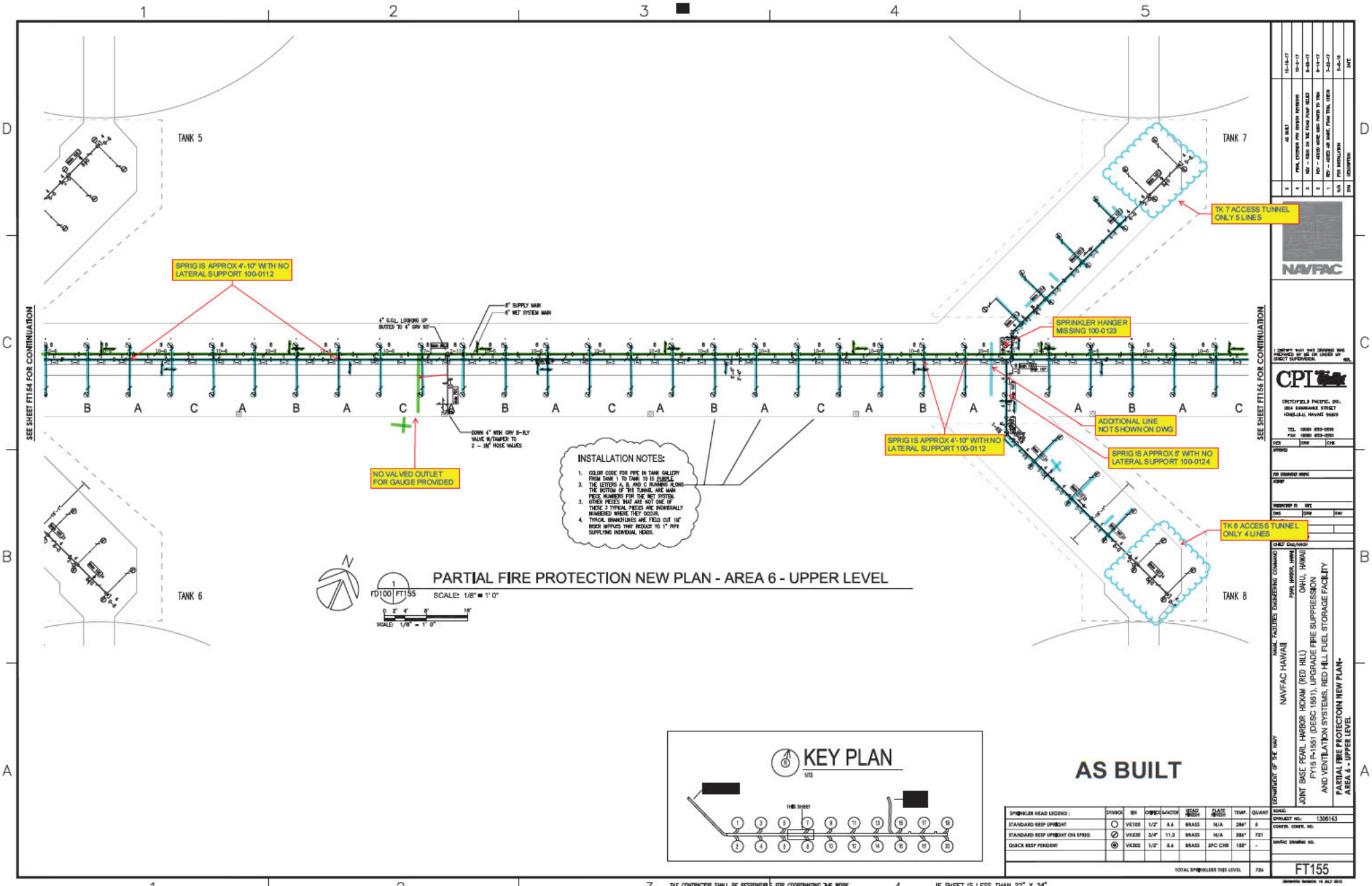


SPRINKLER HEAD LEGEND :	SYMBOL	MFR	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	○	VK100	1/2"	5.6	BRASS	N/A	286°	8
STANDARD RESP UPRIGHT ON SPRIG	⊘	VK830	3/4"	11.2	BRASS	N/A	286°	721
QUICK RESP PENDENT	⊛	VK302	1/2"	5.6	BRASS	3PC CHR	155°	-
							TOTAL SPRINKLERS THIS LEVEL	726

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK OF THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

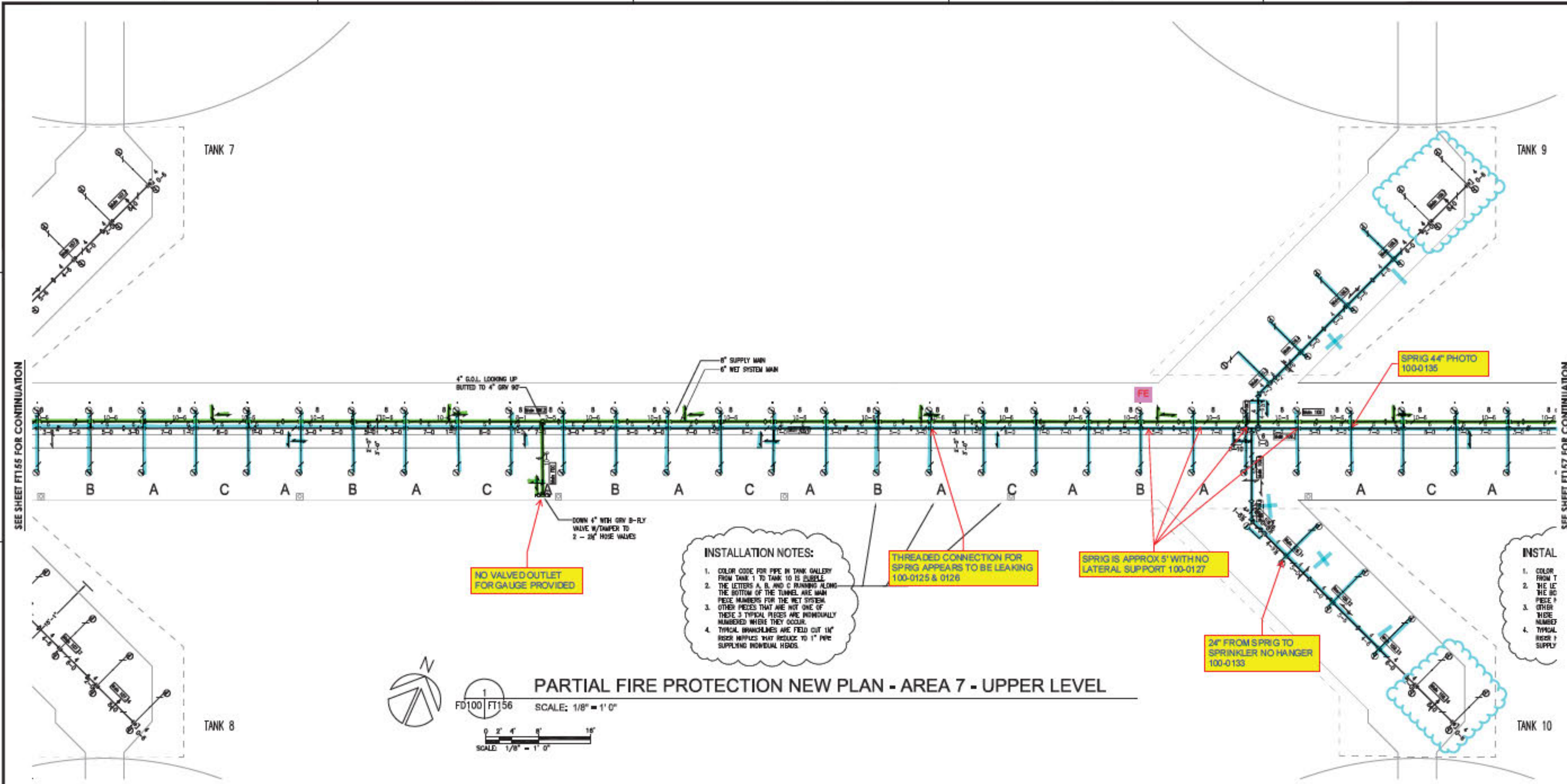
IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT -- USE GRAPHIC SCALES


ONLY 5 LINE IN ACCESS TUNNEL TO TK 3
TANK 3
LAST HANGER NOT INSTALLED ON BRANCHLINE SPRIG TO SPRINKLER APPROX 2'4" PHOTOS 100-0109 & 100-0110
4" G.S.L. LOOKING UP BUTTED TO 4" GRV 90°
6" SUPPLY MAIN
6" WET SYSTEM MAIN
DOWN 4" WITH GRV B-FLY VALVE W/DAMPER TO 2 - 3/4" HOSE VALVES
NO VALVED OUTLET FOR GAUGE PROVIDED
SEE SHEET FT153 FOR CONTINUATION
B A C A B A C A B A C A B A C A B A C A B C A B A C
INSTALLATION NOTES:
1. COLOR CODE FOR PIPE IN TANK GALLERY FROM TANK 1 TO TANK 10 IS PURPLE.
2. THE LETTERS A, B, AND C RUNNING ALONG THE BOTTOM OF THE TUNNEL ARE MAIN PIPE NUMBERS FOR THE WET SYSTEM.
3. OTHER PIPES THAT ARE NOT ONE OF THESE 3 TYPICAL PIPES ARE INDIVIDUALLY NUMBERED WHERE THEY OCCUR.
4. TYPICAL BRANCHLINES ARE FIELD CUT 10" FROM NIPPLES THAT REDUCE TO 1" PIPE SUPPLYING INDIVIDUAL HEADS.
N
1 FD100 | FT154
SCALE: 1/8" = 1' 0"
0 2' 4' 8' 16'
SCALE: 1/8" = 1' 0"
PARTIAL FIRE PROTECTION NEW PLAN - AREA 5 - UPPER LEVEL
TANK 4
ONLY 5 LINE IN ACCESS TUNNEL TO TK 4
TANK 5
ONLY 4 LINES IN ACCESS TUNNEL TO TK 5.
SPRIG IS APPROX 4'-10" WITH NO LATERAL SUPPORT 100-0112
NO HANGER ON BRANCHLINE OR SPRIG 100-0122
ONLY 5 LINES IN ACCESS TUNNEL TO TK 6
SEE SHEET FT155 FOR CONTINUATION
KEY PLAN
THIS SHEET
1 3 5 7 9 11 13 15 17 19
2 4 6 8 10 12 14 16 18 20
AS BUILT
SPRINKLER HEAD LEGEND : | SYMBOL | MFR | ORIFICE | K-FACTOR | HEAD FINISH | PLATE FINISH | TEMP. | QUANT
STANDARD RESP UPRIGHT | ○ | VK100 | 1/2" | 5.6 | BRASS | N/A | 286° | 5
STANDARD RESP UPRIGHT ON SPRIG | ⊘ | VK830 | 3/4" | 11.2 | BRASS | N/A | 286° | 721
QUICK RESP PENDENT | ◉ | VK302 | 1/2" | 5.6 | BRASS | 3PC CHR | 155° | -
TOTAL SPRINKLERS THIS LEVEL | 726
THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK OF THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.
IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES
AS BUILT
NAVFAC
CPL
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FIRE PROTECTOIN NEW PLAN- AREA 5 - UPPER LEVEL
DRAWING NO. 1308143
FT154



THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES



INSTALLATION NOTES:

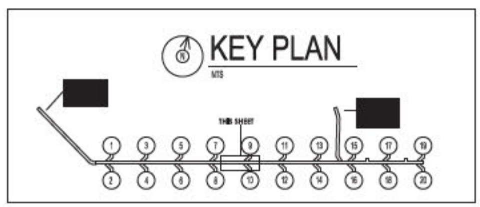
1. COLOR CODE FOR PIPE IN TANK GALLERY FROM TANK 1 TO TANK 10 IS PURPLE.
2. THE LETTERS A, B, AND C RUNNING ALONG THE BOTTOM OF THE TUNNEL ARE MAIN PIECE NUMBERS FOR THE WET SYSTEM.
3. OTHER PIECES THAT ARE NOT ONE OF THESE 3 TYPICAL PIECES ARE INDIVIDUALLY NUMBERED WHERE THEY OCCUR.
4. TYPICAL BRANCHLINES ARE FIELD CUT 1¼" RISER NIPPLES THAT REDUCE TO 1" PIPE SUPPLYING INDIVIDUAL HEADS.

PARTIAL FIRE PROTECTION NEW PLAN - AREA 7 - UPPER LEVEL

1 FD100 FT156

SCALE: 1/8" = 1' 0"

SCALE: 1/8" = 1' 0"



[redacted]

AS BUILT

SPRINKLER HEAD LEGEND :	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	○	VK100	1/2"	5.6	BRASS	N/A	286°	5
STANDARD RESP UPRIGHT ON SPRIG	⊘	VK530	3/4"	11.2	BRASS	N/A	286°	721
QUICK RESP PENDENT	◉	VK302	1/2"	5.6	BRASS	2PC CHR	155°	-
						TOTAL SPRINKLERS THIS LEVEL		726

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK A[redacted]HE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INST[redacted]HE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

SYM	DESCRIPTION	DATE
5	AS BUILT	10-18-17
4	FINAL EXTERIOR FPW REVIEW REVISIONS	10-2-17
3	REV – SIZED ON THE FOAM PUMP RELIEF	8-28-17
2	REV – ADDED MORE MISC PARTS TO TRIM	8-14-17
1	REV – ADDED AIR MAINT, FOAM TRIM, CHECK	3-22-17
N/A	FOR INSTALLATION	5-8-16

NAVFAC

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CPI

CRITCHFIELD PACIFIC, INC.
1804 KAMAKAHUE STREET
HONOLULU, HAWAII 96819
TEL (808) 853-2000
FAX (808) 853-2001

DES | DRW | CHK
APPROVED
FOR COMMANDER NAVFAC
ACTIVITY
SATISFACTORY TO | DATE
DES | DRW | REV
PM/DM
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

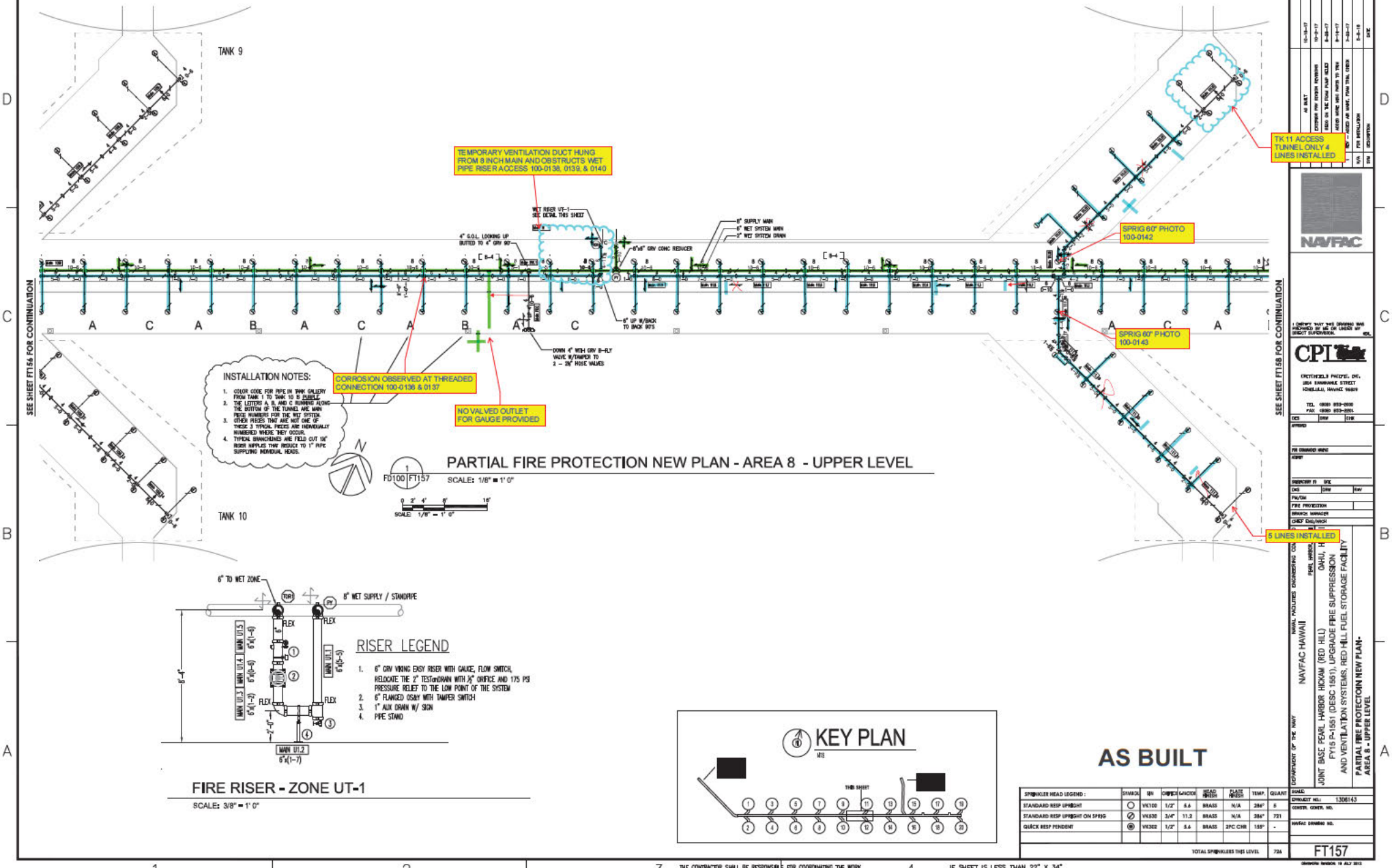
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION
AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

PARTIAL FIRE PROTECTOIN NEW PLAN-
AREA 7 - UPPER LEVEL

SCALE:
EPROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

FT156

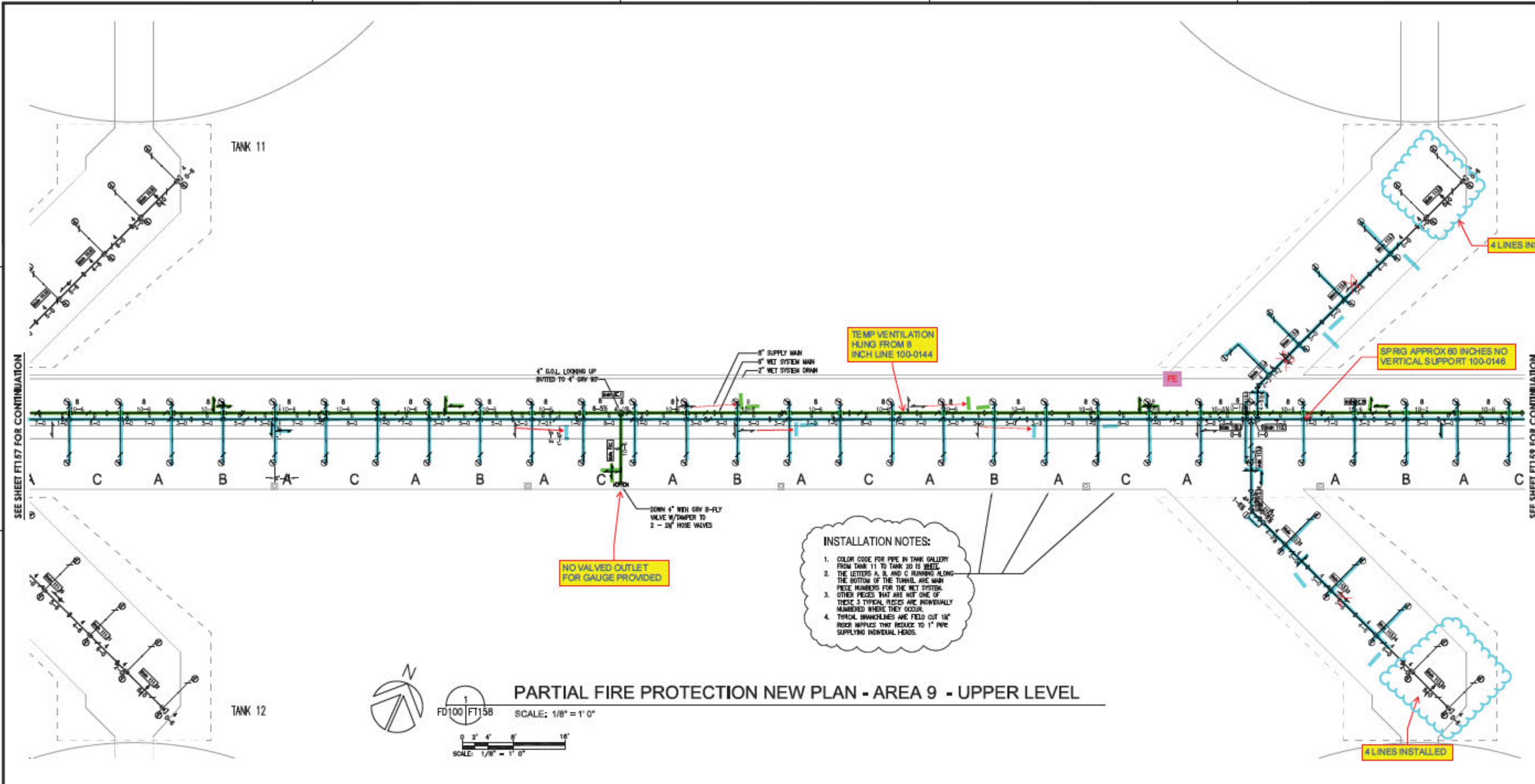
DRAWFORM REVISION 19 JULY 2012



SPRINKLER HEAD LEGEND :	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	○	VK100	1/2"	5.6	BRASS	N/A	286°	5
STANDARD RESP UPRIGHT ON SPRIG	⊘	VK830	3/4"	11.2	BRASS	N/A	286°	721
QUICK RESP PENDENT	⊛	VK302	1/2"	5.6	BRASS	3PC CHR	155°	-
						TOTAL SPRINKLERS THIS LEVEL		726

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT -- USE GRAPHIC SCALES



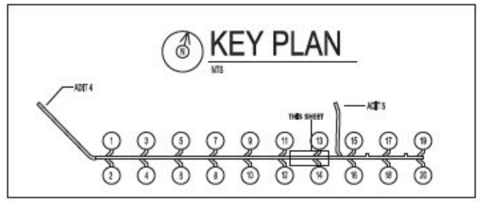
INSTALLATION NOTES:

1. COLOR CODE FOR PIPE IN TANK GALLERY FROM TANK 11 TO TANK 20 IS WHITE.
2. THE LETTERS A, B, AND C RUNNING ALONG THE BOTTOM OF THE TUNNEL ARE MAIN PIECE NUMBERS FOR THE WET SYSTEM.
3. OTHER PIECES THAT ARE NOT ONE OF THESE 3 TYPICAL PIECES ARE INDIVIDUALLY NUMBERED WHERE THEY OCCUR.
4. TYPICAL BRANCHLINES ARE FIELD CUT 1¼" RISER NIPPLES THAT REDUCE TO 1" PIPE SUPPLYING INDIVIDUAL HEADS.

PARTIAL FIRE PROTECTION NEW PLAN - AREA 9 - UPPER LEVEL

FD100 | FT158

SCALE: 1/8" = 1' 0"



AS BUILT

SPRINKLER HEAD LEGEND :	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	○	VK100	1/2"	5.6	BRASS	N/A	286°	5
STANDARD RESP UPRIGHT ON SPRIG	⊘	VK530	3/4"	11.2	BRASS	N/A	286°	721
QUICK RESP PENDENT	◉	VK302	1/2"	5.6	BRASS	2PC CHR	155°	•
TOTAL SPRINKLERS THIS LEVEL								726

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

NAVFAC

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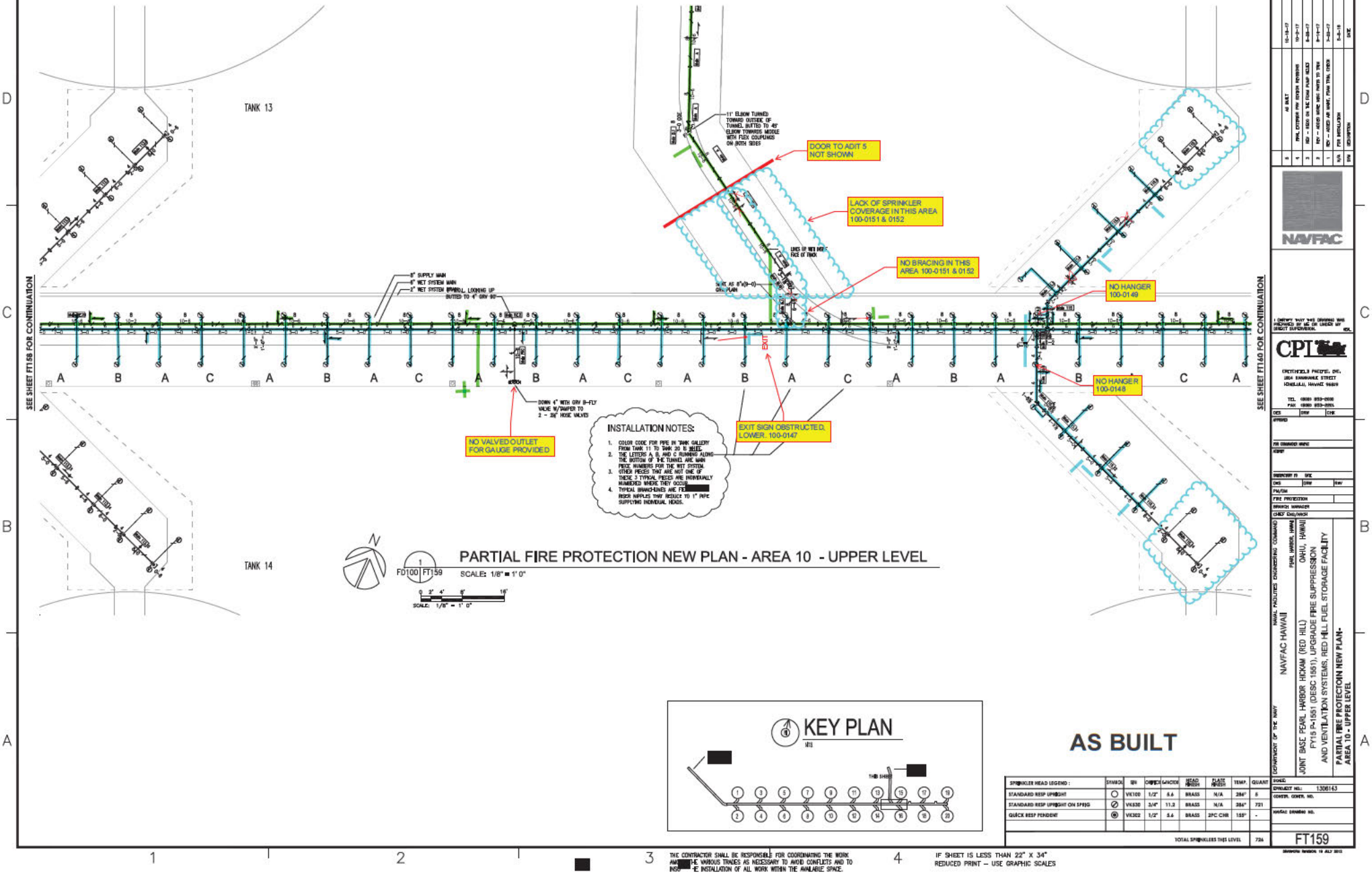
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

PARTIAL FIRE PROTECTION NEW PLAN - AREA 9 - UPPER LEVEL

EPROJECT NO.: 1308143

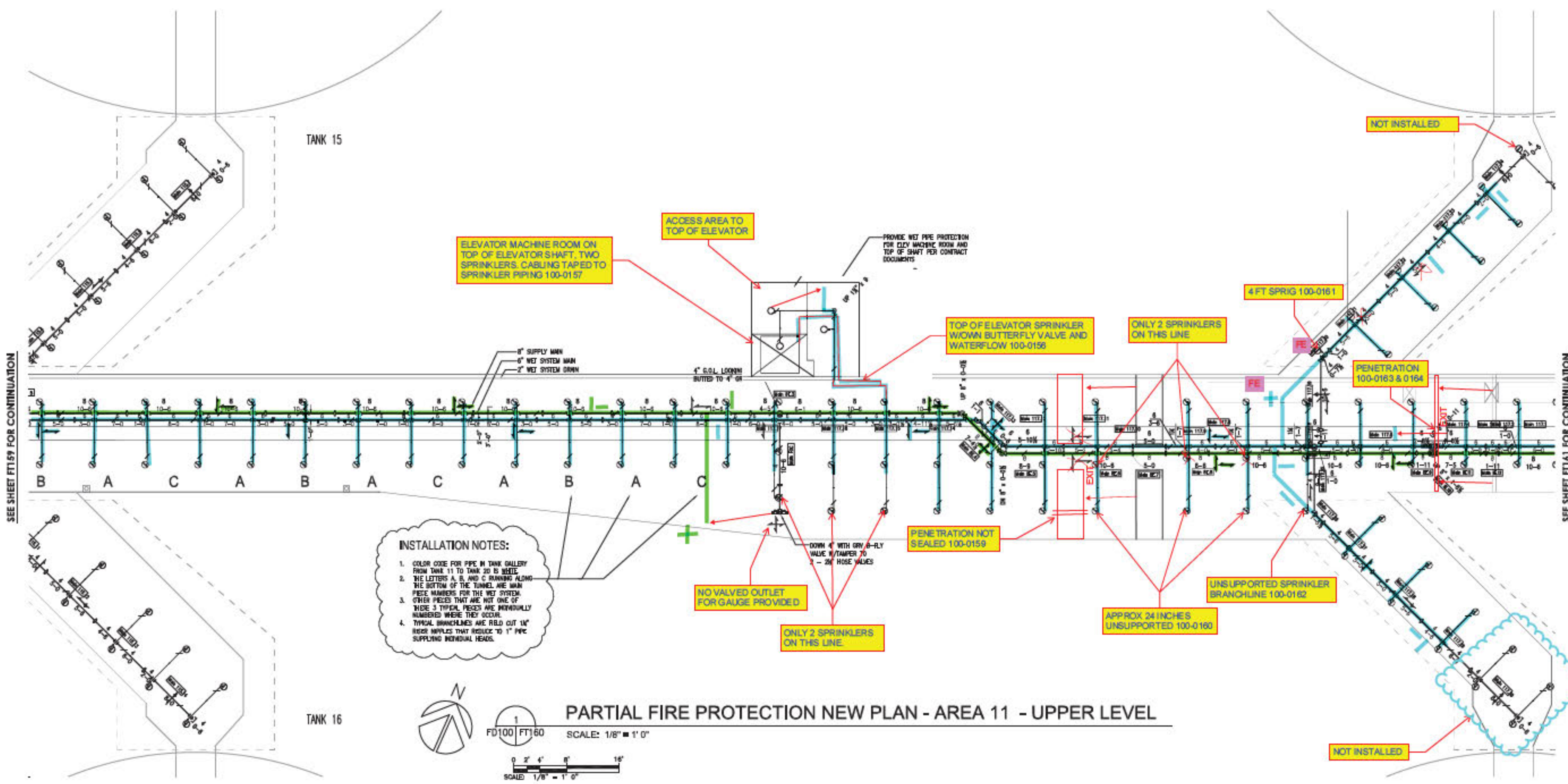
FT158



SPRINKLER HEAD LEGEND :	SYMBOL	P/N	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	○	VK100	1/2"	5.6	BRASS	N/A	286°	5
STANDARD RESP UPRIGHT ON SPRIG	⊘	VK830	3/4"	11.2	BRASS	N/A	286°	721
QUICK RESP PENDENT	⊛	VK302	1/2"	5.6	BRASS	3PC CHR	155°	-
						TOTAL SPRINKLERS THIS LEVEL		726

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

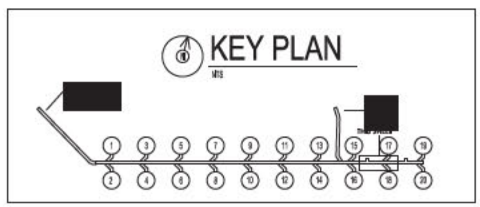
IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT -- USE GRAPHIC SCALES



PARTIAL FIRE PROTECTION NEW PLAN - AREA 11 - UPPER LEVEL

1 FD100 FT160

SCALE: 1/8" = 1' 0"



AS BUILT

SPRINKLER HEAD LEGEND :	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	○	VK100	1/2"	5.6	BRASS	N/A	286°	5
STANDARD RESP UPRIGHT ON SPRIG	⊘	VK530	3/4"	11.2	BRASS	N/A	286°	721
QUICK RESP PENDENT	◉	VK302	1/2"	5.6	BRASS	2PC CHR	155°	-
TOTAL SPRINKLERS THIS LEVEL								726

SYM	DESCRIPTION	DATE
5	AS BUILT	10-18-17
4	FINAL EXTERIOR FHV STATION REVISIONS	10-2-17
3	REV - RISER ON THE FOAM PUMP SKID	8-28-17
2	REV - ADDED MORE MISC PARTS TO TRIM	8-14-17
1	REV - ADDED AIR MAINT, FOAM TRIM, CHECK	7-28-17
N/A	FOR INSTALLATION	5-8-16

NAVFAC

I CERTIFY THAT THIS DRAWING WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION. SEAL

CPI

CRETCHFIELD PACIFIC, INC.
1804 KAHANAHUE STREET
HONOLULU, HAWAII 96819
TEL (808) 853-2600
FAX (808) 853-2201

DES | DRW | CHK
APPROVED
FOR COMMANDER NAVFAC
SUBMIT
SATISFACTORY TO DATE
DES | DRW | REV
PM/DM
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

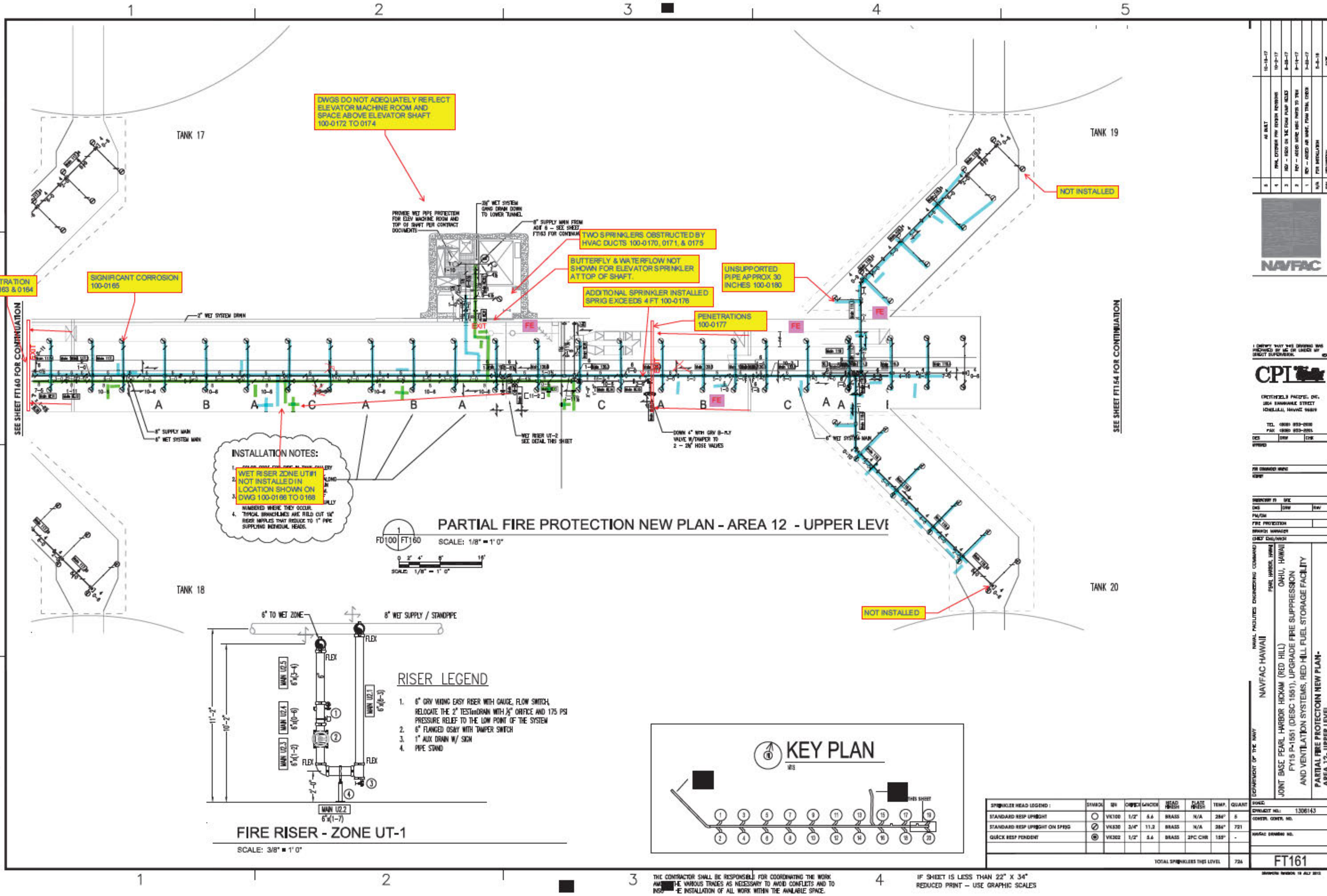
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FIRE PROTECTION NEW PLAN- AREA 11 - UPPER LEVEL

SCALE:
PROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.
FT160

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AM[redacted]HE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSU[redacted]E INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

[redacted]


DWGS DO NOT ADEQUATELY REFLECT ELEVATOR MACHINE ROOM AND SPACE ABOVE ELEVATOR SHAFT 100-0172 TO 0174
TANK 17
TANK 19
TANK 18
TANK 20
NOT INSTALLED
TWO SPRINKLERS OBSTRUCTED BY HVAC DUCTS 100-0170, 0171, & 0175
BUTTERFLY & WATERFLOW NOT SHOWN FOR ELEVATOR SPRINKLER AT TOP OF SHAFT.
UNSUPPORTED PIPE APPROX 30 INCHES 100-0180
ADDITIONAL SPRINKLER INSTALLED SPRIG EXCEEDS 4 FT 100-0176
PENETRATIONS 100-0177
PENETRATION 100-0163 & 0164
SIGNIFICANT CORROSION 100-0165
SEE SHEET FT160 FOR CONTINUATION
SEE SHEET FT154 FOR CONTINUATION
2" WET SYSTEM DRAIN
8" SUPPLY MAIN
6" WET SYSTEM MAIN
WET RISER UT-2 SEE DETAIL THIS SHEET
DOWN 4" WITH GRV B-FLY VALVE W/TAMPER TO 2 - 2½" HOSE VALVES
INSTALLATION NOTES:
WET RISER ZONE UT#1 NOT INSTALLED IN LOCATION SHOWN ON DWG 100-0166 TO 0168
NUMBERED WHERE THEY OCCUR.
4. TYPICAL BRANCHLINES ARE FIELD CUT 1¼" RISER NIPPLES THAT REDUCE TO 1" PIPE SUPPLYING INDIVIDUAL HEADS.
PARTIAL FIRE PROTECTION NEW PLAN - AREA 12 - UPPER LEVEL
SCALE: 1/8" = 1' 0"
6" TO WET ZONE
8" WET SUPPLY / STANDPIPE
FLEX
RISER LEGEND
1. 6" GRV VIKING EASY RISER WITH GAUGE, FLOW SWITCH, RELOCATE THE 2" TEST and DRAIN WITH ½" ORIFICE AND 175 PSI PRESSURE RELIEF TO THE LOW POINT OF THE SYSTEM
2. 6" FLANGED OS&Y WITH TAMPER SWITCH
3. 1" AUX DRAIN W/ SIGN
4. PIPE STAND
FIRE RISER - ZONE UT-1
SCALE: 3/8" = 1' 0"
KEY PLAN
THIS SHEET
SPRINKLER HEAD LEGEND:
STANDARD RESP UPRIGHT VK100 1/2" 5.6 BRASS N/A 286° 5
STANDARD RESP UPRIGHT ON SPRIG VK530 3/4" 11.2 BRASS N/A 286° 721
QUICK RESP PENDENT VK302 1/2" 5.6 BRASS 2PC CHR 155° -
TOTAL SPRINKLERS THIS LEVEL 726
THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.
IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT - USE GRAPHIC SCALES
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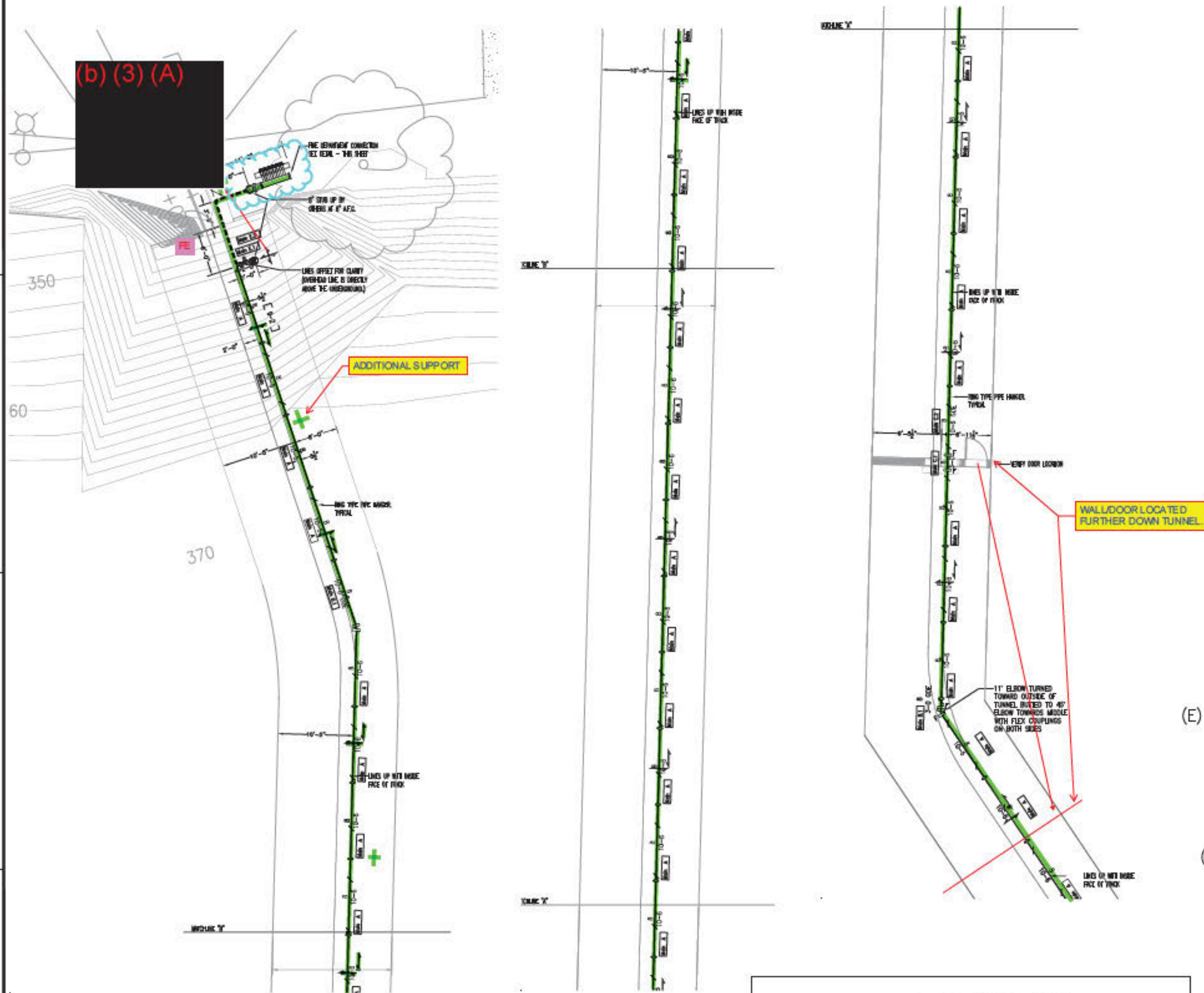
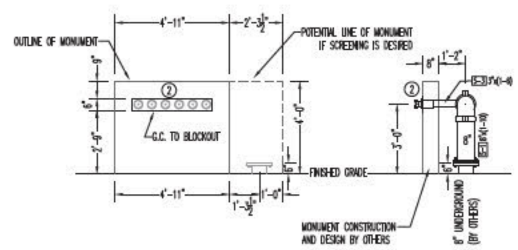
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FIRE PROTECTION NEW PLAN - AREA 12- UPPER LEVEL
PROJECT NO.: 1306143
FT161



PENETRATION INFORMATION

IF WALL IS CONSTRUCTED BEFORE PIPING INSTALLATION, GENERAL CONTRACTOR TO PROVIDE BLOCK OUTS FOR PENETRATIONS FOR WALL POUR OR OTHER METHOD OF CONSTRUCTION. AFTER WALL IS CONSTRUCTED T.F.S. WILL INSTALL SLEEVES AND G.C. TO THEN GROUT SLEEVES IN PLACE. IF PIPING IS INSTALLED BEFORE WALL IS CONSTRUCTED, T.F.S. WILL PROVIDE WALL SLEEVES FOR ALL PENETRATIONS. ALL WALL FINISHES BY OTHERS. G.C. TO PROVIDE CONCRETE PADS FOR STANDS NECESSARY TO SUPPORT PIPING. (SEE PIPING PLANS.)



ELEVATION VIEW FROM FRONT

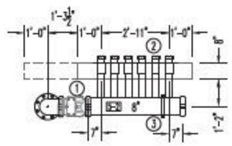
SECTION VIEW

(b) (3) (A) [redacted]

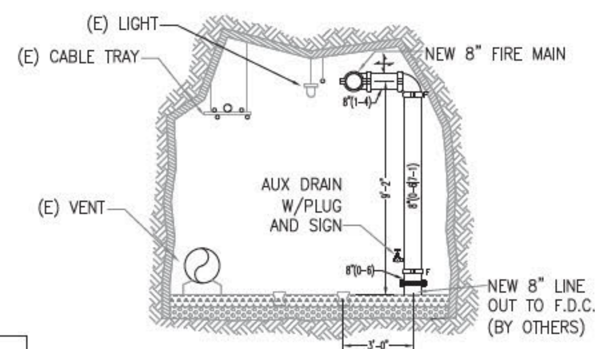
F.D.C. STATION LEGEND

1. 8" GRV TYCO CV-1F GRV CHECK VALVE
2. 2½" INLET x 3" OUTLET FPPI UL LISTED F.D.C. CHECK SNOOT (6 REQ'D) W/RED PLASTIC PLUGS
3. PIPE STAND WITH FULL PIPE CLAMP BOLTED TO CONC. PAD (PAD PROVIDED BY OTHERS)

NOTES:
- PIPING IS GALVANIZED SCHEDULE 40
- FITTINGS ARE FACTORY PAINTED (ORANGE)
- GROOVED FITTINGS ARE STANDARD RADIUS
- ALL UNDERGROUND AND MONUMENT BY OTHERS
- WIRING OF FLOW AND TAMPER SWITCHES BY OTHERS
- SEE ADIT ENTRY DRAWINGS FOR LOCATION
- EACH F.D.C. TO BE LABELED TO SPECIFICALLY IDENTIFY THE LEVEL OF THE TUNNEL THAT IS BEING SUPPLIED



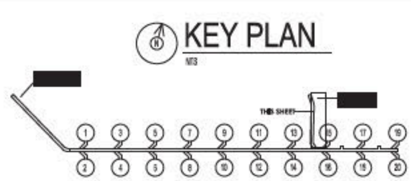
PLAN VIEW



SECTION VIEW OF (b) (5) [redacted]
LOOKING TOWARD EXTERIOR DOORS

PARTIAL FIRE PROTECTION NEW PLAN
AREA 13 (b) (3) (A) [redacted] UPPER LEVEL

SCALE: 1/8" = 1' 0"



AS BUILT

SPRINKLER HEAD LEGEND :	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	○	VK100	1/2"	5.6	BRASS	N/A	286°	5
STANDARD RESP UPRIGHT ON SPRIG	⊘	VK530	3/4"	11.2	BRASS	N/A	286°	721
QUICK RESP PENDENT	◉	VK302	1/2"	5.6	BRASS	2PC CHR	155°	-
							TOTAL SPRINKLERS THIS LEVEL	726

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

SYM	DESCRIPTION	DATE
5	AS BUILT	10-18-17
4	FINAL EXTERIOR FMW SYSTEM REVISIONS	10-3-17
3	REV - ADDED ON THE FOAM PUMP HOLES	8-28-17
2	REV - ADDED MORE MISC PARTS TO TRIM	8-1-17
1	REV - ADDED AIR MAINT, FOAM TRIM, CHECK	3-22-17
N/A	FOR INSTALLATION	5-8-16

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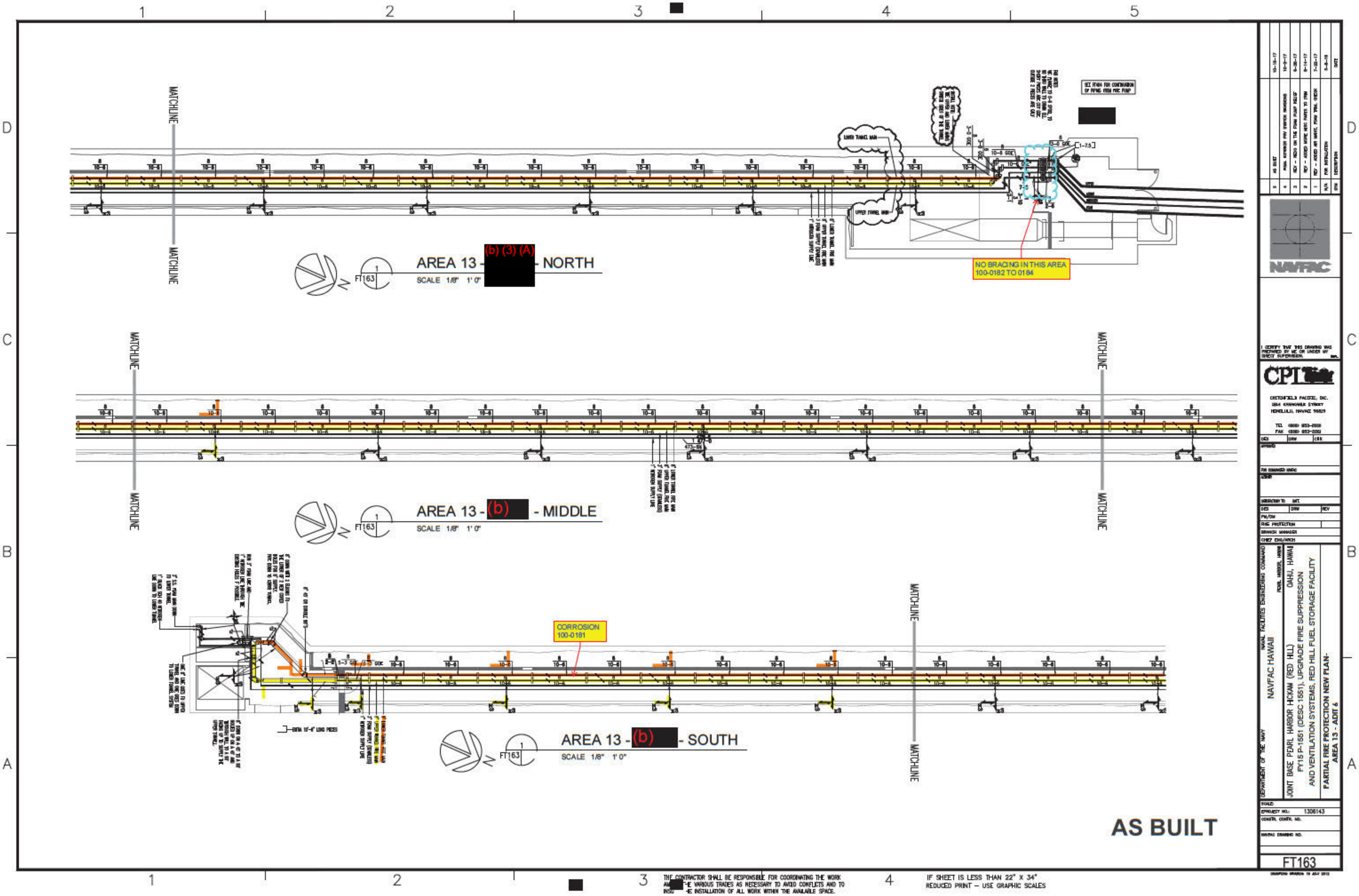
CRITCHFIELD PACIFIC, INC.
1804 KAHANAHUE STREET
HONOLULU, HAWAII 96819
TEL (808) 853-2000
FAX (808) 853-2001

DES | DRW | CHK
APPROVED
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FIRE PROTECTOIN NEW PLAN-ADIT 5 - UPPER LEVEL

SCALE:
PROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

FT162



MATCHLINE
AREA 13 - (b) (3) (A) [redacted] - NORTH
SCALE 1/8" 1'0"
FT163
NO BRACING IN THIS AREA
100-0182 TO 0184
[redacted]
AREA 13 - (b) [redacted] - MIDDLE
SCALE 1/8" 1'0"
FT163
CORROSION
100-0181
AREA 13 - (b) [redacted] - SOUTH
SCALE 1/8" 1'0"
FT163
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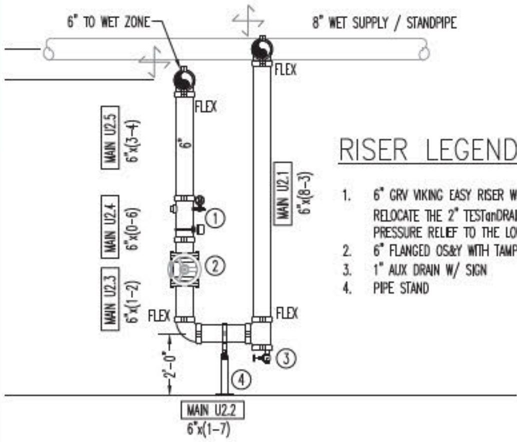
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION
AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FIRE PROTECTION NEW PLAN-
AREA 13 - ADIT 6
EPROJECT NO.: 1306143
FT163
IF SHEET IS LESS THAN 22" X 34"
REDUCED PRINT – USE GRAPHIC SCALES

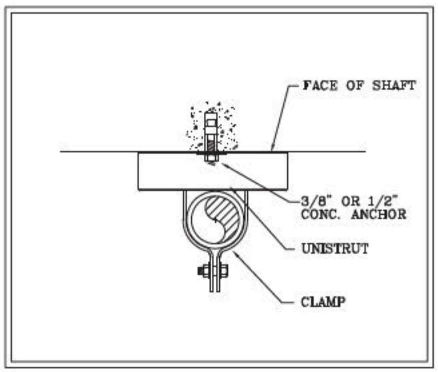


RISER LEGEND

1. 6" GRV VIKING EASY RISER WITH GAUGE, FLOW SWITCH, RELOCATE THE 2" TESTanDRAIN WITH ½" ORIFICE AND 175 PSI PRESSURE RELIEF TO THE LOW POINT OF THE SYSTEM
2. 6" FLANGED OS&Y WITH TAMPER SWITCH
3. 1" AUX DRAIN W/ SIGN
4. PIPE STAND

1 / FT305 UPPER LEVEL - WET RISER DETAIL

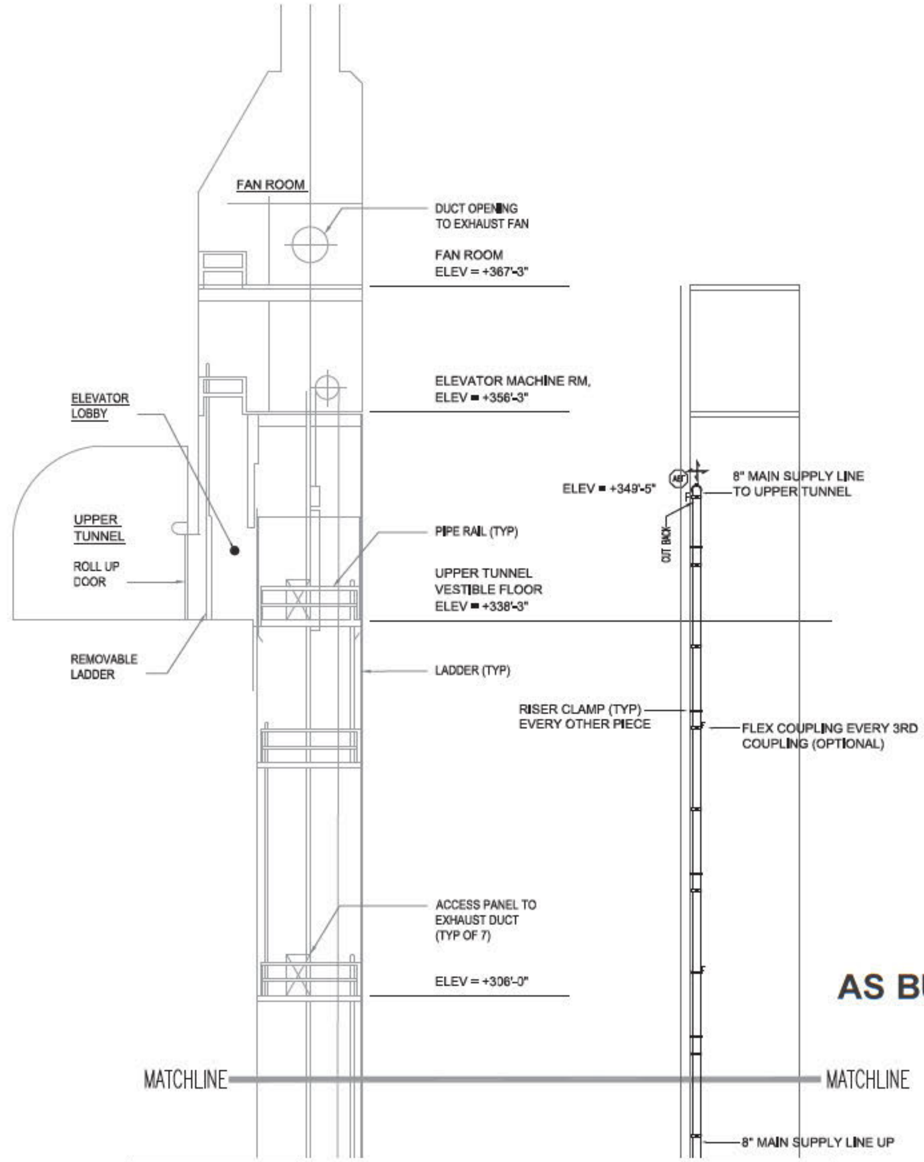
SCALE: 1/2" = 1' 0"



HANGER DETAIL #32 – UNISTRUT

N.T.S.

USE FOR VERTICAL PIPING IN SHAFT



(b) (3) (A) [redacted] - UPPER LEVELS

(b) (3) (A) [redacted] - PIPING

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FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

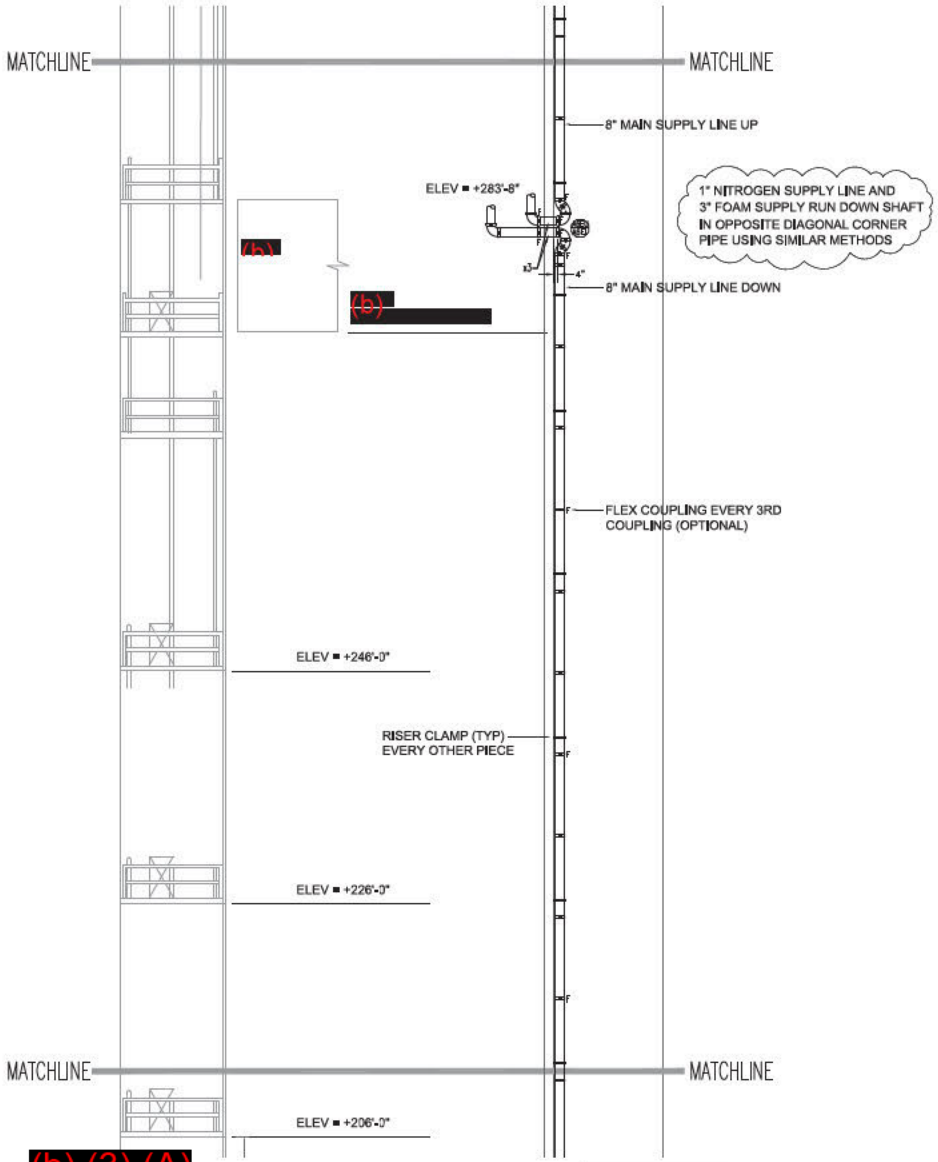
NEW FIRE PROTECTION SECTIONS ELEVATOR 73 UPPER LEVEL

1306143

FT305A

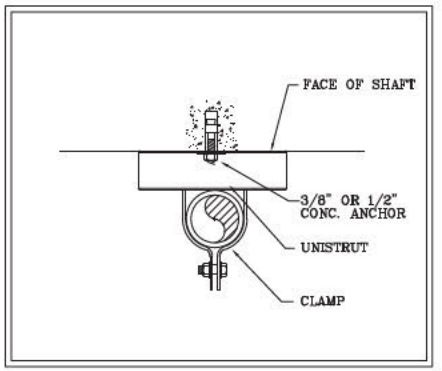
THE [redacted] SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMON[redacted] VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES



(b) (3) (A) - MIDDLE LEVELS

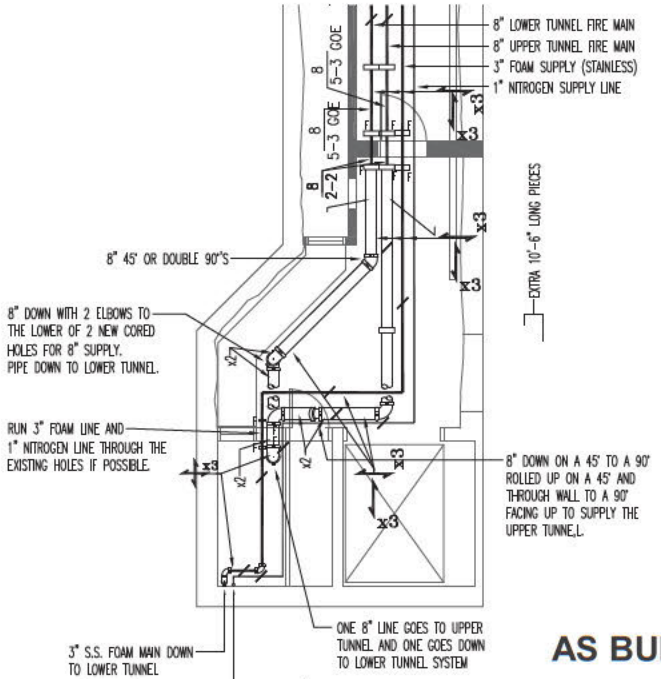
SCALE: 3/16" = 1'-0"



HANGER DETAIL #32 – UNISTRUT

N.T.S.

USE FOR VERTICAL PIPING IN SHAFT



AS BUILT

(b) (3) (A) LEVEL

SCALE: 1/4" = 1'-0"

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IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

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PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 15511), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

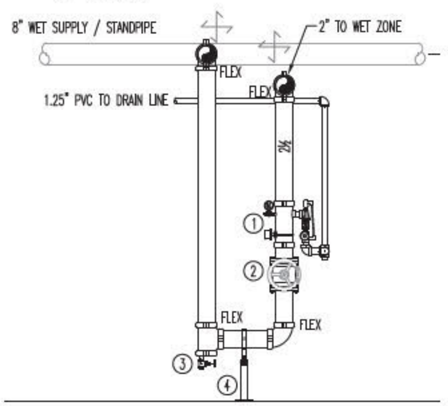
NEW FIRE PROTECTION SECTIONS
ELEVATOR 73 LOWER LEVEL

CONTRACT NO.: 1306143

FT305B

RISER LEGEND

1. 2½" GRV VIKING EASY RISER WITH GAUGE, FLOW SWITCH, AND 1¼" TESTanDRAIN WITH ½" ORIFICE AND 175 PSI PRESSURE RELIEF
2. 2½" FLANGED OS&Y WITH TAMPER SWITCH
3. 1" AUX DRAIN W/ SIGN
4. PIPE STAND

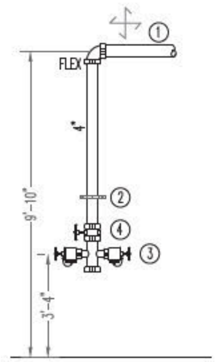


LOWER LEVEL - "GAUGER" RISER (1 / FT305)

SCALE: 1/2" = 1' 0"

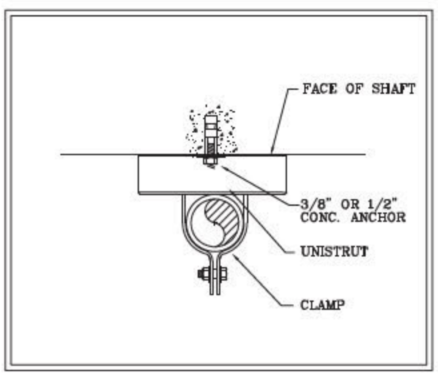
RISER LEGEND

1. 4" SUPPLY PIPING FROM 8" FIRE PROTECTION MAIN
2. RISER CLAMP OR UNISTRUT THE 4" DROP TO WALL
3. 2½" BRONZE ANGLE PATTERN HOSE VALVE WITH ADJUSTABLE PRESSURE RESTRICTION
4. 4" GRV BUTTERFLY VALVE W/TAMPER



FIRE HOSE VALVE STATIONS (1 / FT305)

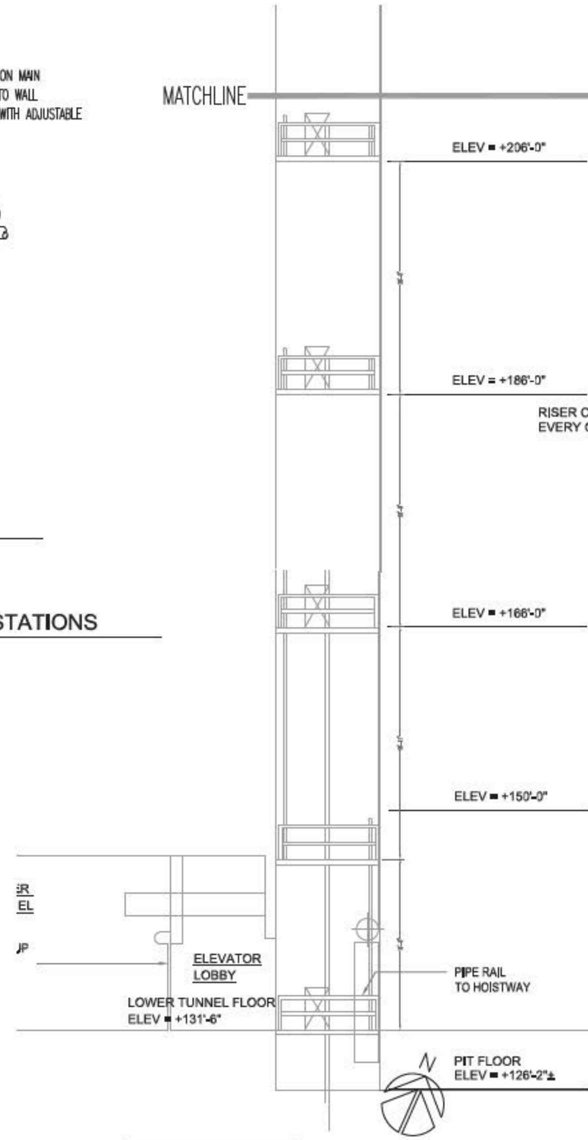
SCALE: 1/2" = 1' 0"



HANGER DETAIL #32 – UNISTRUT

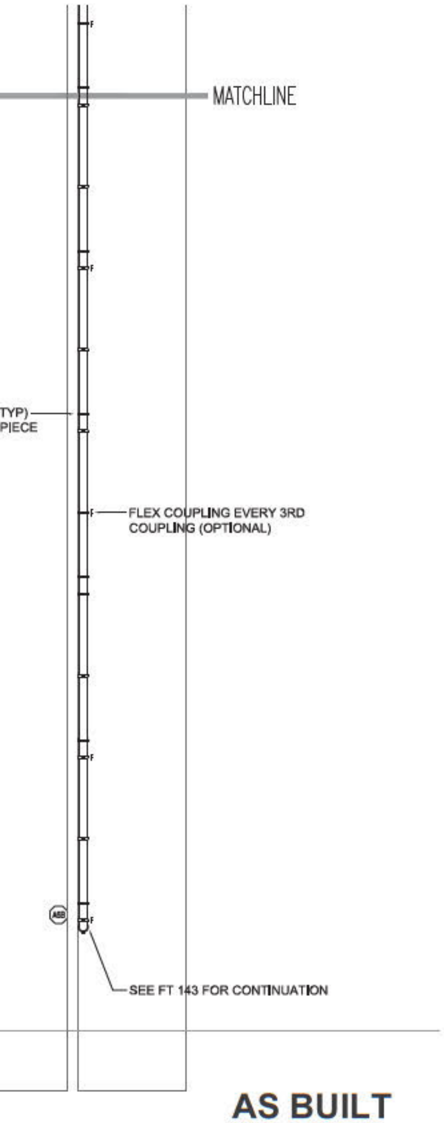
N.T.S.

USE FOR VERTICAL PIPING IN SHAFT



(b) (3) (A) [redacted] LOWER LEVEL

SCALE: 3/16" = 1' 0"



(b) (3) (A) [redacted] - PIPING

SCALE: 3/16" = 1' 0"

AS BUILT

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AM[redacted]E VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INS[redacted]E INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

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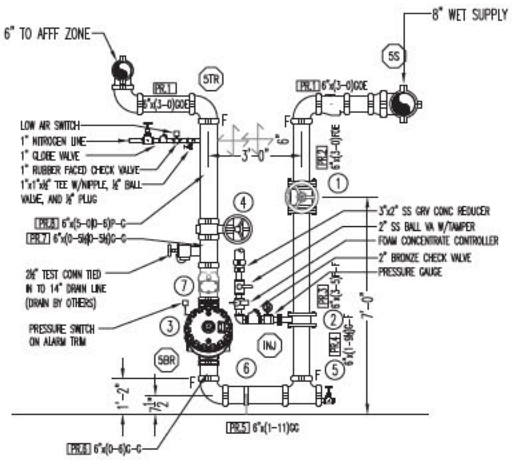
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII

FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

NEW FIRE PROTECTION SECTIONS ELEVATOR 73 LOWER LEVEL

EPROJECT NO.: 1306143

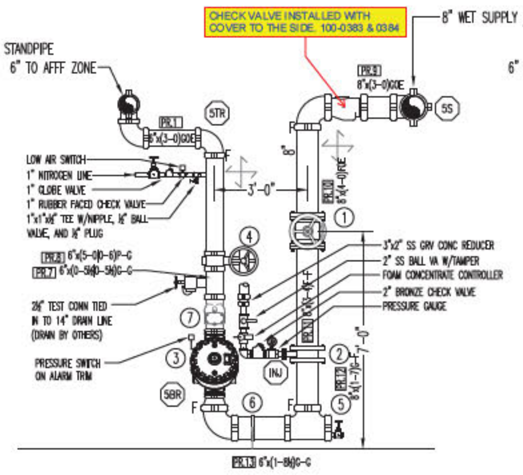
FT305C



PREACTION RISERS SYSTEMS 1 AND 2

RISER LEGEND

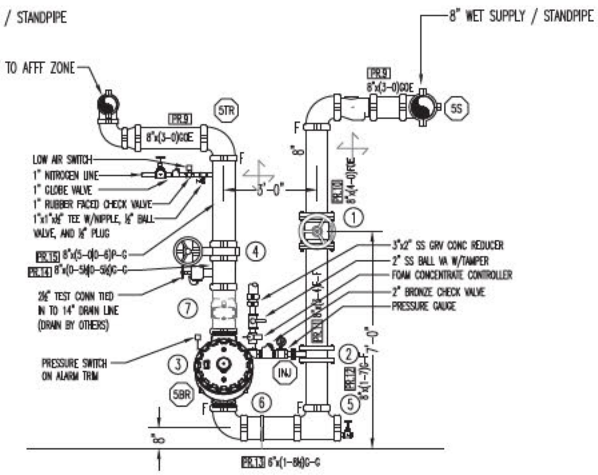
1. 6" FLANGED OS&Y WITH TAMPER SWITCH
2. 6" ANSUL FLOWMAX PPW PROPORTIONER W/HYDRAULIC CONCENTRATE CONTROL VALVE
3. 6" VIKING DELUGE VALVE SET UP AS SINGLE INTERLOCK PREACTION VALVE WITH ELECTRIC RELEASE
4. 6" GRV BUTTERFLY VALVE W/TAMPER
5. 1" AUX DRAIN W/ SIGN
6. PIPE CLAMP RODDED INTO FLOOR (USE ½")
7. 6" GRV CHECK VALVE



PREACTION RISER SYSTEM 3

RISER LEGEND

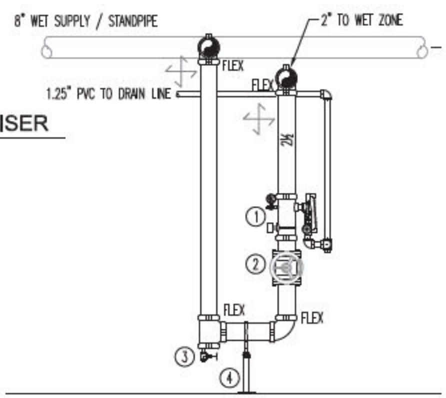
1. 8" FLANGED OS&Y WITH TAMPER SWITCH
2. 8" ANSUL FLOWMAX PPW PROPORTIONER W/HYDRAULIC CONCENTRATE CONTROL VALVE
3. 6" VIKING DELUGE VALVE SET UP AS SINGLE INTERLOCK PREACTION VALVE WITH ELECTRIC RELEASE
4. 6" GRV BUTTERFLY VALVE W/TAMPER
5. 1" AUX DRAIN W/ SIGN
6. PIPE CLAMP RODDED INTO FLOOR
7. 6" GRV CHECK VALVE



PREACTION RISERS SYSTEMS 4 AND 5

RISER LEGEND

1. 8" FLANGED OS&Y WITH TAMPER SWITCH
2. 8" ANSUL FLOWMAX PPW PROPORTIONER W/HYDRAULIC CONCENTRATE CONTROL VALVE
3. 8" VIKING DELUGE VALVE SET UP AS SINGLE INTERLOCK PREACTION VALVE WITH ELECTRIC RELEASE
4. 8" GRV BUTTERFLY VALVE W/TAMPER
5. 1" AUX DRAIN W/ SIGN
6. PIPE CLAMP RODDED INTO FLOOR
7. 6" GRV CHECK VALVE

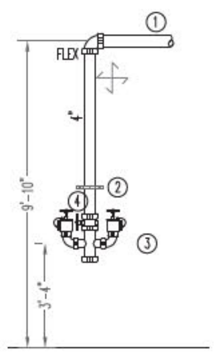


1 FT305 **LOWER LEVEL - "GAUGER" RISER**

SCALE: 1/2" = 1' 0"

RISER LEGEND

1. 2½" GRV VIKING EASY RISER WITH GAUGE, FLOW SWITCH, AND 1¼" TESTanDRAIN WITH ½" ORIFICE AND 175 PSI PRESSURE RELIEF
2. 2½" FLANGED OS&Y WITH TAMPER SWITCH
3. 1" AUX DRAIN W/ SIGN
4. PIPE STAND



RISER LEGEND

1. 4" SUPPLY PIPING FROM 8" FIRE PROTECTION MAIN
2. RISER CLAMP OR UNISTRUT THE 4" DROP TO WALL
3. 2½" BRONZE ANGLE PATTERN HOSE VALVE WITH ADJUSTABLE PRESSURE RESTRICTION
4. 4" GRV BUTTERFLY VALVE W/TAMPER

1 FT305 **FIRE HOSE VALVE STATIONS**

SCALE: 1/2" = 1' 0"

AS BUILT

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IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

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NAVFAC HAWAII

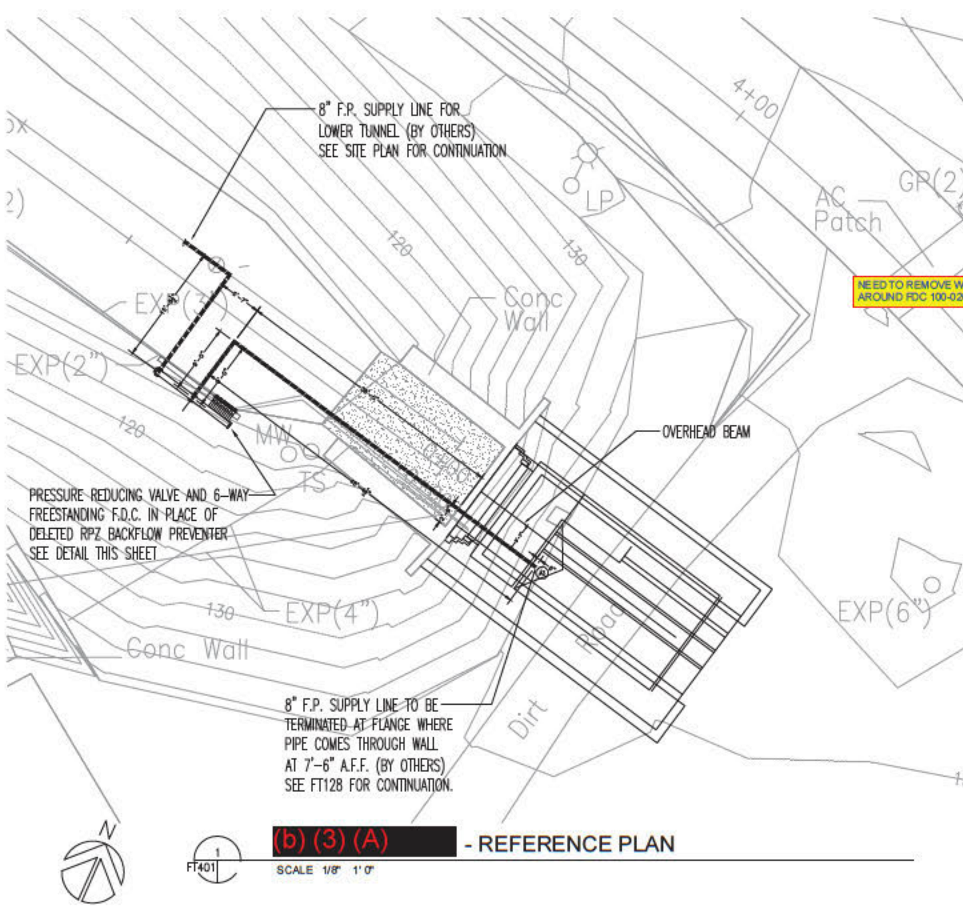
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII

FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

NEW FIRE PROTECTION SECTIONS LOWER LEVEL RISER DETAILS

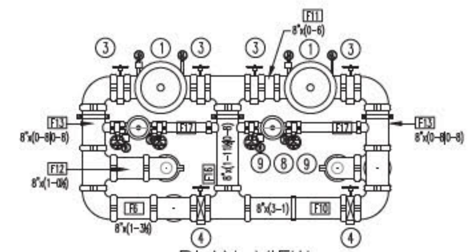
EPROJECT NO.: 1306143

FT305R



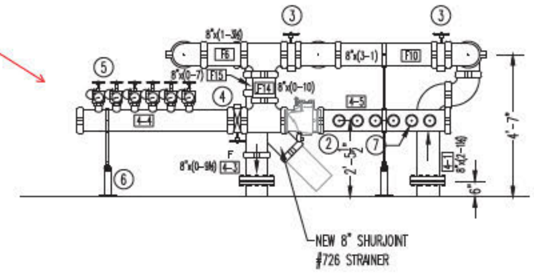
1 FT401 [redacted] - REFERENCE PLAN

SCALE 1/8" 1' 0"



PLAN VIEW

NEED TO REMOVE WEEDS AROUND FDC 100-0208 TO 0216



[redacted]

P.R.V. & F.D.C. STATION LEGEND

1. 8" ZURN 209FP (GRV-HP RV OPTION) PRESSURE REDUCING VALVE WITH GAUGE ON INLET SIDE AND GAUGE/ MONITORING PRESSURE SWITCH ON OUTLET SIDE. (WIRING BY OTHERS)
2. 8" GRV TYCO CV-1F GRV CHECK VALVE WITH WATTS FP53L 175 PSI PRESSURE RELIEF INSTALLED ON SYSTEM SIDE
3. 8" NIBCO GD-4865-8N (300 PSI) GRV BUTTERFLY VALVE W/TAMPER
4. 8" NIBCO GD-4865-C-8N (300 PSI) GRV BUTTERFLY VALVE W/TAMPER (NORM CLOSED)
5. 2½" ROUGH BRASS ANGLE PATTERN HOSE VALVES W/RED PLASTIC CAPS (6 REQ'D)
6. PIPE STAND WITH FULL PIPE CLAMP BOLTED TO CONC. PAD (BY OTHERS) AND RODDED (2x) THROUGH EARS TO ADDITIONAL CLAMP FOR 8" PIPE ABOVE
7. 2½" INLET x 3" OUTLET FPPI UL LISTED F.D.C. CHECK SNOOT (6 REQ'D) W/RED PLASTIC PLUGS
8. 3" CLA-VAL 90G-21 PRESSURE REDUCING VALVE WITH GAUGE ON INLET SIDE AND GAUGE/ MONITORING PRESSURE SWITCH ON OUTLET SIDE. (WIRING BY OTHERS)
9. 3" NIBCO GD-4865-4N (300 PSI) GRV BUTTERFLY VALVE W/OUT TAMPER (2 REQ'D)

NOTES:
- PIPING IS GALVANIZED SCHEDULE 40
- FITTINGS ARE FACTORY PAINTED (ORANGE)
- GROOVED FITTINGS ARE STANDARD RADIUS
- ALL UNDERGROUND AND MONUMENT BY OTHERS
- WIRING OF FLOW AND TAMPER SWITCHES BY OTHERS
- SEE ADIT ENTRY DRAWINGS FOR LOCATION

AS BUILT

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NAVFAC HAWAII
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

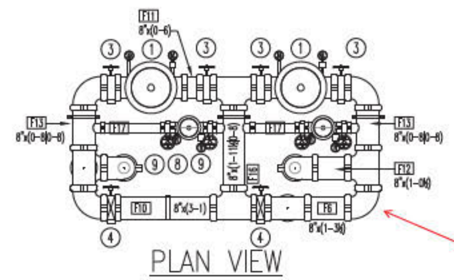
PARTIAL FIRE PROTECTION NEW PLAN- ENTRY TO ADIT 3

ACTIVITY NO.: 1306143

FT401

1 2 3 4 5

D



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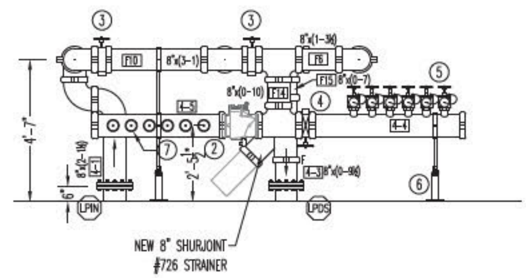
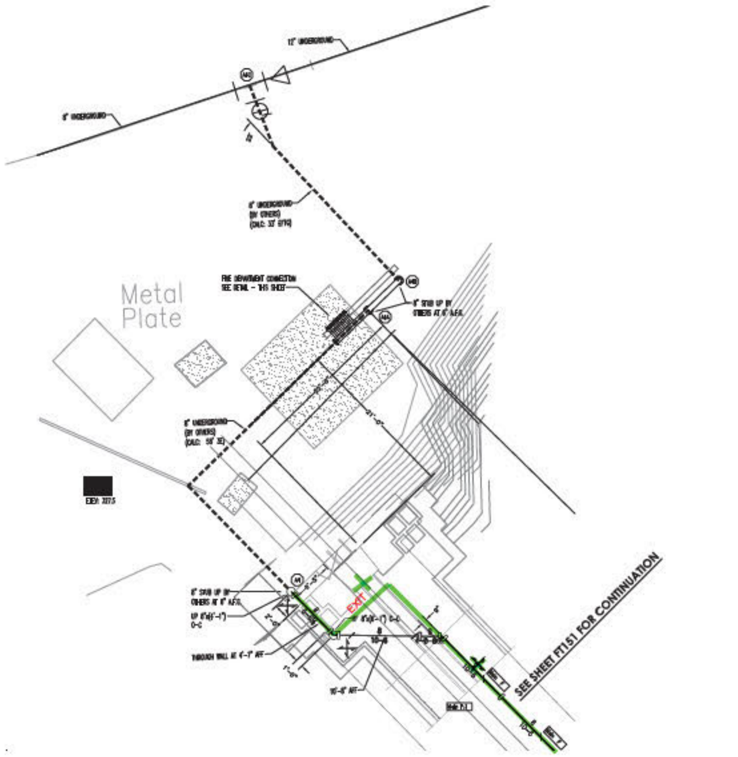




B

(b) (3) (A) [redacted]

P.R.V. & F.D.C. STATION LEGEND

1. 8" ZURN 209FP (GRV-HP RV OPTION) PRESSURE REDUCING VALVE WITH GAUGE ON INLET SIDE AND GAUGE/ MONITORING PRESSURE SWITCH ON OUTLET SIDE. (WIRING BY OTHERS)
2. PRESSURE REDUCING VALVE WITH GAUGES
3. 8" GRV TYCO CV-1F GRV CHECK VALVE WITH WATTS FP53L 175 PSI PRESSURE RELIEF INSTALLED ON SYSTEM SIDE
4. 8" NIBCO GD-4865-8N (300 PSI) GRV BUTTERFLY VALVE W/TAMPER
5. 8" NIBCO GD-4865-C-8N (300 PSI) GRV BUTTERFLY VALVE W/TAMPER (NORM CLOSED)
6. 2½" ROUGH BRASS ANGLE PATTERN HOSE VALVES W/RED PLASTIC CAPS (6 REQ'D)
7. PIPE STAND WITH FULL PIPE CLAMP BOLTED TO CONC. PAD (BY OTHERS) AND RODDED (2x) THROUGH EARS TO ADDITIONAL CLAMP FOR 8" PIPE ABOVE
8. 2½" INLET x 3" OUTLET FPPI UL LISTED F.D.C. CHECK SNOOT (6 REQ'D) W/RED PLASTIC PLUGS
9. 3" CLA-VAL 90G-21 PRESSURE REDUCING VALVE WITH GAUGE ON INLET SIDE AND GAUGE/ MONITORING PRESSURE SWITCH ON OUTLET SIDE. (WIRING BY OTHERS)
10. 3" NIBCO GD-4865-4N (300 PSI) GRV BUTTERFLY VALVE W/OUT TAMPER (2 REQ'D)

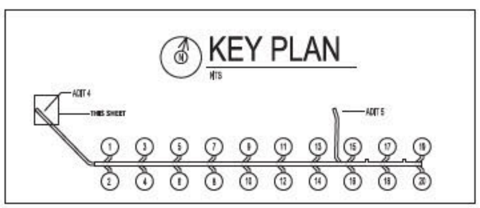
PARTIAL FIRE PROTECTION NEW PLAN - UPPER LEVEL- (b) (3) (A) [redacted]

1 / FT402

SCALE: 1/8" = 1' 0"

SCALE: 1/8" = 1' 0"

A



NOTES:
- PIPING IS GALVANIZED SCHEDULE 40
- FITTINGS ARE FACTORY PAINTED (ORANGE)
- GROOVED FITTINGS ARE STANDARD RADIUS
- ALL UNDERGROUND AND MONUMENT BY OTHERS
- WIRING OF FLOW AND TAMPER SWITCHES BY OTHERS
- SEE ADIT ENTRY DRAWINGS FOR LOCATION

AS BUILT

SYM	DESCRIPTION	DATE
5	AS BUILT	10-18-17
4	FINAL EXTERIOR FHV SYSTEM REVISIONS	10-2-17
3	REV - [illegible]	8-30-17
2	REV - ADDED MORE [illegible]	8-14-17
1	REV - ADDED AIR [illegible]	3-23-17
N/A	FOR INSTALLATION	5-8-16

NAVFAC

I CERTIFY THAT THIS DRAWING WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION.

CPI

CRITCHFIELD PACIFIC, INC.
1804 KAHANAHOU STREET
HONOLULU, HAWAII 96819
TEL (808) 853-2000
FAX (808) 853-2001

DES | DRW | CHK
APPROVED
FOR COMMANDER NAVFAC
ACTIVITY
SATISFACTORY TO | DATE
DES | DRW | REV
PM/DM
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

PARTIAL FIRE PROTECTOIN NEW PLAN- UPPER LEVEL - ADIT 4

SCALE:
EPROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

FT402

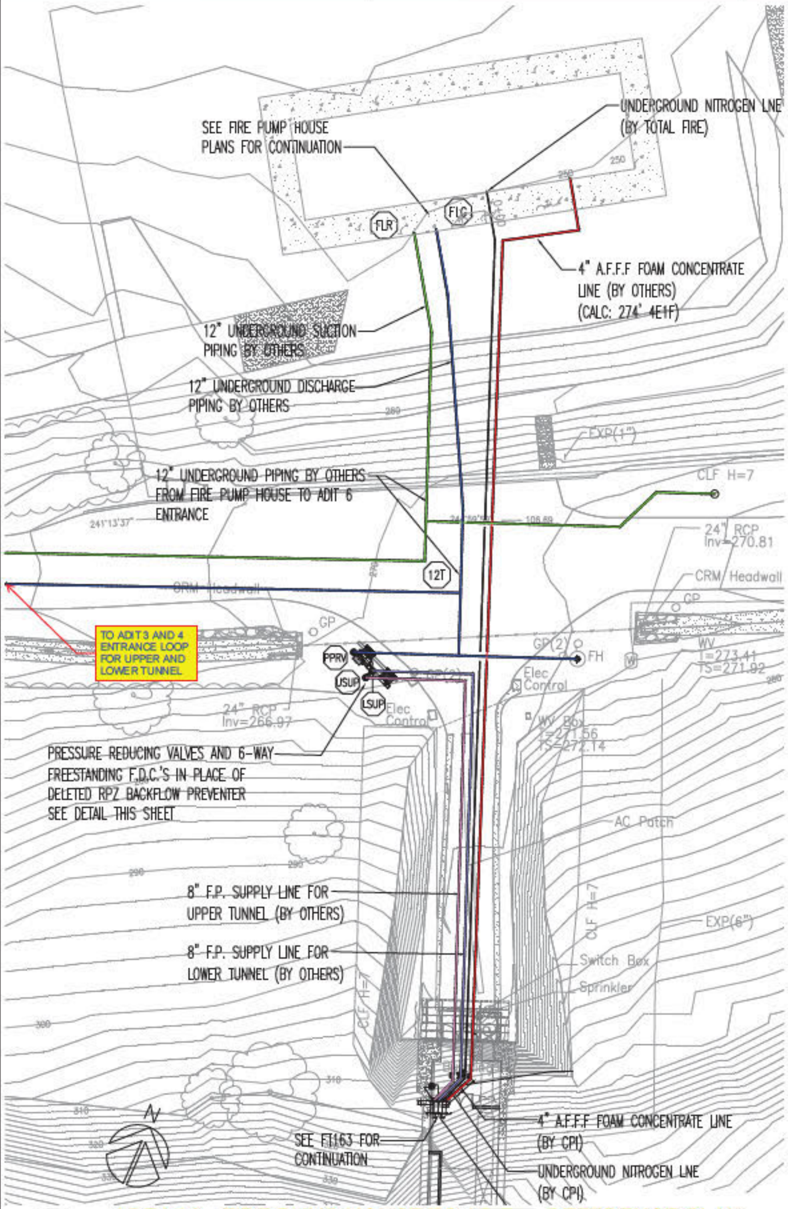
DRAWFORM REVISION: 18 JULY 2012

1 2 3 4

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AM[redacted]THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INS[redacted]HE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

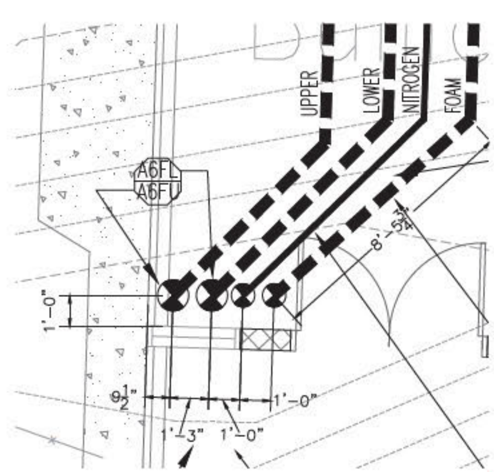
IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT - USE GRAPHIC SCALES

[redacted]



1 FT404 AREA 13 - FIRE PUMP HOUSE TO [redacted] REFERENCE PLAN

SCALE 1/16" 1' 0"



100-0181 TO 0197

[redacted] - STUB UP LOCATION PLAN

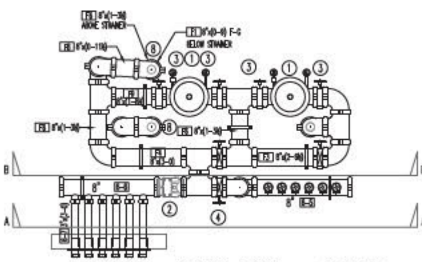
SCALE 1/4" 1' 0"

ADIT #6

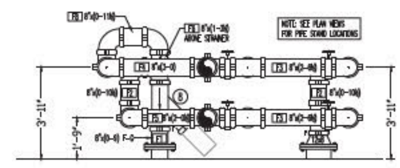
P.R.V. & F.D.C. STATION LEGEND

1. 8" CLA-VAL 90-21 GRV PRESSURE REDUCING VALVE WITH GAUGE ON INLET SIDE AND GAUGE/ MONITORING PRESSURE SWITCH ON OUTLET SIDE. (WIRING BY OTHERS)
2. 8" GRV TYCO CV-1F GRV CHECK VALVE WITH WATTS FP53L 175 PSI PRESSURE RELIEF INSTALLED ON SYSTEM SIDE
3. 8" NIBCO GD-4765-4N (300 PSI) GRV BUTTERFLY VALVE W/OUT TAMPER (4 REQ'D)
4. 8" NIBCO GD-4765-4N (300 PSI) GRV BUTTERFLY VALVE W/OUT TAMPER (NORM CLOSED)
5. 2½" ROUGH BRASS ANGLE PATTERN HOSE VALVES W/RED PLASTIC CAPS (6 REQ'D) TO BE INSTALLED WITH OUTLETS FACING FORWARD
6. PIPE STAND WITH FULL PIPE CLAMP BOLTED TO CONC. PAD (PAD PROVIDED BY OTHERS) AND RODDED (2x) THROUGH EARS TO ADDITIONAL CLAMP FOR 8" PIPE ABOVE
7. 2½" INLET x 3" OUTLET FPPI UL LISTED F.D.C. CHECK SNOOT (12 REQ'D) W/RED PLASTIC PLUGS
8. PIPE STAND WITH FULL PIPE CLAMP BOLTED TO CONC. PAD (PAD PROVIDED BY OTHERS)
9. 8" SHURJOINT 726 GROOVED STRAINER

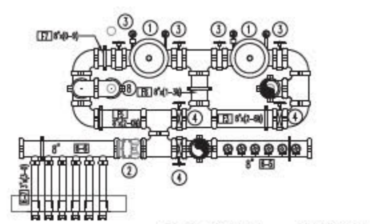
NOTES:
- PIPING IS GALVANIZED SCHEDULE 40
- FITTINGS ARE FACTORY PAINTED (ORANGE)
- GROOVED FITTINGS ARE STANDARD RADIUS
- ALL UNDERGROUND AND MONUMENT BY OTHERS
- WIRING OF FLOW AND TAMPER SWITCHES BY OTHERS
- SEE ADIT ENTRY DRAWINGS FOR LOCATION
- EACH F.D.C. TO BE LABELED TO SPECIFICALLY IDENTIFY THE LEVEL OF THE TUNNEL THAT IS BEING SUPPLIED



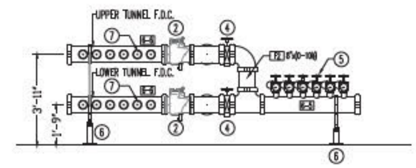
PLAN VIEW - UPPER



ELEVATION VIEW - B-B



PLAN VIEW - LOWER



ELEVATION VIEW - A-A

AS BUILT

SYM	DESCRIPTION	DATE
N/A	FOR INSTALLATION	5-8-15
1	REV - ADDED AIR MAINT. FOAM TANK CHECK	7-25-17
2	REV - ADDED MORE MISC PARTS TO ITEM	8-14-17
3	REV - REDO ON THE FOAM PUMP RELIEF	9-28-17
4	FINAL EXTERIOR PRV STATION REVISIONS	10-2-17
5	AS BUILT	10-16-17

I CERTIFY THAT THIS DRAWING WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION.

CPI

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DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FIRE PROTECTION NEW PLAN-PUMP HOUSE TO ADIT 6

EPROJECT NO.: 1306143

FT404

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AM[redacted]E VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INS[redacted]E INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT - USE GRAPHIC SCALES

[redacted]

APPENDIX B. SITE SURVEY NOTES PREACTION FOAM/WATER SPRINKLER SYSTEM

FIRE PROTECTION GENERAL NOTES

1. INSTALLATION SHALL CONFORM TO NFPA 13 2013 .
2. ALL MATERIALS INSTALLED SHALL BE NEW, UL LISTED AND/ OR F.M. "APPROVED" FOR FIRE PROTECTION USE.
3. SWAY BRACING TO BE PER NFPA 13, 2013 EDITION.
   - LATERAL BRACING MAY BE OMITTED FROM PIPES INDIVIDUALLY SUPPORTED BY RODS LESS THEN 6" LONG.
   - THE DISTANCE BETWEEN THE LAST BRACE AND THE END OF THE PIPE SHALL NOT EXCEED 6'-0"
   - THE LAST LENGTH OF PIPE AT THE END OF A FEED OR CROSS MAIN SHALL BE PROVIDED WITH A LATERAL BRACE.
   - LATERAL BRACES MAY ACT AS LONGITUDINAL BRACES ONLY WHEN INSTALLED WITHIN 2'-0" OF THE PIPE BEING BRACED LONGITUDINALLY.
   - THE FOUR WAY BRACE SHALL BE ATTACHED ABOVE THE FLEXIBLE CONNECTION REQUIRED FOR THE RISER, AND TO THE WALL STRUCTURE.
   - THE END SPRINKLER ON A BRANCH LINE SHALL BE RESTRAINED AGAINST EXCESSIVE MOVEMENT BY USE OF A WRAP AROUND U-HOOK OR OTHER APPROVED MEANS.
   - ALL BRACES ARE CALCULATED. SEE CALCULATION AND DETAIL SHEET FP-4.

3b. THE SYSTEM IS OVER 100 PSI AND MUST HAVE THE LAST HANGER ON THE END OF BRANCHLINES SUPPLYING PENDENT SPRINKLERS AT DROPPED CEILINGS INSTALLED WITHIN 12" OF THE END OF THE LINE PER 9.2.3.4.4.

4. ALL SPRINKLER SYSTEM CONTROL VALVES SHALL BE PROVIDED WITH TAMPER SWITCHES. ALL SYSTEMS SHALL BE EQUIPPED WITH A FLOW SWITCH. ALL TAMPERS AND FLOW SWITCHES SHALL BE MONITORED BY AN OFF-SITE PROPRIETARY STATION , U.L. LISTED AND/ OR F.M. APPROVED AND INSTALLED BY OTHERS.
5. ALL GROOVED COUPLINGS INSTALLED SHALL BE RIGID TYPE. (U.N.O.)
6. THE USE OF GROOVED FITTINGS WILL BE LIMITED TO PIPES HAVING A NOMINAL DIAMETERS OF 1 ¼ INCHES OR LARGER.
7. COUPLINGS AND FITTINGS MAY BE CAST IRON, MALLEABLE IRON OR DUCTILE IRON.
8. GENERAL CONTRACTOR SHALL MAKE PIPING ABOVE SUSPENDED CEILINGS ACCESSIBLE FOR VISUAL INSPECTION AS A CONDITION OF FINAL APPROVAL.
9. ALL NEW ABOVEGROUND PIPING WILL BE BLK SCH 40 EXCEPT FOR FOAM CONCENTRATE PIPING THAT SHALL BE STAINLESS STEEL AND PVC DRAIN LINES.
10. ALL NEW SYSTEMS SHALL BE HYDROSTATICALLY TESTED AT 200 PSI OR 50 PSI IN EXCESS OF THE MAXIMUM PRESSURE, WHEN THE MAXIMUM PRESSURE TO BE MAINTAINED IN EXCESS OF 150 PSI.
11. FLEXIBLE COUPLINGS TO BE INSTALLED WITHIN 12" OF EITHER SIDE OF MASONRY OR CONCRETE WALLS. FLEXIBLE COUPLINGS TO BE INSTALLED WITHIN 12"ABOVE AND WITHIN 24" BELOW FLOORS. A FLEXIBLE COUPLING TO BE INSTALLED ON RISERS MORE THAN 3' & LESS THAN 7'. IN RISERS MORE THAN 7', FLEXIBLE COUPLINGS TO BE INSTALLED WITHIN 24" OF THE TOP AND BOTTOM OF THE RISER.
12. SPRINKLER HEADS IN CEILING TILES ARE NOT REQUIRED TO BE CENTER OF TILE. SPRINKLERS TO BE AT LEAST 6" FROM CEILING GRID.
14. ALL PIPING PENETRATIONS IN FIRE RATED WALLS/FLOORS OTHER THAN MASONRY/CONCRETE SHALL BE SIZED AS FOLLOWS:
   - NOMINALLY 2" LARGER THAN PIPE FOR 1" TO 3" NOMINAL PIPE DIAMETERS.
   - FOR PIPING 4" AND LARGER, THE HOLE DIAMETER IS TO BE 4" LARGER THAN NOMINAL PIPE DIAMETER.

   NO CLEARANCE IS REQUIRED FOR NON-FIRE RATED WALLS/FLOORS OTHER THAN MASONRY/CONCRETE.
15. ALL PREACTION SYSTEM MAIN PIPING TO BE SLOPED AS THE NATURAL SLOPE OF THE TUNNELS ALLOW. LINEE PIPING TO BE SLOPED PER NFPA-13.

FIRE PROTECTION DESIGN CRITERIA

THE FIRE PROTECTION SYSTEM SHALL BE HYDRAULICALLY DESIGNED AND INSTALLED IN ACCORDANCE WITH THE FOLLOWING CRITERIA:

UPPER TUNNEL (TANKS COMPARTMENT)
DESIGN DENSITY: 0.4 GPM/SF [NFPA 13: EXTRA HAZARD GROUP 2]
DESIGN AREA: 2,500 SF (UPPER TUNNEL UP TO ADIT 5 DOOR AND ADIT 4 DOOR.)
HOSE STREAM: 500 GPM DURATION: 90 MINUTES

THE ZONES TO BE COVERED ARE SHOWN ON THE LAYOUTS.

UPPER TUNNEL STANDPIPE
FLOW DEMAND: 1000 GPM
PRESSURE: MIN 100 PSI AT NOZZLE
DURATION: 90 MINUTES

LOWER TUNNEL (TANKS COMPARTMENTS)
DESIGN DENSITY: 0.16 GPM/SF [NFPA 16, SINGLE INTERLOCK ELECTRIC RELEASE PRE-ACTION SYSTEM. 3% AFFF MIL-F 24385 PREACTION AFFF SYSTEMS ARE ACTUATED BY CROSSE-ZONE TRIPLE IR DETECTION]
DESIGN AREA: COMPARTMENT AREA (APPROXIMATELY 10,000 SF)
HOSE STREAM: 1000 GPM
DURATION: 15 MINUTES OF FOAM [NFPA 30]/ 60 MINUTES OF WATER
THE ZONES TO BE COVERED ARE SHOWN ON THE LAYOUTS.
TESTING TO BE DONE AT THE PROPORTIONER'S MINIMUM FLOW RATE AND AT A FLOW RATE OF 4 TIMES THE MINIMUM PER SPECIFICATION. PERFORM THIS IN ACCORDANCE W./NFPA 16.

LOWER TUNNEL (GAUGER OFFICE AND ELECTRICAL ROOM)
DESIGN DENSITY: .0.2 GPM/SF [NFPA 13 : ORDINARY HAZARD GROUP 2]
DESIGN AREA: 1,500 SF
HOSE STREAM: 250 GPM
DURATION: 60 MINUTES
THE ZONE TO BE COVERED IS SHOWN ON THE LAYOUT

LOWER TUNNEL STANDPIPE
FLOW DEMAND: 1000 GPM
PRESSURE: MIN 100 PSI AT VALVE
DURATION: 60 MINUTES

FIRE PUMP BUILDING (ELECTRICAL ROOM, FIRE PUMP ROOM, AND AFFF PUMP ROOM, GENERATOR ROOM)
DESIGN DENSITY: 0.2 GPM/SF [NFPA 13 : ORDINARY HAZARD GROUP 2]
DESIGN AREA: 1,500 SF
HOSE STREAM: 250 GPM
DURATION: 60 MINUTES

CONTRACT DEVIATIONS & COORDINATION

1) THE CONTRACT DOCUMENTS SHOW 2 JOCKEY PUMPS. NFPA REQUIRES ONLY ONE. TOTAL FIRE SYSTEMS, INC. WILL SUPPLY AND PROVIDE THE SECOND JOCKEY PUMP / CONTROLLER AS A SPARE AND NOT INSTALL IT AS SHOWN. THEY WILL BE LEFT IN THE LOCATION AS DIRECTED.

2) WE HAVE DELETED THE INDIVIDUAL PRV'S FOR THE FHV'S AND SPRINKLER RISER'S AND INSTALLING A MASTER PRV WITH BACKUP FOR BOTH THE LOWER AND UPPER TUNNEL. NFPA REQUIRES TESTING OF THESE DEVICES BOTH AT THE PROJECT COMPLETION AND ANNUALLY. THERE ARE NO PROVISIONS FOR THEIR TESTING SHOWN AND OR CALLED FOR. THE DESIGN USING MASTER PRV'S WILL REDUCE THE FUTURE MAINTENANCE AND WILL IMPROVE THE SYSTEM OVERALL.

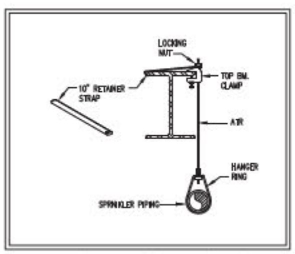
3) DELETION OF THE FDC AND ITS PIPING AS SHOWN FOR THE AFFF FOAM SYSTEMS. NFPA PROHIBITS THE FDC TO BE SUPPLIED ABOVE THE SHUT OFF ON MULTIPLE RISER SYSTEMS AS SHOWN. FURTHER THE FDC'S SUPPLYING THE 8" SUPPLY HAVE AN FDC SHOWN AT ADIT'S 3, 4, 5, & 6 AS REQUIRED BY NFPA BELOW THE CONTROL VALVE.

4) REDESIGN OF THE FIRE PUMP ROOM DUE TO THE PIPING BEING RUN OVERHEAD HAS RESULTED IN CHANGES TO THE FLOOR DRAIN, ALLOWABLE LIGHT FIXTURE LOCATIONS, POWER HOOKUP LOCATIONS, AND WATER SERVICE ENTRY LOCATION AND CONFIGURATION. OTHER TRADES WILL NEED TO MODIFY THEIR SCOPE OF WORK TO ACCOMMODATE THIS RECONFIGURATION.

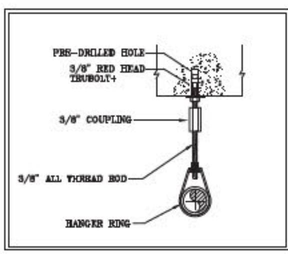
5) EXTERIOR BACKFLOW PREVENTORS (IN SITE CONTRACTOR'S SCOPE) HAVE BEEN ELIMINATED AND ARE NOT INCLUDED IN OUR HYDRAULIC CALCULATIONS ON THE DISCHARGE SIDE OF THE PUMP. ONE BACKFLOW IN THE LINE FROM THE TANK TO THE FIRE PUMP HAS BEEN ACCOUNTED FOR BY REDUCING THE AVAILABLE WATER FROM THE CALCULATED WAT3ER FLOW TEST BY 12 PSI REFLECTED IN THE SUBSEQUENT CALCULATIONS FOR UPPER AND LOWER TUNNELS.

- NEW SPRINKLER PIPE
- NEW SPRINKLER
- GROOVED COUPLING
- FLEXIBLE GROOVED COUPLING
- SWAY BRACE (END OF LINE)
- TWO WAY EARTHQUAKE BRACE
- FOUR WAY EARTHQUAKE BRACE
- PIPE DROP
- PIPE RISE
- HANGER
- HYDRAULIC REFERENCE POINT
- SPRINKLER RISER SYMBOL
- FULL HEIGHT WALL/BEAM
- REMOTE AREA BOUNDARY

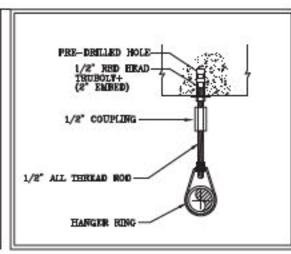
SPRINKLER SYMBOL LEGEND



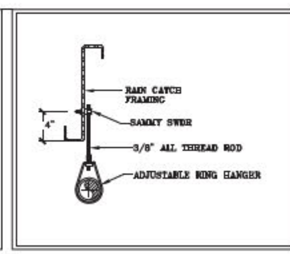
HANGER DETAIL - TOP BEAM CLAMP
N.T.S.
USE ONLY WHERE HANGING TO EXISTING I-BEAM STRUCTURE WITHIN TUNNEL



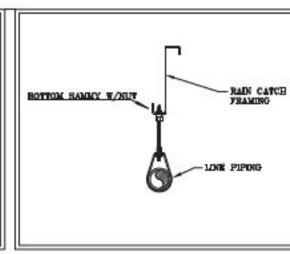
HANGER DETAIL - UP TO 4" PIPE
N.T.S.
TYP. FOR BRANCHLINES AND SMALL MAINS



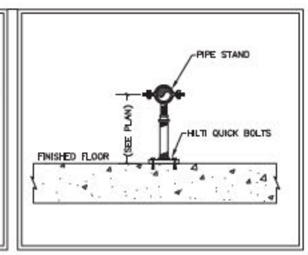
HANGER DETAIL - UP TO 6"-8" PIPE
N.T.S.
TYP. FOR 6" AND 8" MAINS (10" AND 12" SIM. BUT WITH NFPA REQ'D ATR)



HANGER DETAIL #52 - SIDE SAMMY
N.T.S.
TYP. FOR BRANCHLINES UNDER RAIN CATCH CEILING AREAS



HANGER DETAIL #51 - BOTTOM SAMMY
N.T.S.
ALTERNATE FOR BRANCHLINES UNDER RAIN CATCH CEILING AREAS



PIPE STAND DETAIL
N.T.S.

AS BUILT

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AM[redacted]E VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INS[redacted]E INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

[redacted] THAT THIS DRAWING WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION.

CPI

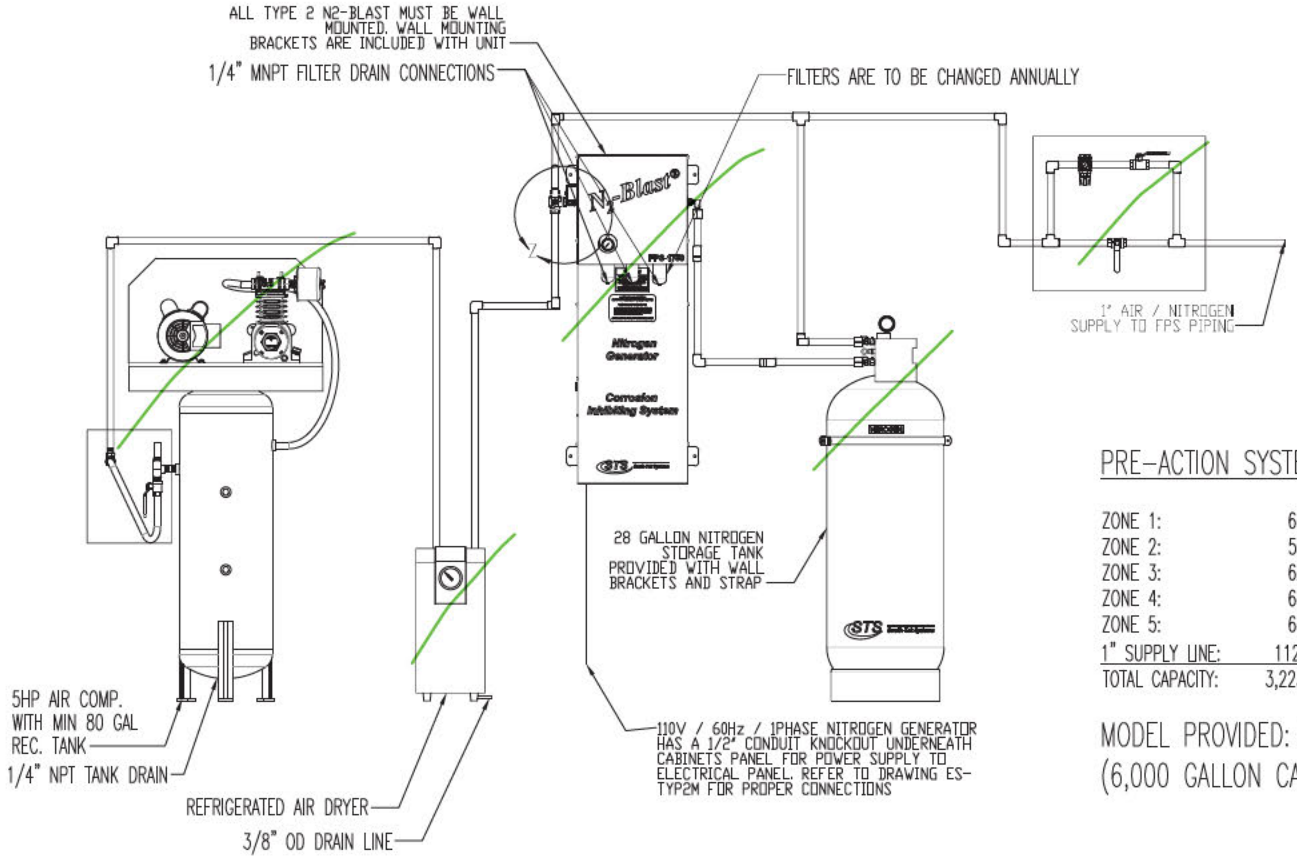
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

FIRE PROTECTION GENERAL NOTES

SCALE:
EPROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

F-001



PRE-ACTION SYSTEM CAPACITIES:

ZONE 1:	614 GALLONS
ZONE 2:	573 GALLONS
ZONE 3:	629 GALLONS
ZONE 4:	646 GALLONS
ZONE 5:	649 GALLONS
1" SUPPLY LINE:	112.5 GALLONS
TOTAL CAPACITY:	3,223.5 GALLONS

MODEL PROVIDED: FPS-6000
(6,000 GALLON CAPACITY)

FIRE PUMP ROOM - NITROGEN INJECTION SYSTEM SCHEMATIC

AS BUILT

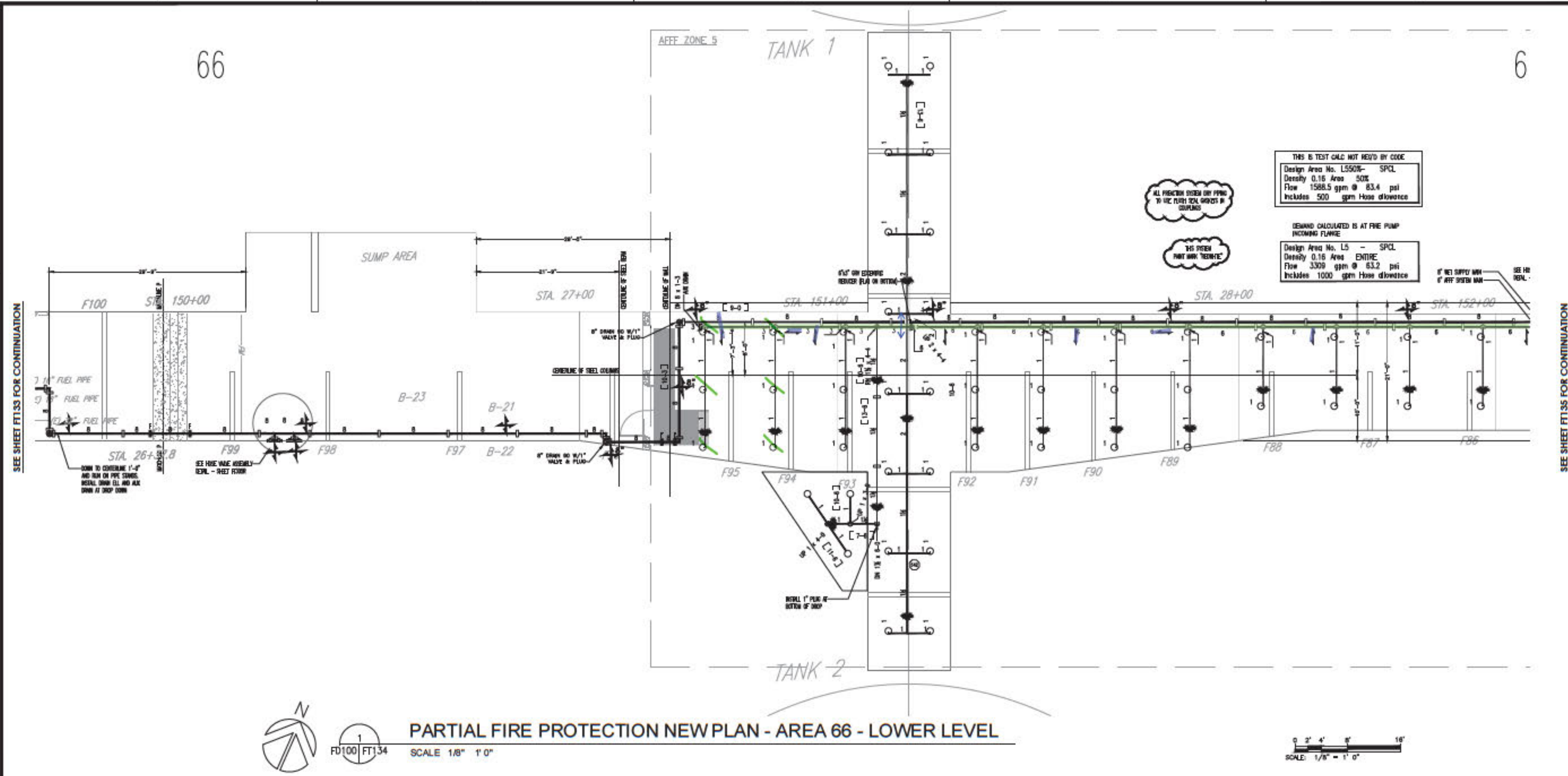
THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT - USE GRAPHIC SCALES

DEPARTMENT OF THE NAVY
NAVFAC HAWAII
PEARL HARBOR, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FIRE PUMP ROOM - NITROGEN INJECTION SCHEMATIC
NEW FIRE PUMP BUILDING

PROJECT NO.: 1306143

FB504



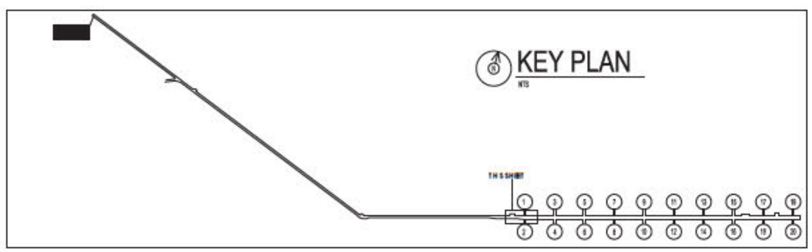
PARTIAL FIRE PROTECTION NEW PLAN - AREA 66 - LOWER LEVEL

FD100 | 1 | FT134

SCALE 1/8" 1' 0"

SCALE: 1/8" = 1' 0"

[redacted]



[redacted]

AS BUILT

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	⊙	VK100	1/2	5.6	BRASS	N/A	175°	5
STANDARD RESP UPRIGHT	○	VK100	1/2	5.6	BRASS	N/A	286°	135
STANDARD RESP UPRIGHT ON SPRIG	⊗	VK100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP PENDENT w/PLATE	◉	VK102	1/2	5.6	BRASS	2PC CHR	175°	4
STAN RESP HORIZONTAL SIDEWALL	◁	TY3311	1/2	5.6	BRASS	NONE	175°	2
TOTAL SPRINKLERS THIS LEVEL								617

THE [redacted]ACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMON[redacted] VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

CPI

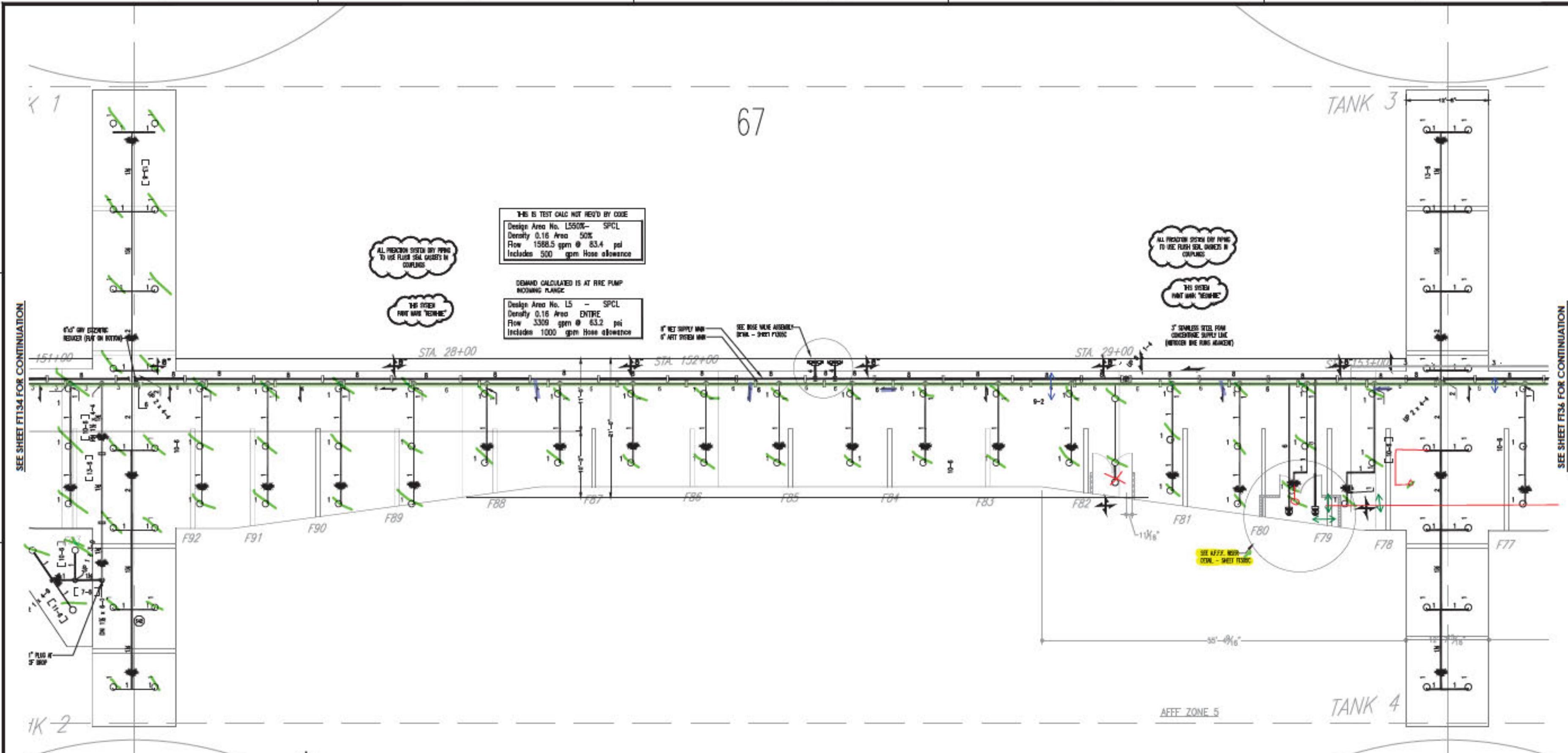
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

PARTIAL FIRE PROTECTION NEW PLAN- AREA 66 - LOWER LEVEL

SCALE:
EPROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

FT134

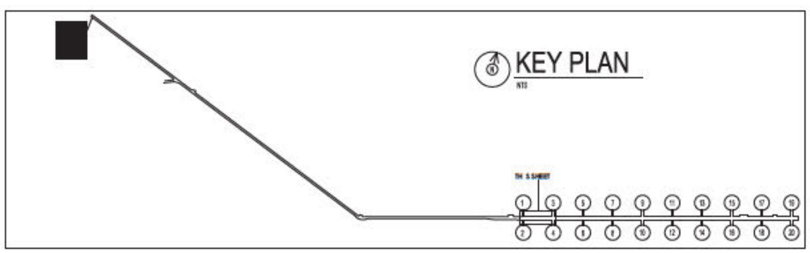


PARTIAL FIRE PROTECTION NEW PLAN - AREA 67 - LOWER LEVEL

FD100 FT134

SCALE 1/8" 1' 0"

SCALE: 1/8" = 1' 0"



KEY PLAN

AS BUILT

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	●	VK100	1/2	5.6	BRASS	N/A	175°	5
STANDARD RESP UPRIGHT	○	VK100	1/2	5.6	BRASS	N/A	286°	135
STANDARD RESP UPRIGHT ON SPRIG	⊗	VK100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP PENDENT w/PLATE	◉	VK102	1/2	5.6	BRASS	2PC CHR	175°	4
STAN RESP HORIZONTAL SIDEWALL	◁	TY3311	1/2	5.6	BRASS	NONE	175°	2
TOTAL SPRINKLERS THIS LEVEL								617

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT - USE GRAPHIC SCALES

SYM	DESCRIPTION	DATE
5	AS BUILT	10-18-17
4	FINAL EXTERIOR PRV STATION REVISIONS	10-2-17
3	REV - REDO ON THE FOAM PUMP RELIEF	8-28-17
2	REV - ADDED MORE MISC PARTS TO TRIM	8-14-17
1	REV - ADDED AIR MAINT. FOAM TRIM. CHECK	7-22-17
N/A	FOR INSTALLATION	5-8-18

I CERTIFY THAT THIS DRAWING WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION.

CPI

CRITCHFIELD PACIFIC, INC.
TEL (808) 853-2900
FAX (808) 853-3200

DEPARTMENT OF THE NAVY — NAVAL FACILITIES ENGINEERING COMMAND

NAVFAC HAWAII

PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII

FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

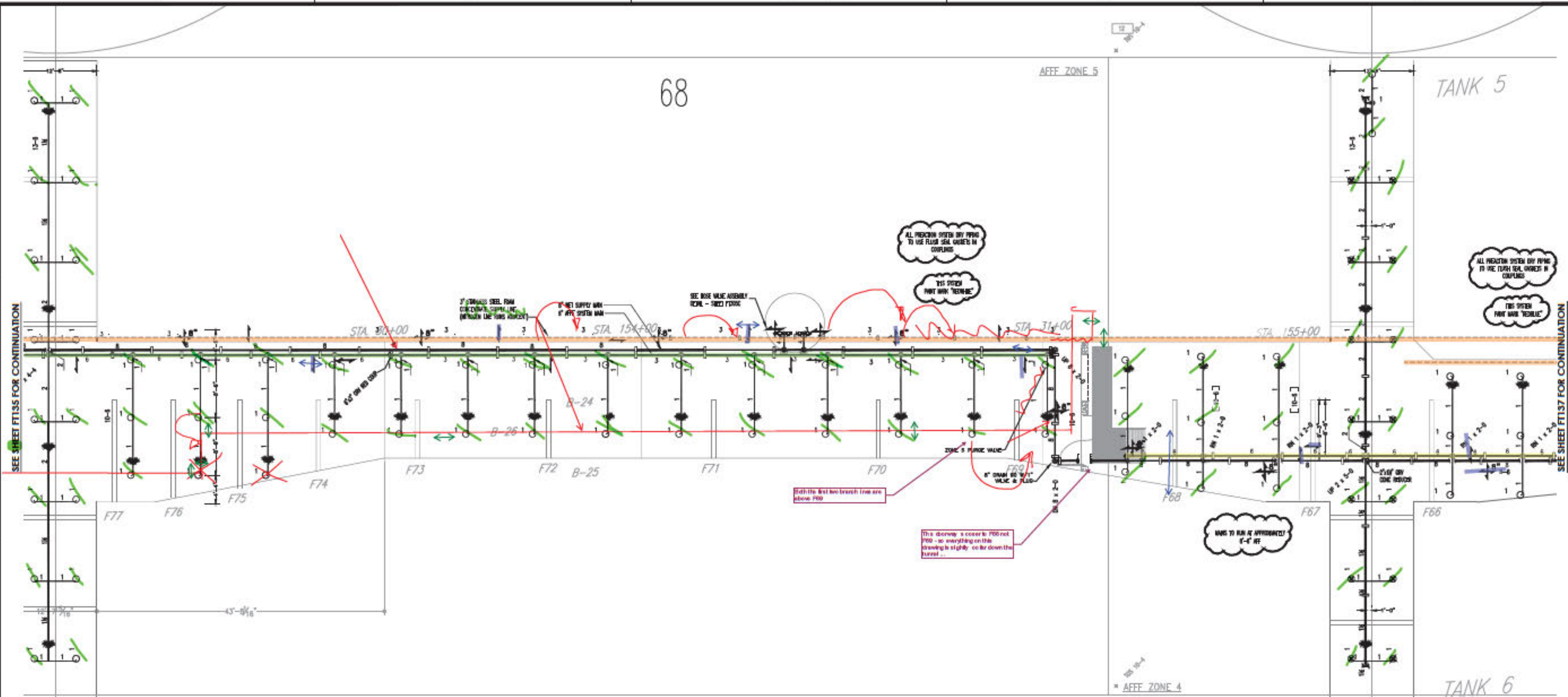
PARTIAL FIRE PROTECTION NEW PLAN- AREA 67 - LOWER LEVEL

PROJECT NO.: 1306143

FT135

1 2 3 4 5

[redacted]



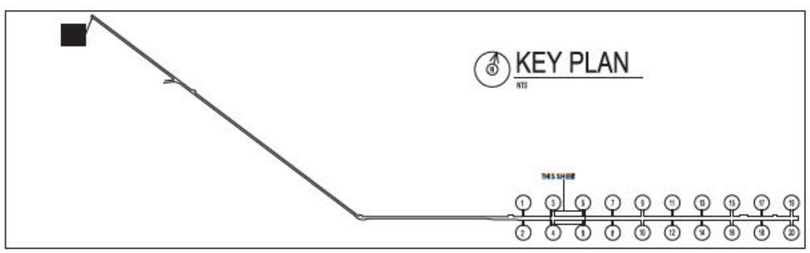
PARTIAL FIRE PROTECTION NEW PLAN - AREA 68 - LOWER LEVEL

FD100 | FT134

SCALE 1/8" 1' 0"

SCALE: 1/8" = 1' 0"

[redacted]



AS BUILT

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	◉	VK 100	1/2	5.6	BRASS	N/A	175°	8
STANDARD RESP UPRIGHT	○	VK 100	1/2	5.6	BRASS	N/A	286°	135
STANDARD RESP UPRIGHT ON SPRIG	⊗	VK 100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP PENDENT w/PLATE	⊙	VK 102	1/2	5.6	BRASS	2PC CHR	175°	4
STAN RESP HORIZONTAL SIDEWALL	◁	TY3311	1/2	5.6	BRASS	NONE	175°	2
							TOTAL SPRINKLERS THIS LEVEL	617

SYM	DESCRIPTION	DATE
5	AS BUILT	10-18-17
4	FINAL EXTERIOR PRV STATION REVISIONS	10-9-17
3	REV - REDO ON THE FOAM PUMP RELIEF	8-28-17
2	REV - ADDED MORE MISC PARTS TO FRM	8-14-17
1	REV - ADDED AIR MAINT, FOAM TRIAL CHECK	7-25-17
N/A	FOR INSTALLATION	5-8-16

NAVFAC

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1264 KAUMUALII STREET
HONOLULU, HAWAII 96819
TEL (808) 853-0500
FAX (808) 853-0201

DES | DRW | CHK
APPROVED
FOR COMMANDER NAVFAC
SATISFACTORY TO | DATE
DES | DRW | REV
PM/DM
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FIRE PROTECTION NEW PLAN- AREA 68 - LOWER LEVEL

SCALE:
EPROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

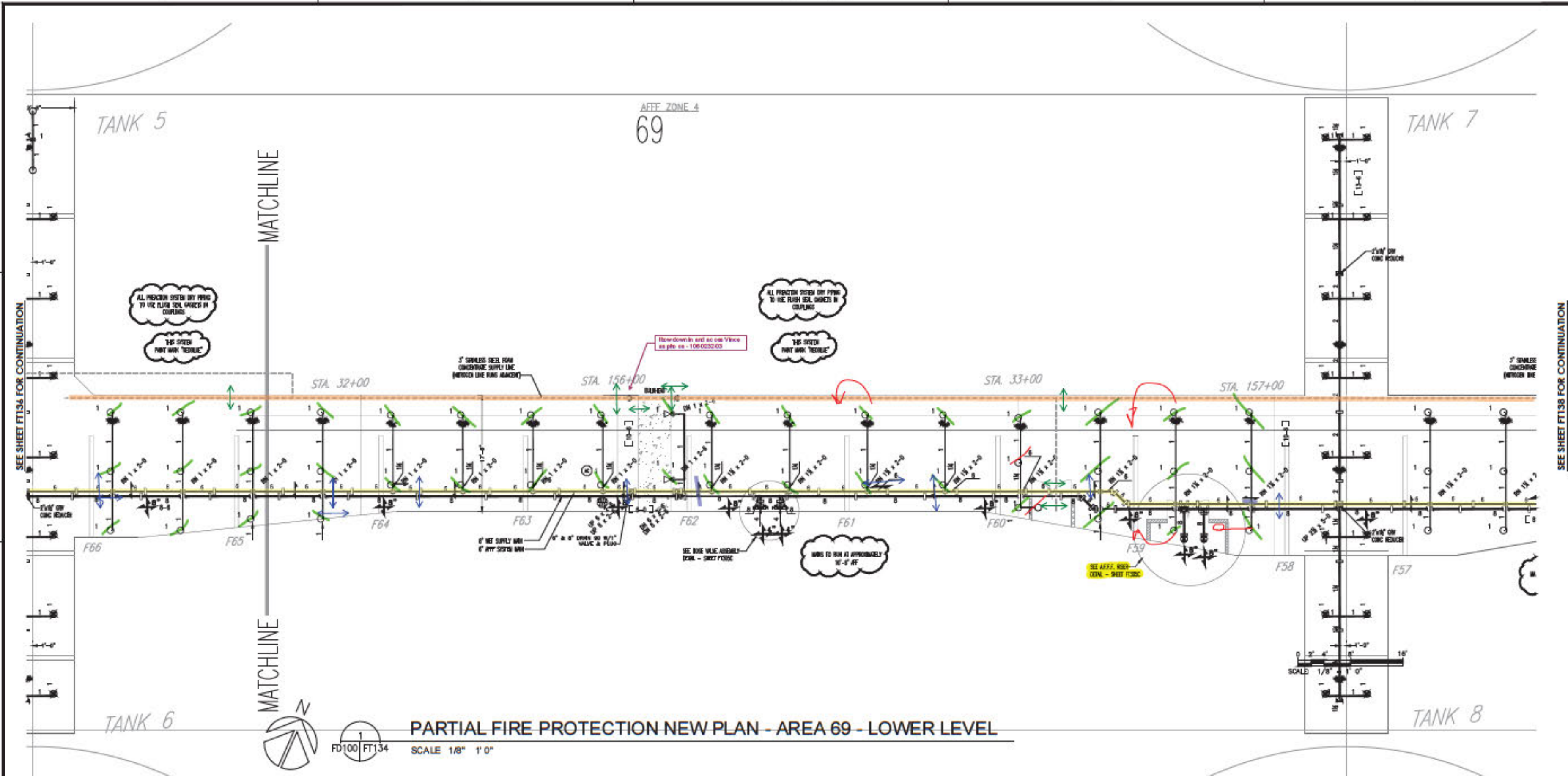
FT136

1 2 3 4

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AN[redacted]HE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSU[redacted]HE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

[redacted]

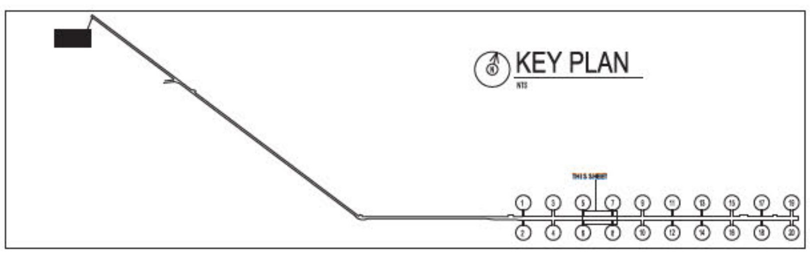
IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES



PARTIAL FIRE PROTECTION NEW PLAN - AREA 69 - LOWER LEVEL

SCALE 1/8" 1' 0"

FD100 | FT134



AS BUILT

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	⊙	VK100	1/2	5.6	BRASS	N/A	175°	6
STANDARD RESP UPRIGHT	○	VK100	1/2	5.6	BRASS	N/A	286°	135
STANDARD RESP UPRIGHT ON SPRIG	⊗	VK100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP PENDENT w/PLATE	◉	VK102	1/2	5.6	BRASS	2PC CHR	175°	6
STAN RESP HORIZONTAL SIDEWALL	◁	TY3311	1/2	5.6	BRASS	NONE	175°	2
						TOTAL SPRINKLERS THIS LEVEL		617

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

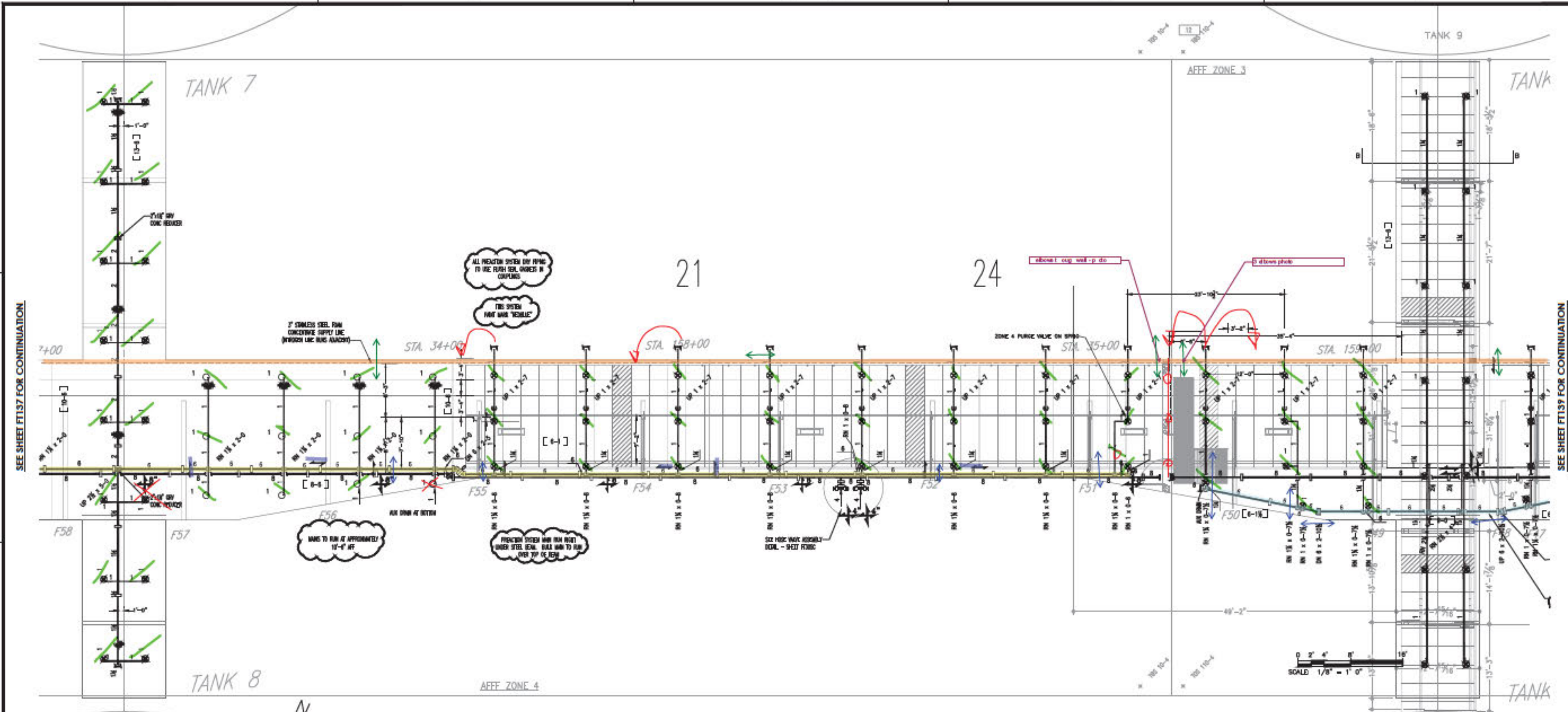
PARTIAL FIRE PROTECTION NEW PLAN-AREA 69 - LOWER LEVEL

SCALE:
EPROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

FT137

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK A[redacted]E VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSU[redacted]E INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

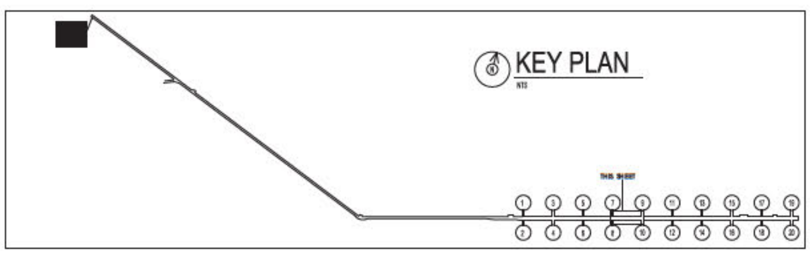
IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES



PARTIAL FIRE PROTECTION NEW PLAN - AREA 70 - LOWER LEVEL

1 FD100 FT134

SCALE 1/8" 1'-0"



AS BUILT

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	◉	VK100	1/2	5.6	BRASS	N/A	175°	5
STANDARD RESP UPRIGHT	○	VK100	1/2	5.6	BRASS	N/A	284°	135
STANDARD RESP UPRIGHT ON SPRIG	⊗	VK100	1/2	5.6	BRASS	N/A	284°	469
STAND RESP PENDENT w/PLATE	⊙	VK102	1/2	5.6	BRASS	2PC CHR	175°	4
STAN RESP HORIZONTAL SIDEWALL	◁	TY3511	1/2	5.6	BRASS	NONE	175°	2
						TOTAL SPRINKLERS THIS LEVEL		617

DEPARTMENT OF THE NAVY
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PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

PARTIAL FIRE PROTECTION NEW PLAN- AREA 70 - LOWER LEVEL

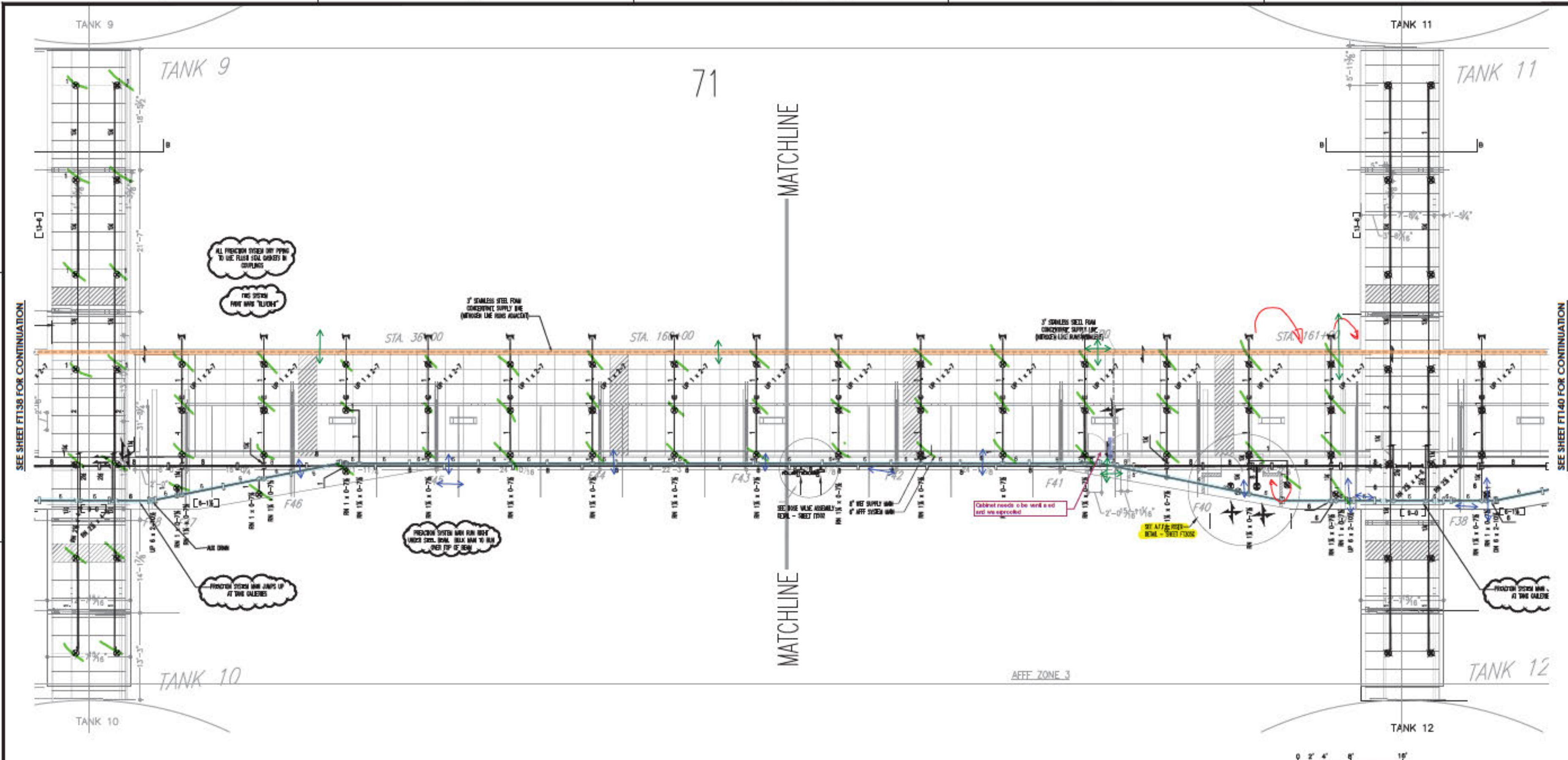
SCALE:
EPROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

FT138

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK A[redacted]E VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSU[redacted]E INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

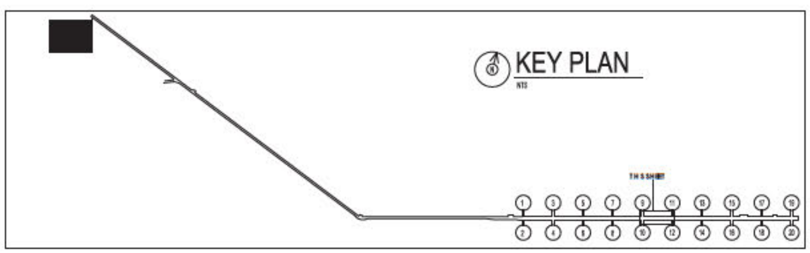
[redacted]



PARTIAL FIRE PROTECTION NEW PLAN - AREA 71 - LOWER LEVEL

FD100 FT134

SCALE 1/8" 1'-0"



[redacted]

AS BUILT

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	◉	VK100	1/2	5.6	BRASS	N/A	175°	6
STANDARD RESP UPRIGHT	○	VK100	1/2	5.6	BRASS	N/A	286°	135
STANDARD RESP UPRIGHT ON SPRIG	⊗	VK100	1/2	5.6	BRASS	N/A	286°	467
STAND RESP PENDENT w/PLATE	◎	VK102	1/2	5.6	BRASS	2PC CHR	175°	6
STAN RESP HORIZONTAL SIDEWALL	◁	TY3311	1/2	5.6	BRASS	NONE	175°	2
							TOTAL SPRINKLERS THIS LEVEL	617

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

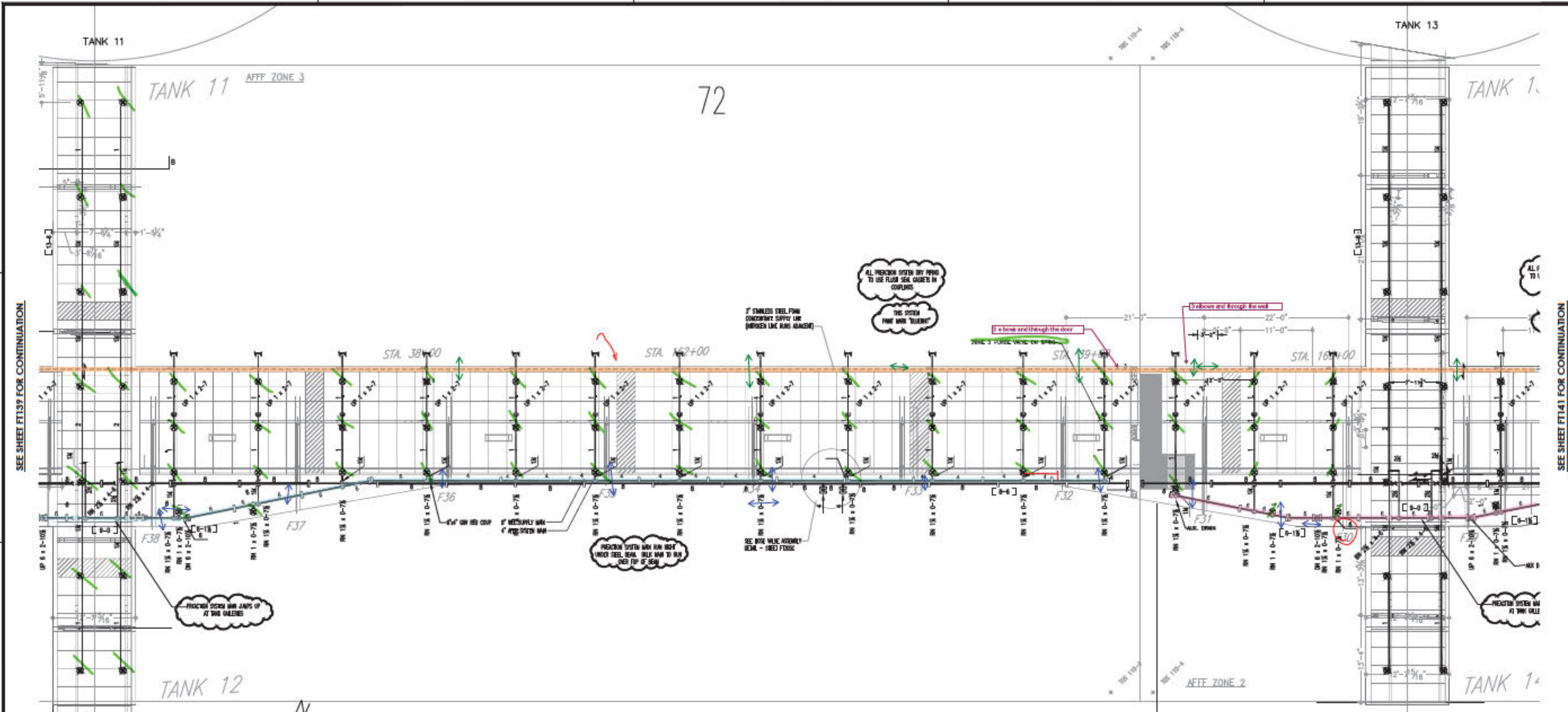
PARTIAL FIRE PROTECTION NEW PLAN- AREA 71 - LOWER LEVEL

SCALE:
EPROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

FT139

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMO[redacted]E VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSU[redacted]E INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

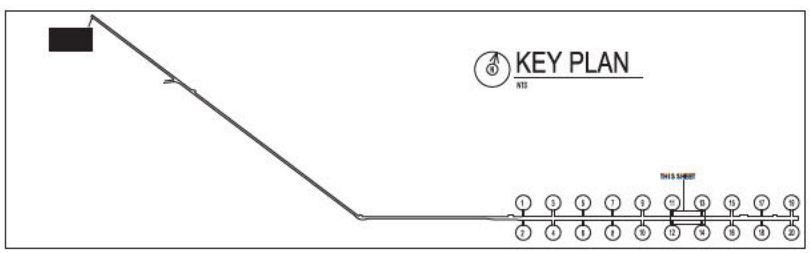


PARTIAL FIRE PROTECTION NEW PLAN - AREA 72 - LOWER LEVEL

FD100 | FT134

SCALE 1/8" 1' 0"

SCALE: 1/8" = 1' 0"



AS BUILT

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	⊙	VK100	1/2	5.6	BRASS	N/A	175°	5
STANDARD RESP UPRIGHT	○	VK100	1/2	5.6	BRASS	N/A	286°	135
STANDARD RESP UPRIGHT ON SPRIG	⊗	VK100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP PENDENT w/PLATE	◉	VK102	1/2	5.6	BRASS	2PC CHR	175°	6
STAN RESP HORIZONTAL SIDEWALL	◁	TY3311	1/2	5.6	BRASS	NONE	175°	2
						TOTAL SPRINKLERS THIS LEVEL		617

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK A[redacted]HE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INS[redacted]HE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

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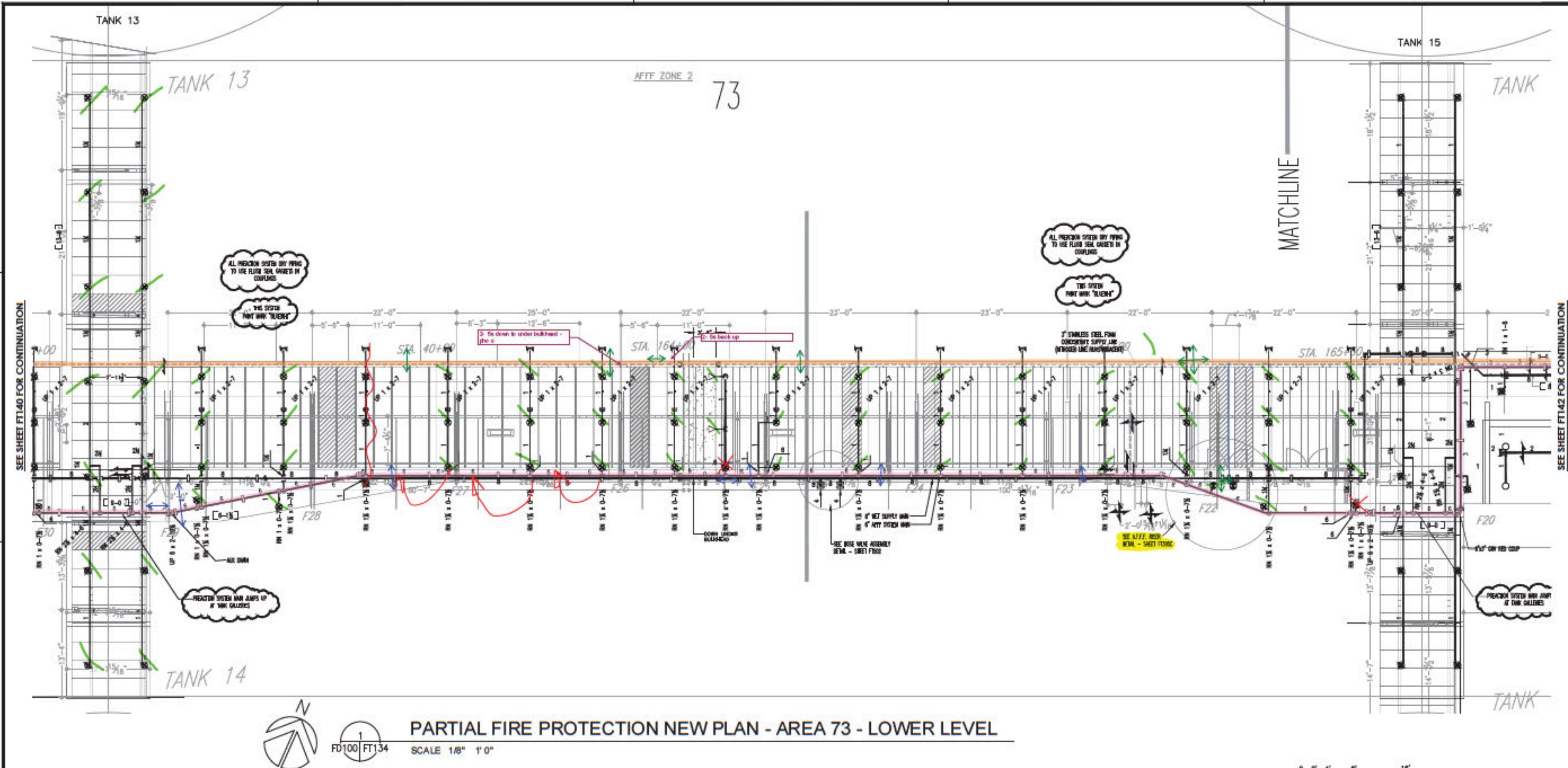
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

PARTIAL FIRE PROTECTION NEW PLAN-AREA 72 - LOWER LEVEL

SCALE:
PROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

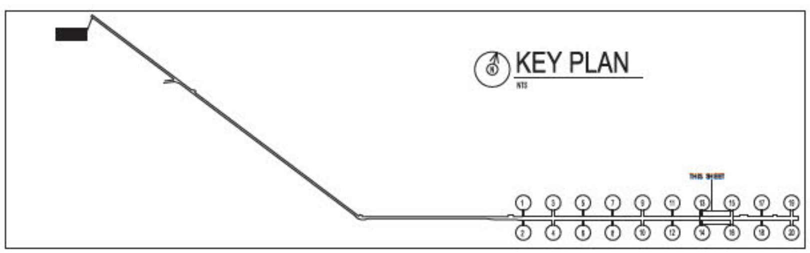
FT140



PARTIAL FIRE PROTECTION NEW PLAN - AREA 73 - LOWER LEVEL

FD100 | FT134

SCALE 1/8" 1' 0"



AS BUILT

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	◉	VK100	1/2	5.6	BRASS	N/A	175°	5
STANDARD RESP UPRIGHT	○	VK100	1/2	5.6	BRASS	N/A	286°	135
STANDARD RESP UPRIGHT ON SPRIG	⊗	VK100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP PENDENT w/PLATE	⊙	VK102	1/2	5.6	BRASS	2PC CHR	175°	6
STAN RESP HORIZONTAL SIDEWALL	◁	TY3311	1/2	5.6	BRASS	NONE	175°	2
						TOTAL SPRINKLERS THIS LEVEL		617

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AM[redacted]E VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INS[redacted]E INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

SYM	DESCRIPTION	DATE
5	AS BUILT	10-16-17
4	FINAL EXTERIOR FRV STATION DRAWINGS	10-2-17
3	REV – RE3D ON THE FOAM PUMP RELIEF	8-28-17
2	REV – ADDED MORE MISC PARTS TO FRN	8-14-17
1	REV – ADDED AIR MAINT, FOAM TRIAL CHECK	7-25-17
N/A	FOR INSTALLATION	5-8-16

NAVFAC

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CPI
CRITCHFIELD PACIFIC, INC.
1864 KAHANAHUI STREET
HONOLULU, HAWAII 96819
TEL (808) 853-0800
FAX (808) 853-0201

DES | DRW | CHK
APPROVED
FOR COMMANDER NAVFAC
ACTIVITY
SATISFACTORY TO | DATE
DES | DRW | REV
PM/DM
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

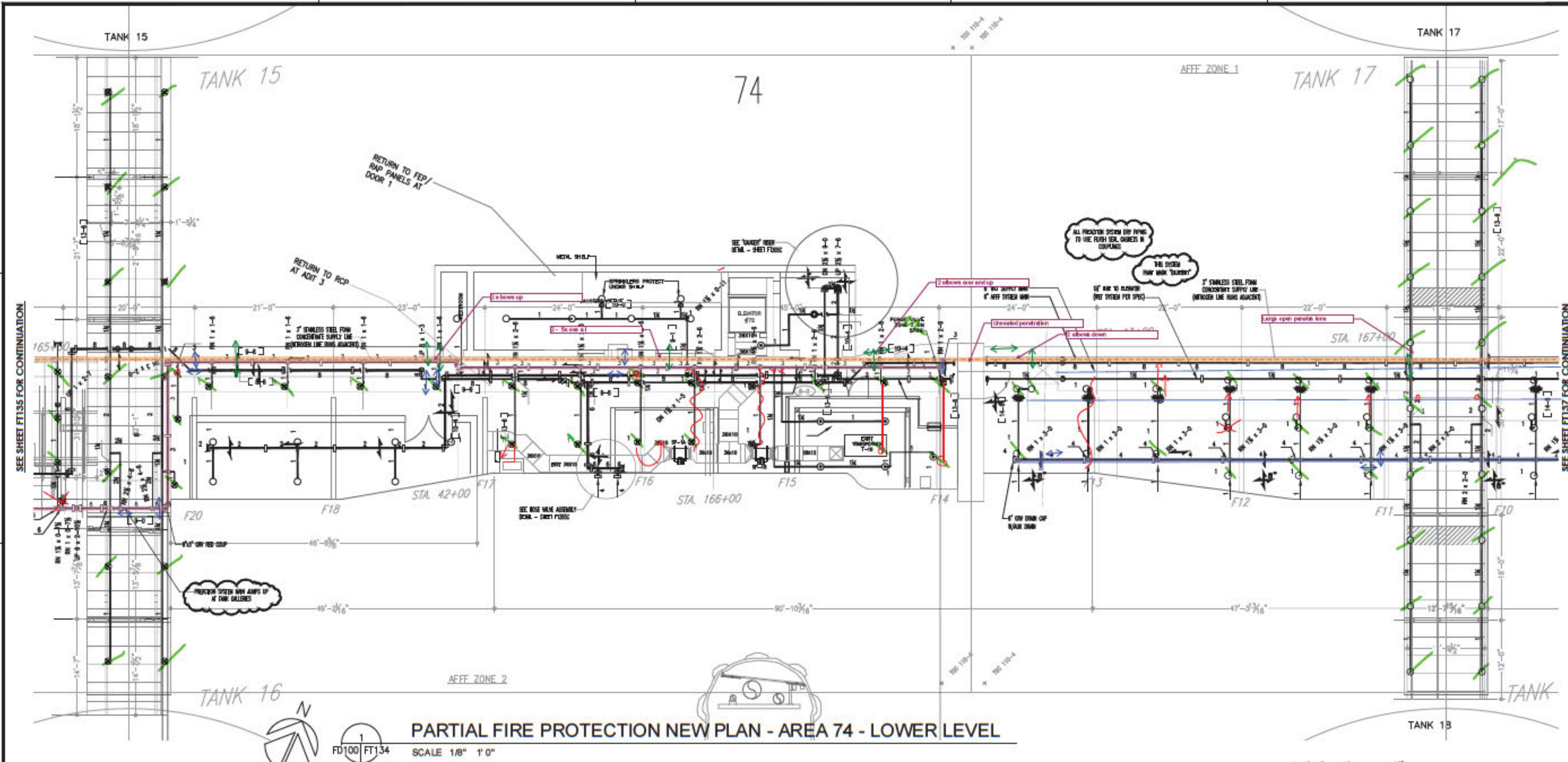
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
PEARL HARBOR, HAWAII
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

PARTIAL FIRE PROTECTION NEW PLAN-AREA 73 - LOWER LEVEL

SCALE:
EPROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

FT141

[redacted]

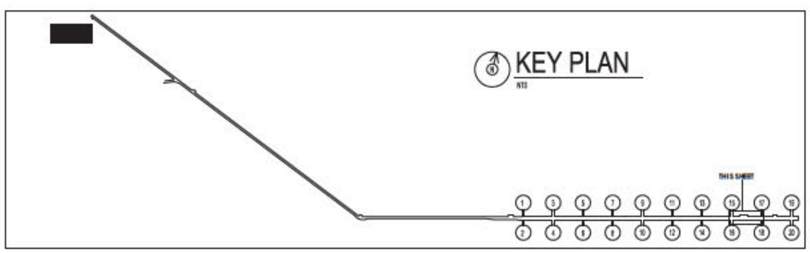


PARTIAL FIRE PROTECTION NEW PLAN - AREA 74 - LOWER LEVEL

1 FD100 FT134

SCALE 1/8" 1' 0"

SCALE: 1/8" = 1' 0"



AS BUILT

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	◉	VK100	1/2	5.6	BRASS	N/A	175°	5
STANDARD RESP UPRIGHT	○	VK100	1/2	5.6	BRASS	N/A	286°	135
STANDARD RESP UPRIGHT ON SPRIG	⊗	VK100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP PENDENT w/PLATE	⦿	VK102	1/2	5.6	BRASS	2PC CHR	175°	6
STAN RESP HORIZONTAL SIDEWALL	◁	TY3311	1/2	5.6	BRASS	NONE	175°	2
						TOTAL SPRINKLERS THIS LEVEL		617

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FIRE PROTECTION NEW PLAN- AREA 74 - LOWER LEVEL

SCALE:
EPROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

FT142

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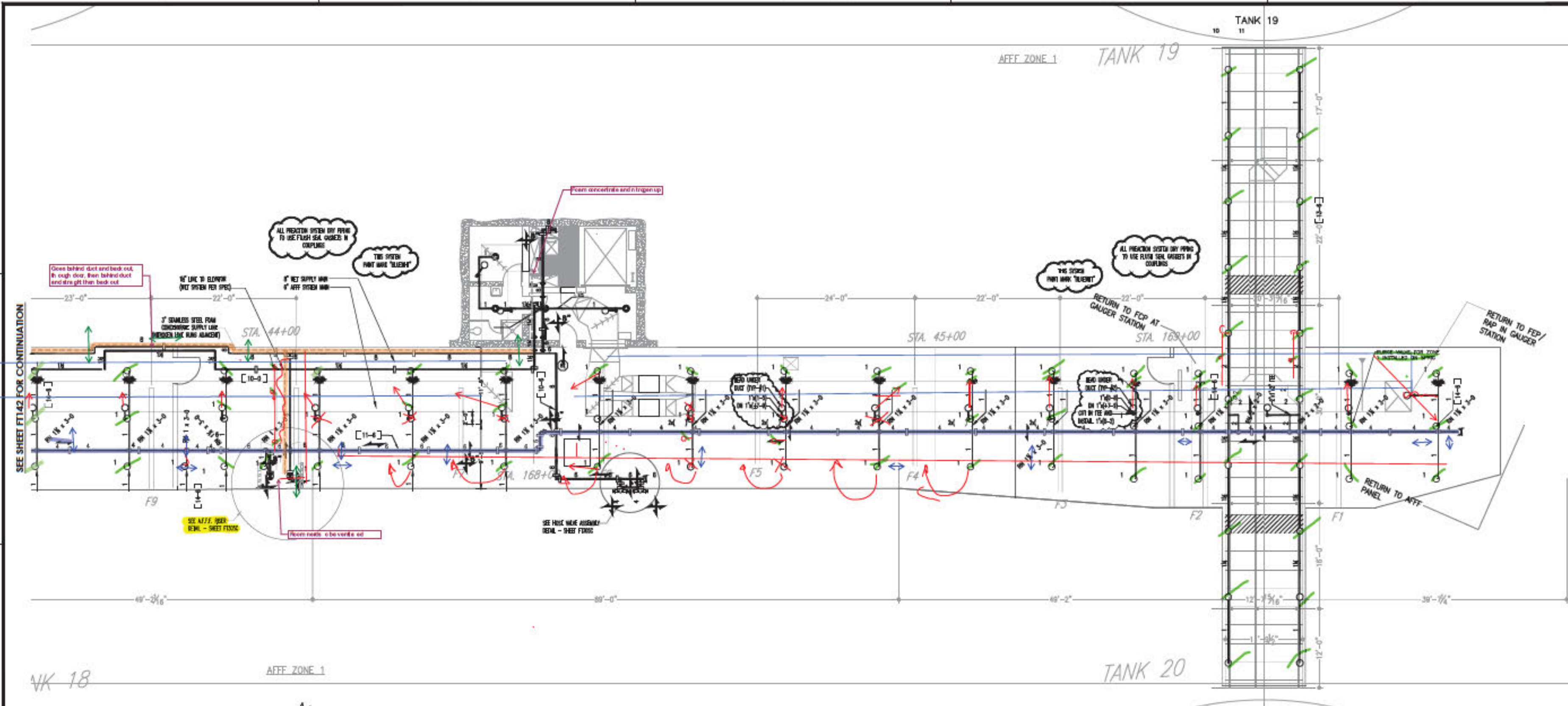
CHESTERFIELD PACIFIC, INC.
TEL (808) 853-2800
FAX (808) 853-3200

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AW[redacted]E INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

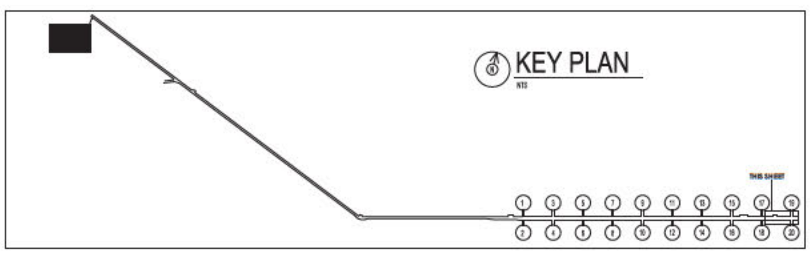
[redacted]



PARTIAL FIRE PROTECTION NEW PLAN - AREA 75 - LOWER LEVEL

1 FD100 FT134

SCALE 1/8" 1' 0"



AS BUILT

SPRINKLER HEAD LEGEND:	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
STANDARD RESP UPRIGHT	⭘	VK100	1/2	5.6	BRASS	N/A	175°	5
STANDARD RESP UPRIGHT	○	VK100	1/2	5.6	BRASS	N/A	286°	135
STANDARD RESP UPRIGHT ON SPRIG	⊗	VK100	1/2	5.6	BRASS	N/A	286°	469
STAND RESP PENDENT w/PLATE	◉	VK102	1/2	5.6	BRASS	2PC CHR	175°	6
STAN RESP HORIZONTAL SIDEWALL	◁	TY3511	1/2	5.6	BRASS	NONE	175°	2
TOTAL SPRINKLERS THIS LEVEL								617

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AM[redacted]E VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INS[redacted]E INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

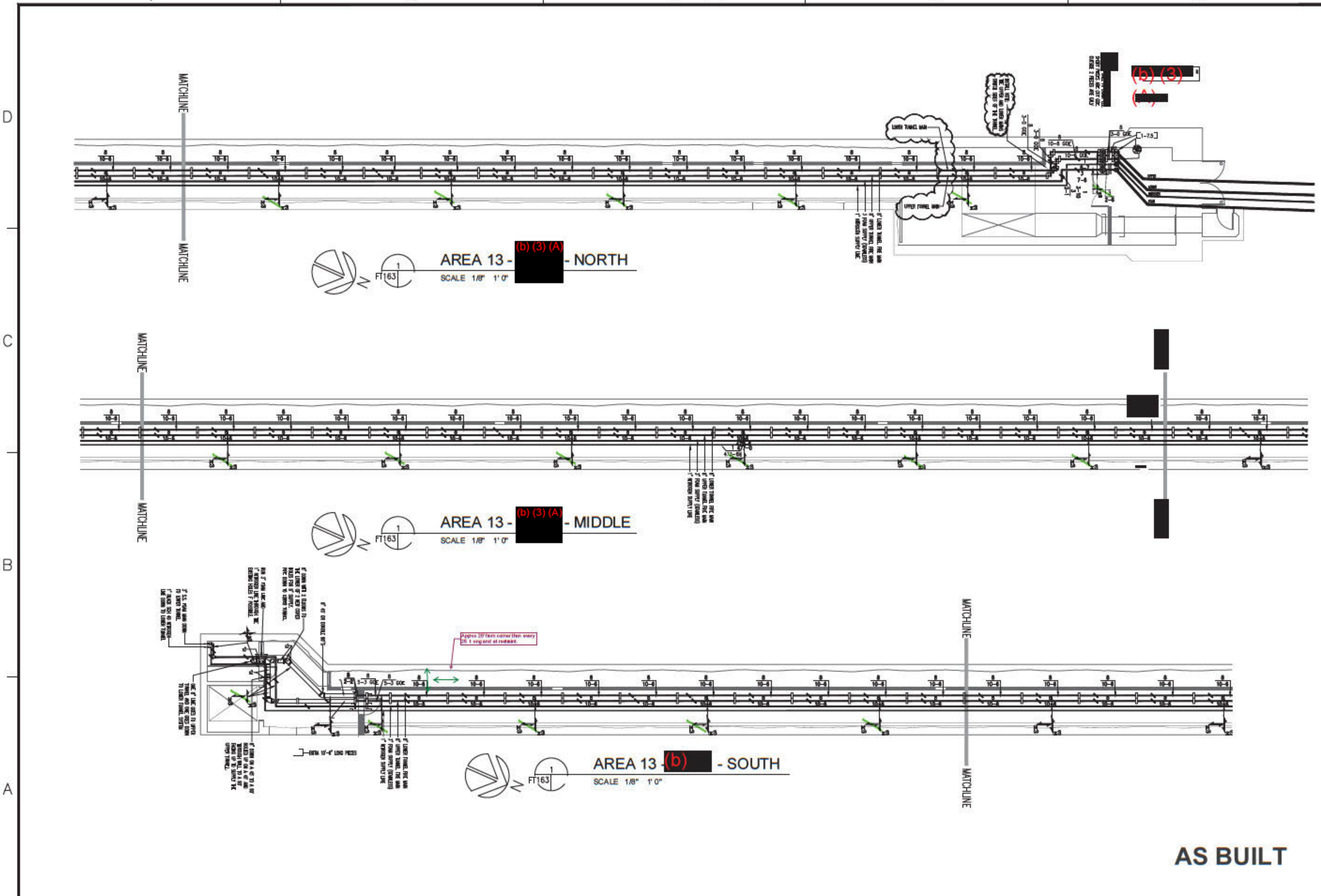
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

PARTIAL FIRE PROTECTION NEW PLAN- AREA 75 - LOWER LEVEL

SCALE:
EPROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

FT143



DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

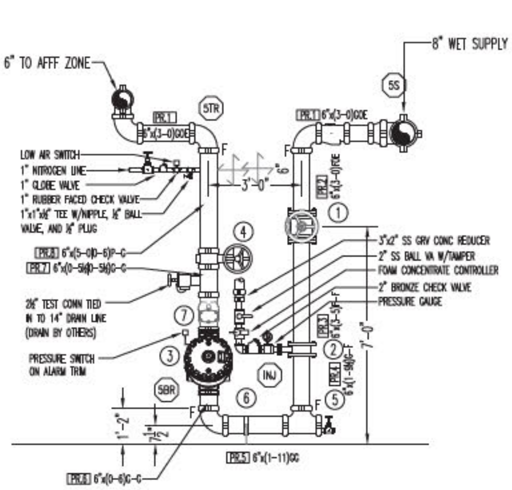
PARTIAL FIRE PROTECTION NEW PLAN- AREA 13 - ADIT 6

EPROJECT NO.: 1306143

FT163

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK [redacted] THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSU[redacted]E INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

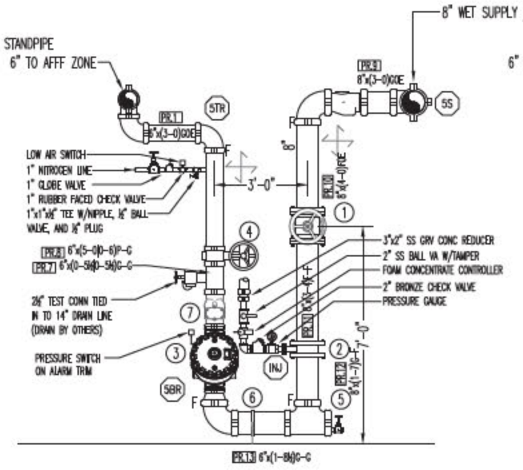
IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES



PREACTION RISERS SYSTEMS 1 AND 2

RISER LEGEND

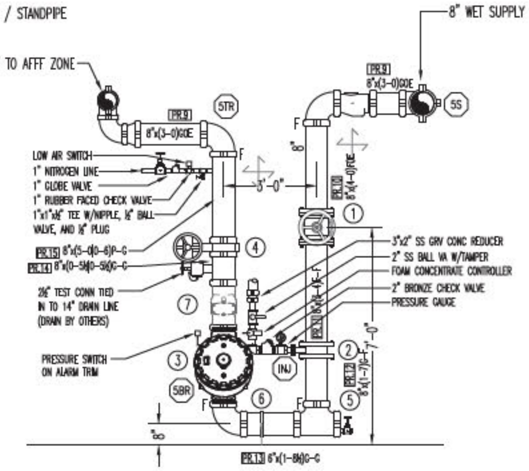
1. 6" FLANGED OS&Y WITH TAMPER SWITCH
2. 6" ANSUL FLOWMAX PPW PROPORTIONER W/HYDRAULIC CONCENTRATE CONTROL VALVE
3. 6" VIKING DELUGE VALVE SET UP AS SINGLE INTERLOCK PREACTION VALVE WITH ELECTRIC RELEASE
4. 6" GRV BUTTERFLY VALVE W/TAMPER
5. 1" AUX DRAIN W/ SIGN
6. PIPE CLAMP RODDED INTO FLOOR (USE ½")
7. 6" GRV CHECK VALVE



PREACTION RISER SYSTEM 3

RISER LEGEND

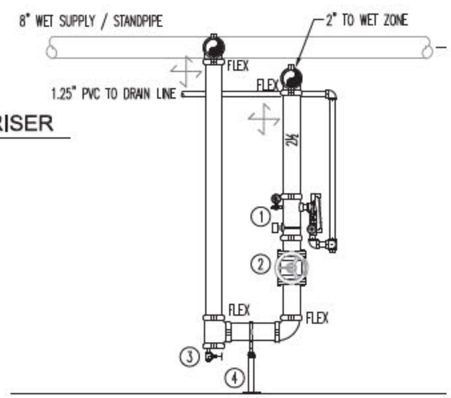
1. 8" FLANGED OS&Y WITH TAMPER SWITCH
2. 8" ANSUL FLOWMAX PPW PROPORTIONER W/HYDRAULIC CONCENTRATE CONTROL VALVE
3. 6" VIKING DELUGE VALVE SET UP AS SINGLE INTERLOCK PREACTION VALVE WITH ELECTRIC RELEASE
4. 6" GRV BUTTERFLY VALVE W/TAMPER
5. 1" AUX DRAIN W/ SIGN
6. PIPE CLAMP RODDED INTO FLOOR
7. 6" GRV CHECK VALVE



PREACTION RISERS SYSTEMS 4 AND 5

RISER LEGEND

1. 8" FLANGED OS&Y WITH TAMPER SWITCH
2. 8" ANSUL FLOWMAX PPW PROPORTIONER W/HYDRAULIC CONCENTRATE CONTROL VALVE
3. 8" VIKING DELUGE VALVE SET UP AS SINGLE INTERLOCK PREACTION VALVE WITH ELECTRIC RELEASE
4. 8" GRV BUTTERFLY VALVE W/TAMPER
5. 1" AUX DRAIN W/ SIGN
6. PIPE CLAMP RODDED INTO FLOOR
7. 6" GRV CHECK VALVE

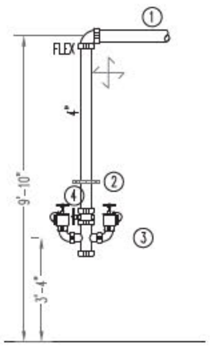


1 FT305 LOWER LEVEL - "GAUGER" RISER

SCALE: 1/2" = 1' 0"

RISER LEGEND

1. 2½" GRV VIKING EASY RISER WITH GAUGE, FLOW SWITCH, AND 1¼" TESTanDRAIN WITH ½" ORIFICE AND 175 PSI PRESSURE RELIEF
2. 2½" FLANGED OS&Y WITH TAMPER SWITCH
3. 1" AUX DRAIN W/ SIGN
4. PIPE STAND



RISER LEGEND

1. 4" SUPPLY PIPING FROM 8" FIRE PROTECTION MAIN
2. RISER CLAMP OR UNISTRUT THE 4" DROP TO WALL
3. 2½" BRONZE ANGLE PATTERN HOSE VALVE WITH ADJUSTABLE PRESSURE RESTRICTION
4. 4" GRV BUTTERFLY VALVE W/TAMPER

1 FT305 FIRE HOSE VALVE STATIONS

SCALE: 1/2" = 1' 0"

AS BUILT

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JOINT BASE PEARL HARBOR HICKAM (RED HILL) — OAHU, HAWAII

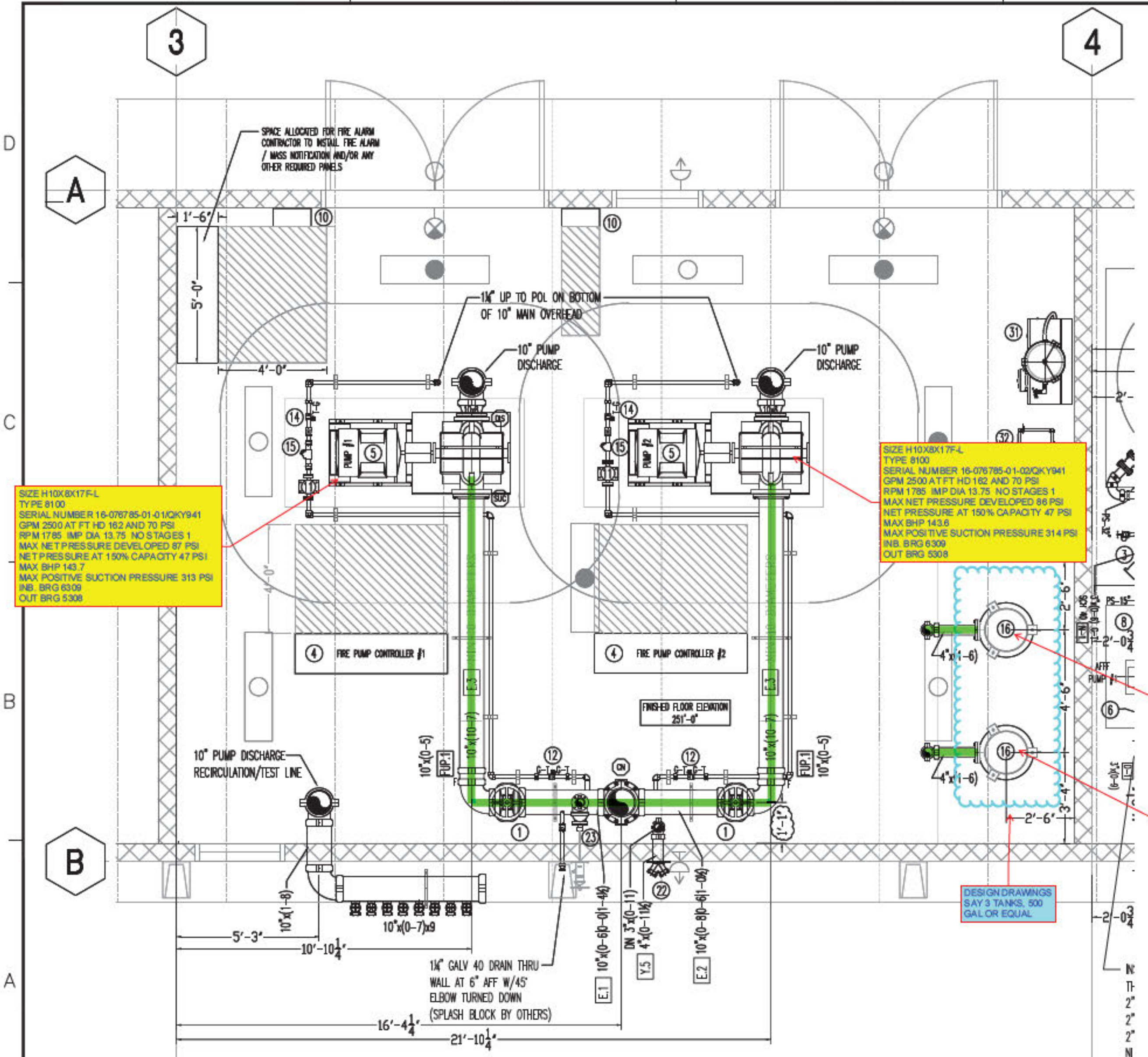
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

NEW FIRE PROTECTION SECTIONS LOWER LEVEL RISER DETAILS

EPROJECT NO: 1306143

FT305R

APPENDIX C. SITE SURVEY NOTES FIRE PUMP SYSTEM



FIRE PUMP ROOM - GROUND LEVEL / LOW PIPING

FIRE PUMP ROOM - EQUIPMENT LEGEND

1. 10" VICTAULIC 771H GRV OS&Y VALVE W/TAMPER (250PSI)
2. 12" TYCO BFV-N WAFER BUTTERFLY WITH TAMPER (250PSI)
3. 12" TYCO CV-1F GRV CHECK VALVE (300PSI)
4. FIRE PUMP CONTROLLER W/TRANSFER SWITCH
5. ELECTRIC FIRE PUMP – 2,500 GPM @ 70 PSI
6. 1" AUX DRAIN
7. 10" NIBCO GD-6765-8N BUTTERFLY VALVE WITH TAMPER SWITCH
8. 8" NIBCO GD-4765-8N BUTTERFLY VALVE WITH TAMPER SWITCH
9. 8" FLOW METER
10. JOCKEY PUMP CONTROLLER
11. 25 GPM @ 125 PSI JOCKEY PUMP
12. 1¼" MILWAUKEE BB-SC100 BUTTERBALL VALVE (NO TAMPER STANDARD 175 PSI)
13. NOT USED
14. 1¼" MILWAUKEE BB-SC100 BUTTERBALL VALVE (NO TAMPER – SPEC. ORDER 350 PSI NYC)
15. 1½" FPPI THREADED CHECK VALVE (UL)
16. SPT-14 – 106 GAL FIRE PUMP SURGE TANK – SIZED PER MANU. FORMULA
17. 4" GROOVED B-FLY VALVE WITH TAMPER – NIBCO GD-4765-8N 300PSI
18. ½" 175 PSI PRESSURE RELIEF VALVE (PIPE TO DRAIN)
19. 300 PSI WATER PRESSURE GAUGE
20. AUTOMATIC AIR RELEASE VALVE
21. 4" VIKING M-2 GRV CHECK VALVE (250 PSI)
22. CROKER 6410-PB POLISHED BRASS DOUBLE CLAPPER 2-WAY FIRE DEPARTMENT CONNECTION W/ ROUND PLATE "AUTO SPKR" & PLUGS
23. 3" KENNEDY KS-FW FLG NON RISING STEM GATE VALVE (200 PSI) WITH WALL POST INDICATOR AND SUPERVISORY SWITCH
24. 3" VIKING J-1 FLG-GRV ALARM VALVE WITH VERT VARIABLE PRESSURE TRIM + RETARD + PRESSURE SWITCH (300 PSI)
25. WATER MOTOR & ALARM GONG ON OUTSIDE OF BUILDING
26. 10" NIBCO GD-6765-8N BUTTERFLY VALVE WITH TAMPER SWITCH (300PSI)
27. 10" TYCO CV-1F GRV CHECK VALVE (300PSI)
28. AUTOMATIC AIR RELEASE
29. ¾" CASING RELIEF SET TO 240 PSI – PIPE TO FLOOR DRAIN
30. 300 PSI OIL FILLED WATER PRESSURE GAUGE
31. AIR COMPRESSOR
32. AIR DRYER
33. NITROGEN GENERATOR
34. NITROGEN TANK
35. AIR MAINTENANCE DEVICE

345768
CERTIFIED BY AMTROL INC. SPT14
MAWP 275 PSI AT 240 DEG F
MDMT +18 DEG F AT 275 PSI
MFG. SER. NO 345768 YEAR BUILT 2016
SIZE 106 GALS

NOTE: PROVIDE SIGNAGE ON VALVES INDICATING NORMAL OPERATING POSITION. (OPEN OR CLOSED) – CHAIN & LOCK ALL

SEE SHEET FB-503 FOR PUMP SCHEDULES

345767
CERTIFIED BY AMTROL INC. SPT14
MAWP 275 PSI AT 240 DEG F
MDMT +18 DEG F AT 275 PSI
MFG. SER. NO 345767 YEAR BUILT 2016
SIZE 106 GALS

AS BUILT

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SYM	DESCRIPTION	DATE
5	AS BUILT	10-18-17
4	FINAL EXTERIOR FIRE SYSTEM REVISIONS	10-2-17
3	REV – SIZED ON THE FOAM PUMP RELIEF	8-28-17
2	REV – ADDED MORE MISC PARTS TO TRIM	8-14-17
1	REV – ADDED AIR MAINT, FOAM TRIM, CHECK	7-22-17
N/A	FOR INSTALLATION	5-8-18

NAVFAC

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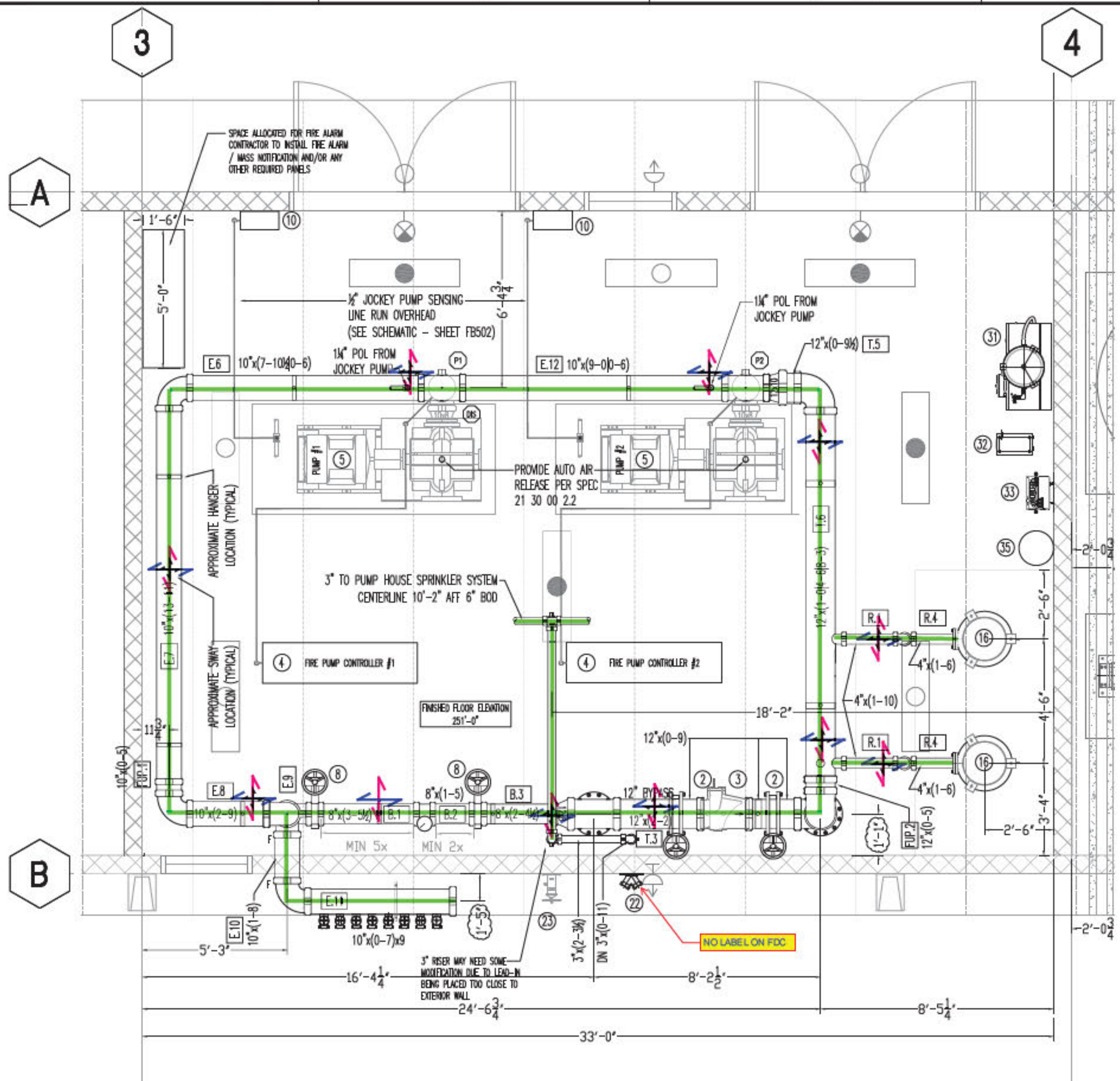
CPI
CRITCHFIELD PACIFIC, INC.
1604 KAMAMAHUE STREET
HONOLULU, HAWAII 96819
TEL (808) 853-2000
FAX (808) 853-2001

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FIRE PUMP ROOM PLAN - GROUND / LOW LEVEL PIPING
NEW FIRE PUMP BUILDING

PROJECT NO.: 1306143

FB101B



FIRE PUMP ROOM - OVERHEAD / HIGH PIPING

FIRE PUMP ROOM - EQUIPMENT LEGEND

1. 10" VICTAULIC 771H GRV OS&Y VALVE W/TAMPER (250PSI)
2. 12" TYCO BFV-N WAFER BUTTERFLY WITH TAMPER (250PSI)
3. 12" TYCO CV-1F GRV CHECK VALVE (300PSI)
4. FIRE PUMP CONTROLLER W/TRANSFER SWITCH
5. ELECTRIC FIRE PUMP – 2,500 GPM @ 70 PSI
6. 1" AUX DRAIN
7. 10" NIBCO GD-6765-8N BUTTERFLY VALVE WITH TAMPER SWITCH
8. 8" NIBCO GD-4765-8N BUTTERFLY VALVE WITH TAMPER SWITCH
9. 8" FLOW METER
10. JOCKEY PUMP CONTROLLER
11. 25 GPM @ 125 PSI JOCKEY PUMP
12. 1¼" MILWAUKEE BB-SC100 BUTTERBALL VALVE (NO TAMPER STANDARD 175 PSI)
13. NOT USED
14. 1¼" MILWAUKEE BB-SC100 BUTTERBALL VALVE (NO TAMPER – SPEC. ORDER 350 PSI NYC)
15. 1¼" FPPI THREADED CHECK VALVE (UL)
16. SPT-14 – 106 GAL FIRE PUMP SURGE TANK – SIZED PER MANU. FORMULA
17. 4" GROOVED B-FLY VALVE WITH TAMPER – NIBCO GD-4765-8N 300PSI
18. ½" 175 PSI PRESSURE RELIEF VALVE (PIPE TO DRAIN)
19. 300 PSI WATER PRESSURE GAUGE
20. AUTOMATIC AIR RELEASE VALVE
21. 4" VIKING M-2 GRV CHECK VALVE (250 PSI)
22. CROKER 6410-PB POLISHED BRASS DOUBLE CLAPPER 2-WAY FIRE DEPARTMENT CONNECTION W/ ROUND PLATE "AUTO SPKR" & PLUGS
23. 3" KENNEDY KS-FW FLG NON RISING STEM GATE VALVE (200 PSI) WITH WALL POST INDICATOR AND SUPERVISORY SWITCH
24. 3" VIKING J-1 FLG-GRV ALARM VALVE WITH VERT VARIABLE PRESSURE TRIM + RETARD + PRESSURE SWITCH (300 PSI)
25. WATER MOTOR & ALARM GONG ON OUTSIDE OF BUILDING
26. 10" NIBCO GD-6765-8N BUTTERFLY VALVE WITH TAMPER SWITCH (300PSI)
27. 10" TYCO CV-1F GRV CHECK VALVE (300PSI)
28. AUTOMATIC AIR RELEASE
29. ¾" CASING RELIEF SET TO 240 PSI – PIPE TO FLOOR DRAIN
30. 300 PSI OIL FILLED WATER PRESSURE GAUGE
31. AIR COMPRESSOR
32. AIR DRYER
33. NITROGEN GENERATOR
34. NITROGEN TANK
35. AIR MAINTENANCE DEVICE

NOTE: PROVIDE SIGNAGE ON VALVES INDICATING NORMAL OPERATING POSITION. (OPEN OR CLOSED) – CHAIN & LOCK ALL

SEE SHEET FB-503 FOR PUMP SCHEDULES

AS BUILT

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FIRE PUMP ROOM PLAN - OVERHEAD / HIGH PIPING
NEW FIRE PUMP BUILDING

CPI
PROJECT NO.: 1306143

FB101C

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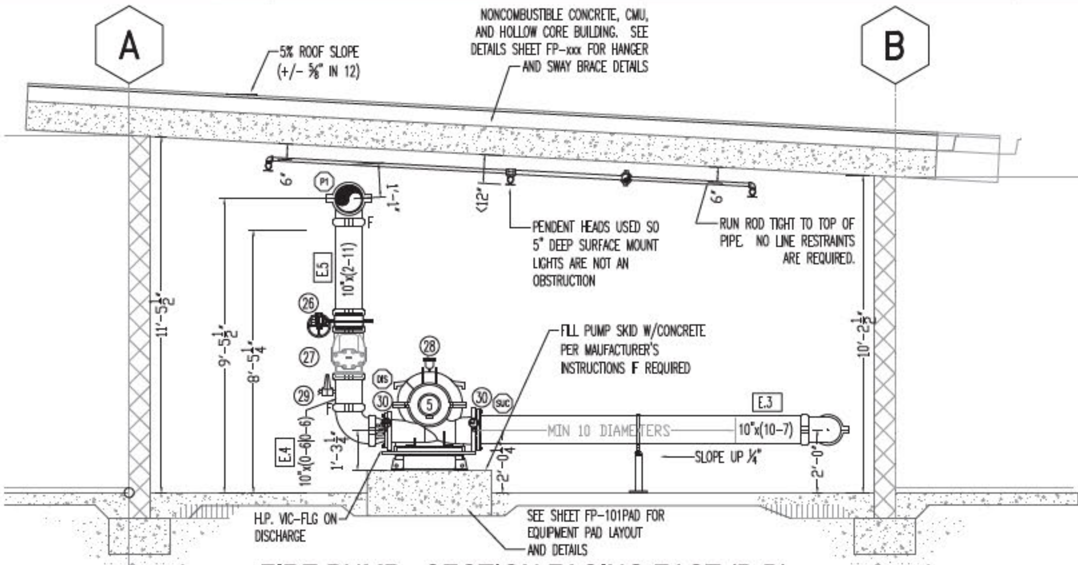
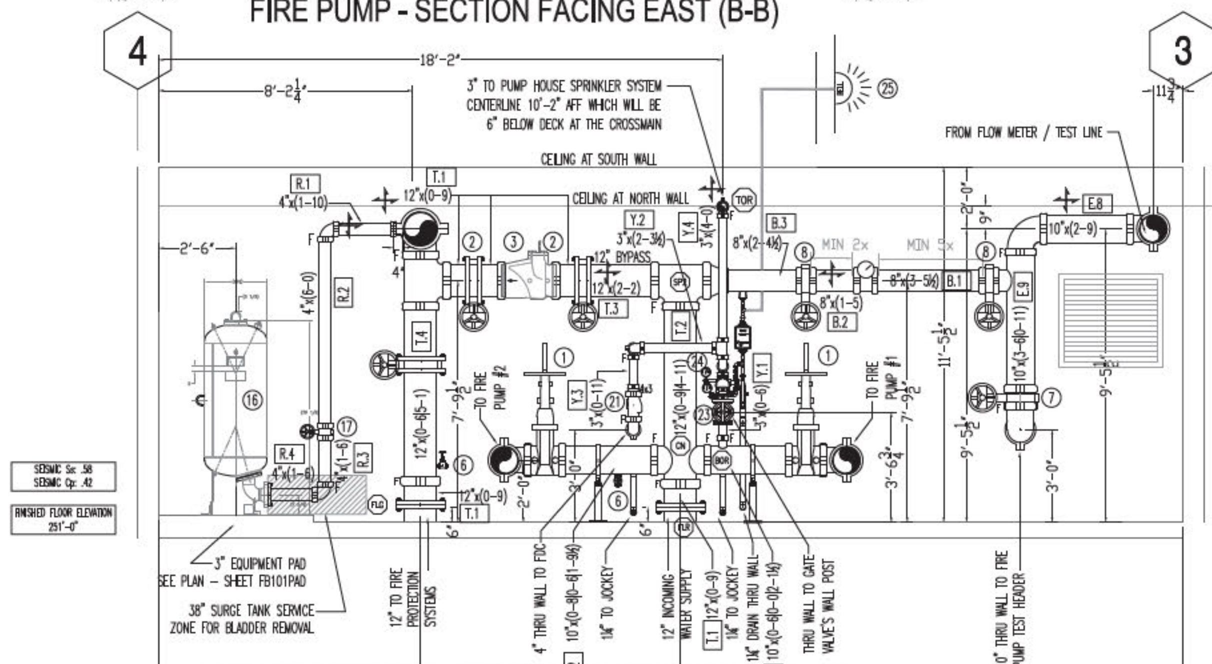


FIRE PUMP - SECTION FACING EAST (B-B)



FIRE PUMP ROOM - SECTION FACING SOUTH (A-A)

FIRE PUMP ROOM - EQUIPMENT LEGEND

1. 10" VICTAULIC 771H GRV OS&Y VALVE W/TAMPER (250PSI)
2. 12" TYCO BFV-N WAFER BUTTERFLY WITH TAMPER (250PSI)
3. 12" TYCO CV-1F GRV CHECK VALVE (300PSI)
4. FIRE PUMP CONTROLLER W/TRANSFER SWITCH
5. ELECTRIC FIRE PUMP - 2,500 GPM @ 70 PSI
6. 1" AUX DRAIN
7. 10" NIBCO GD-6765-8N BUTTERFLY VALVE WITH TAMPER SWITCH
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10. JOCKEY PUMP CONTROLLER
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12. 1¼" MILWAUKEE BB-SC100 BUTTERBALL VALVE (NO TAMPER STANDARD 175 PSI)
13. NOT USED
14. 1¼" MILWAUKEE BB-SC100 BUTTERBALL VALVE (NO TAMPER - SPEC. ORDER 350 PSI NYC)
15. 1½" FPPI THREADED CHECK VALVE (UL)
16. SPT-14 - 106 GAL FIRE PUMP SURGE TANK - SIZED PER MANU. FORMULA
17. 4" GROOVED B-FLY VALVE WITH TAMPER - NIBCO GD-4765-8N 300PSI
18. ½" 175 PSI PRESSURE RELIEF VALVE (PIPE TO DRAIN)
19. 300 PSI WATER PRESSURE GAUGE
20. AUTOMATIC AIR RELEASE VALVE
21. 4" VIKING M-2 GRV CHECK VALVE (250 PSI)
22. CROKER 6410-PB POLISHED BRASS DOUBLE CLAPPER 2-WAY FIRE DEPARTMENT CONNECTION W/ ROUND PLATE "AUTO SPKR" & PLUGS
23. 3" KENNEDY KS-FW FLG NON RISING STEM GATE VALVE (200 PSI) WITH WALL POST INDICATOR AND SUPERVISORY SWITCH
24. 3" VIKING J-1 FLG-GRV ALARM VALVE WITH VERT VARIABLE PRESSURE TRIM + RETARD + PRESSURE SWITCH (300 PSI)
25. WATER MOTOR & ALARM GONG ON OUTSIDE OF BUILDING
26. 10" NIBCO GD-6765-8N BUTTERFLY VALVE WITH TAMPER SWITCH (300PSI)
27. 10" TYCO CV-1F GRV CHECK VALVE (300PSI)
28. AUTOMATIC AIR RELEASE
29. ¾" CASING RELIEF SET TO 240 PSI - PIPE TO FLOOR DRAIN
30. 300 PSI OIL FILLED WATER PRESSURE GAUGE
31. AIR COMPRESSOR
32. AIR DRYER
33. NITROGEN GENERATOR
34. NITROGEN TANK
35. AIR MAINTENANCE DEVICE

NOTE: PROVIDE SIGNAGE ON VALVES INDICATING NORMAL OPERATING POSITION. (OPEN OR CLOSED) - CHAIN & LOCK ALL

SEE SHEET FB-503 FOR PUMP SCHEDULES

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

FIRE PUMP ROOM SECTIONS
NEW FIRE PUMP BUILDING

PROJECT NO. 1306143

FB101D

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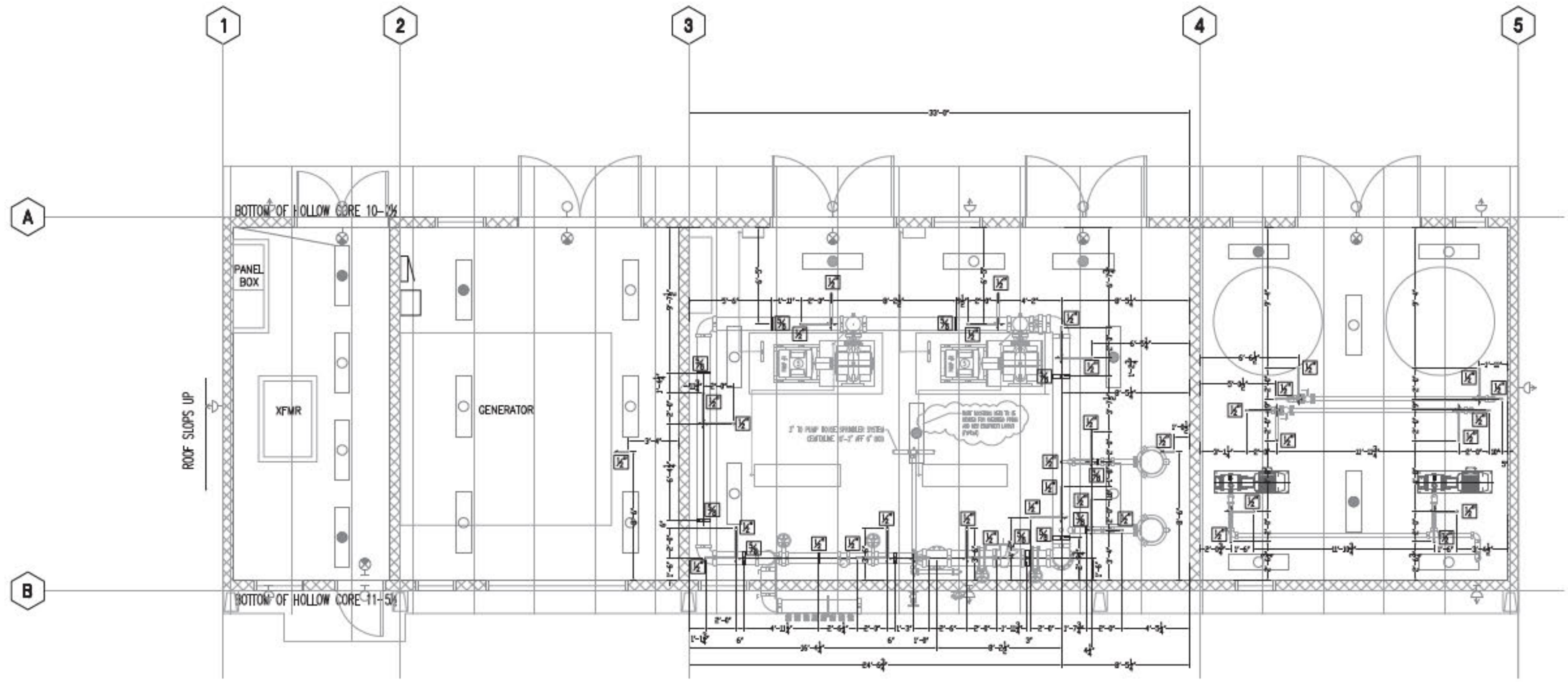
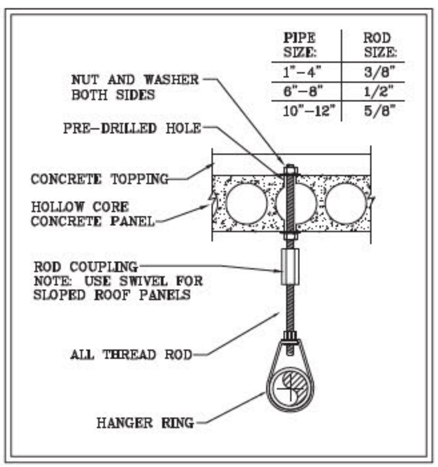


PUMP HOUSE HANGER / SWAY THROUGH BOLTS

INCLUDES 4" AND LARGER HANGERS AND ALL SWAY BRACES
DOES NOT INCLUDE 3" AND SMALLER ATTACHMENTS

PIPE SIZE:	ROD SIZE:
1"–4"	3/8"
6"–8"	1/2"
10"–12"	5/8"



HANGER DETAIL #41 – THRU ROD ANCHOR
N.T.S.

AS BUILT

SPRINKLER HEAD LEGEND :	SYMBOL	SIN	ORIFICE	K-FACTOR	HEAD FINISH	PLATE FINISH	TEMP.	QUANT
QUICK RESP PENDENT w/OUT PLATE	◐	VK302	1/2"	5.6	BRASS	NONE	175°	24
						TOTAL SPRINKLERS THIS LEVEL		24

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AM[illegible]THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INS[illegible]HE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT – USE GRAPHIC SCALES

SYM	DESCRIPTION	DATE
5	AS BUILT	10-18-17
4	FINAL EXTERIOR [illegible] REVISIONS	10-9-17
3	REV – [illegible] FOAM PUMP [illegible]	[illegible]
2	REV – ADDED [illegible]	[illegible]
1	REV – ADDED AIR [illegible], FOAM TRIM, CHECK	[illegible]
N/A	FOR INSTALLATION	[illegible]

NAVFAC

CPI

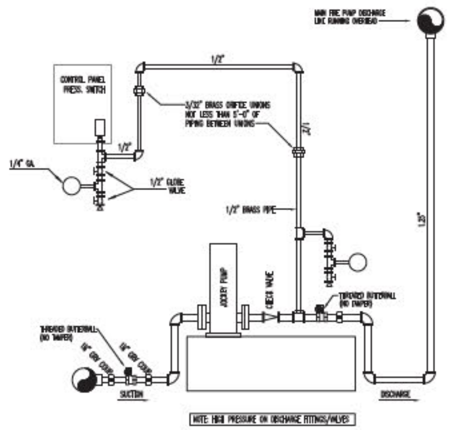
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

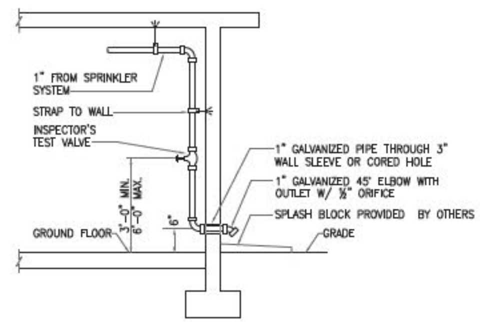
FIRE PROTECTION OVERHEAD HANGERS NEW FIRE PUMP BUILDING

SCALE:
PROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

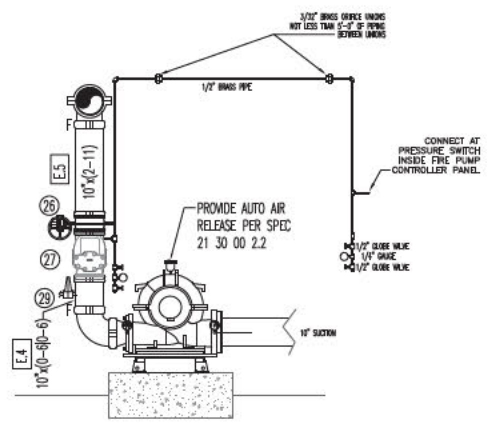
FB101H



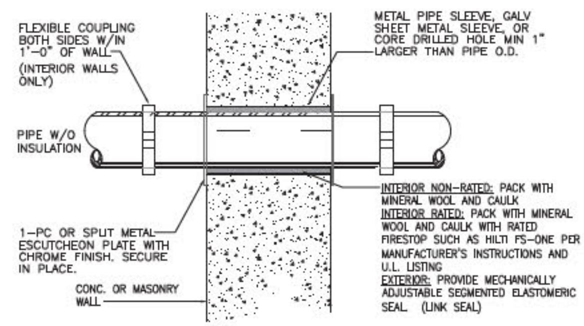
JOCKEY PUMP AND SENSING LINE SCHEMATIC



INSPECTOR'S TEST CONNECTION DETAIL



FIRE PUMP SENSING LINE SCHEMATIC DETAIL



PIPE THROUGH WALL - ABOVE GRADE

AS BUILT

SYM	DESCRIPTION	DATE
5	AS BUILT	10-18-17
4	FINAL EXTERIOR FNV REVIEW REVISIONS	10-2-17
3	REV - RSDO ON THE FOAM PUMP RELIEF	8-28-17
2	REV - ADDED MORE MISC PARTS TO TRIM	8-14-17
1	REV - ADDED AIR MAINT, FOAM TRIM, CHECK	3-28-17
N/A	FOR INSTALLATION	5-8-16

NAVFAC

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CRITCHFIELD PACIFIC, INC.
1804 KAHANAHUE STREET
HONOLULU, HAWAII 96819
TEL (808) 853-2000
FAX (808) 853-2201

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APPROVED
FOR COMMANDER NAVFAC
ACTIVITY
SATISFACTORY TO | DATE
DES | DRW | REV
PM/DM
FIRE PROTECTION
BRANCH MANAGER
CHIEF ENG/ARCH

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

FIRE PUMP HOUSE DETAILS
NEW FIRE PUMP BUILDING

SCALE:
EPROJECT NO.: 1306143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

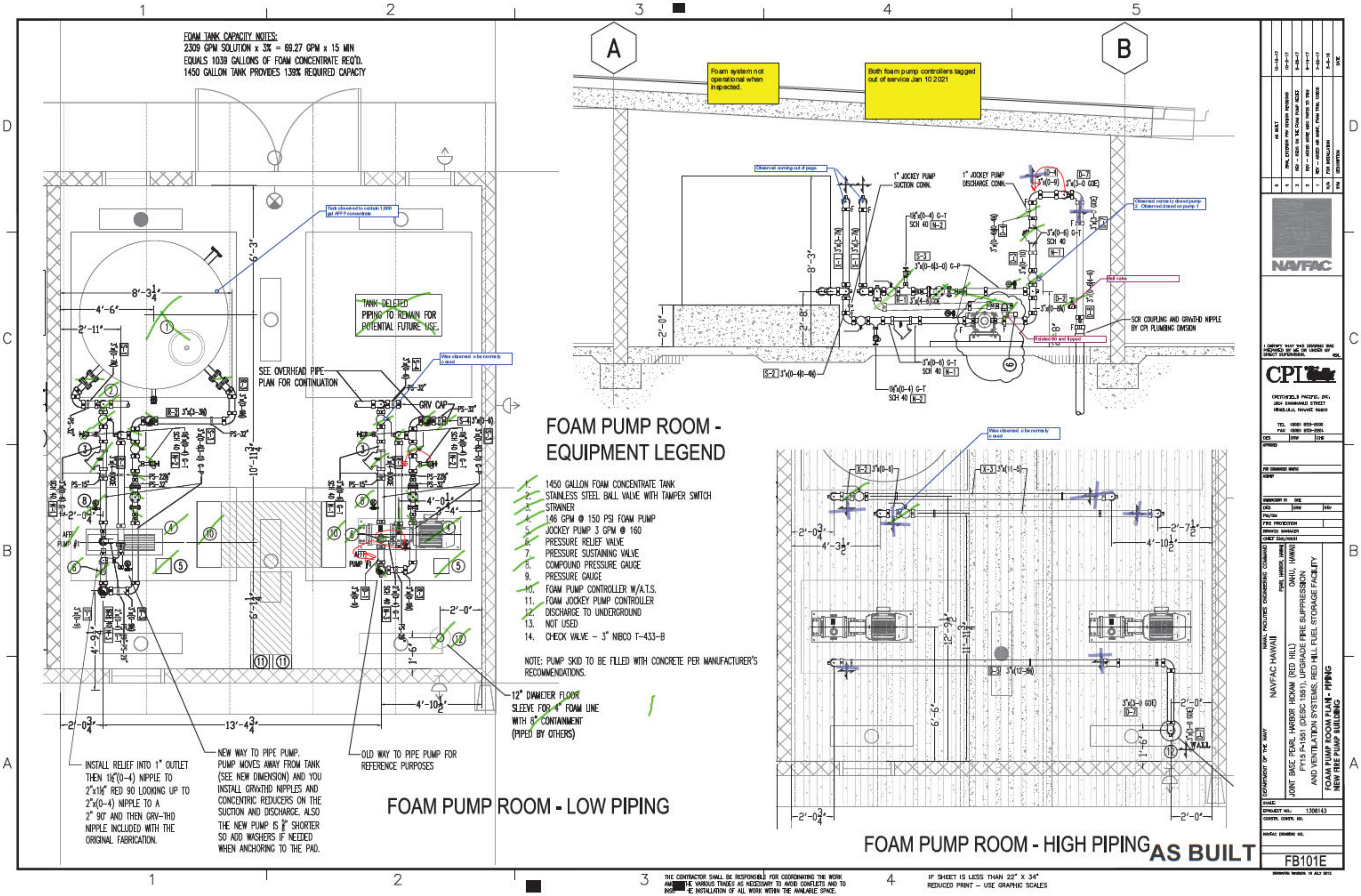
FB502

DRAWFORM REVISION: 18 JULY 2012

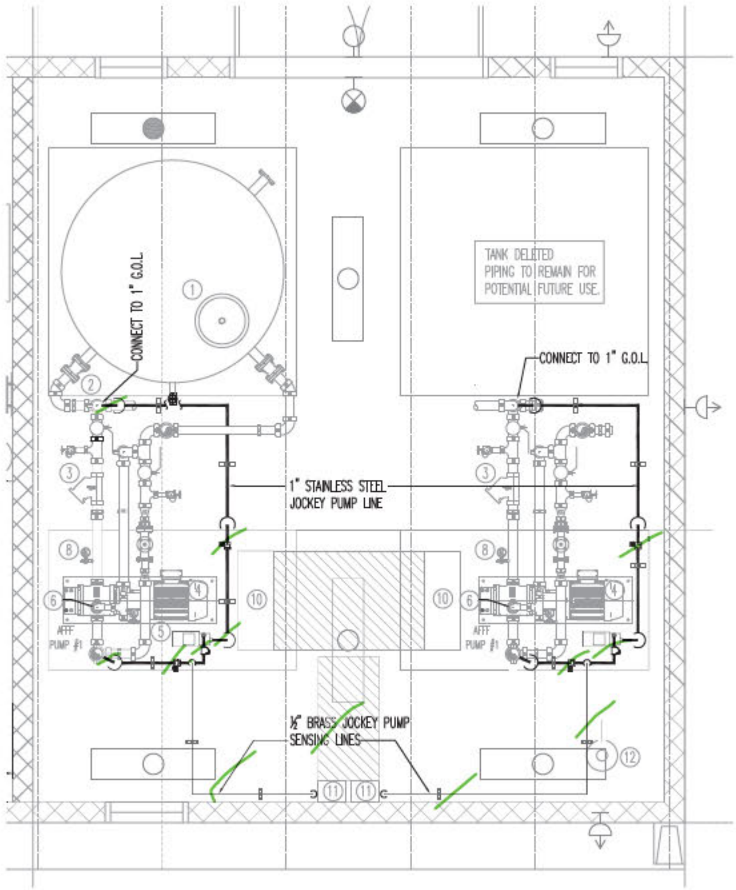
THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT - USE GRAPHIC SCALES

APPENDIX D. SITE SURVEY NOTES FOAM PUMP SYSTEM

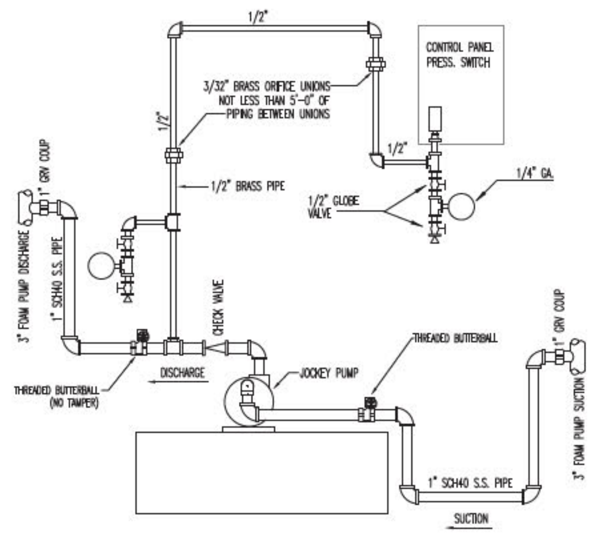


FOAM TANK CAPACITY NOTES:
2309 GPM SOLUTION x 3% = 69.27 GPM x 15 MIN
EQUALS 1039 GALLONS OF FOAM CONCENTRATE REQ'D.
1450 GALLON TANK PROVIDES 139% REQUIRED CAPACITY
Foam system not operational when inspected.
Both foam pump controllers tagged out of service Jan 10 2021
TANK DELETED PIPING TO REMAIN FOR POTENTIAL FUTURE USE.
SEE OVERHEAD PIPE PLAN FOR CONTINUATION
1" JOCKEY PUMP SUCTION CONN.
1" JOCKEY PUMP DISCHARGE CONN.
SCR COUPLING AND GRVxTHD NIPPLE BY CPI PLUMBING DIVISION
FOAM PUMP ROOM - EQUIPMENT LEGEND
1. 1450 GALLON FOAM CONCENTRATE TANK
2. STAINLESS STEEL BALL VALVE WITH TAMPER SWITCH
3. STRAINER
4. 146 GPM @ 150 PSI FOAM PUMP
5. JOCKEY PUMP 3 GPM @ 160
6. PRESSURE RELIEF VALVE
7. PRESSURE SUSTAINING VALVE
8. COMPOUND PRESSURE GAUGE
9. PRESSURE GAUGE
10. FOAM PUMP CONTROLLER W/A.T.S.
11. FOAM JOCKEY PUMP CONTROLLER
12. DISCHARGE TO UNDERGROUND
13. NOT USED
14. CHECK VALVE - 3" NIBCO T-433-B
NOTE: PUMP SKID TO BE FILLED WITH CONCRETE PER MANUFACTURER'S RECOMMENDATIONS.
12" DIAMETER FLOOR SLEEVE FOR 4" FOAM LINE WITH 8" CONTAINMENT (PIPED BY OTHERS)
INSTALL RELIEF INTO 1" OUTLET THEN 1½"(0-4) NIPPLE TO 2"x1½" RED 90 LOOKING UP TO 2"x(0-4) NIPPLE TO A 2" 90° AND THEN GRV-THD NIPPLE INCLUDED WITH THE ORIGINAL FABRICATION.
NEW WAY TO PIPE PUMP. PUMP MOVES AWAY FROM TANK (SEE NEW DIMENSION) AND YOU INSTALL GRVxTHD NIPPLES AND CONCENTRIC REDUCERS ON THE SUCTION AND DISCHARGE. ALSO THE NEW PUMP IS ⅝" SHORTER SO ADD WASHERS IF NEEDED WHEN ANCHORING TO THE PAD.
OLD WAY TO PIPE PUMP FOR REFERENCE PURPOSES
FOAM PUMP ROOM - LOW PIPING
FOAM PUMP ROOM - HIGH PIPING
AS BUILT
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FOAM PUMP ROOM PLAN - PIPING
NEW FIRE PUMP BUILDING
PROJECT NO.: 1306143
FB101E
THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK [redacted] THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO [redacted] THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.
IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT - USE GRAPHIC SCALES



FOAM JOCKEY PUMP PIPING LAYOUT

N.T.S.



JOCKEY PUMP SCHEMATIC

NO SCALE

AS BUILT

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NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION
AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

FOAM JOCKEY PUMP LAYOUT
NEW FIRE PUMP BUILDING

SCALE:
EPROJECT NO.: 1308143
CONSTR. CONTR. NO.
NAVFAC DRAWING NO.

FB101F-JP

DRAWFORM REVISION: 19 JULY 2012

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AM[redacted]HE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INS[redacted]E INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

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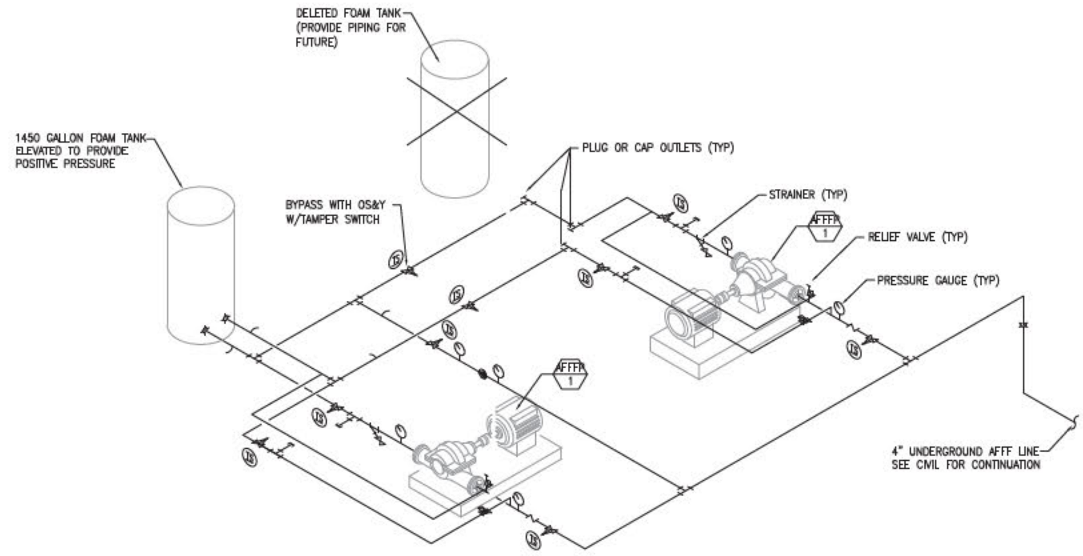
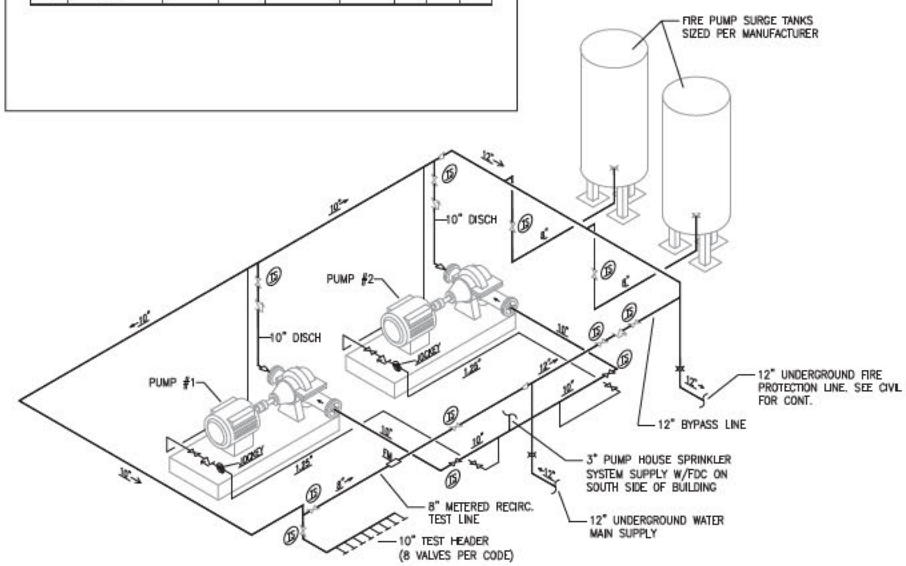
FIRE PUMP SCHEDULE

UNIT	TYPE	FLOW RATE	HEAD (PSI)	HORSEPOWER	RPM	ELECTRICAL		
						V	PH	AMPS
FP-1	IN-LINE ELECTRICAL UL LISTED CENTRIFUGAL FIRE PUMP	2500 GPM	70	125		480	3	
FP-2	IN-LINE ELECTRICAL UL LISTED CENTRIFUGAL FIRE PUMP	2500 GPM	70	125		480	3	
JP-1	ELECTRIC IN-LINE VERTICAL SHAFT CENTRIFUGAL JOCKEY PUMP	25 GPM	80	3		480	3	
JP-2	ELECTRIC IN-LINE VERTICAL SHAFT CENTRIFUGAL JOCKEY PUMP	25 GPM	80	3		480	3	
AFFFP-1	AFFF CONCENTRATE PUMP	156 GPM	150	30		480	3	
AFFFP-2	AFFF CONCENTRATE PUMP	166 GPM	150	30		480	3	
AFFF-JP-1	AFFF CONCENTRATE PUMP	5 GPM	180	3		[illegible]	3	
AFFF-JP-2	AFFF CONCENTRATE PUMP	5 GPM	180	3		[illegible]	3	



FOAM PUMP ISOMETRIC



FIRE PUMP ISOMETRIC

AS BUILT

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

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SYM	DESCRIPTION	DATE
5	AS BUILT	10-18-17
4	FINAL EXTERIOR PRV STATION REVISIONS	10-3-17
3	REV – RESIZE ON THE FOAM PUMP SCALES	8-28-17
2	REV – ADDED MORE MISC PARTS TO TRIM	8-14-17
1	REV – ADDED AIR VALVE, FOAM TRIM, CHECK	7-25-17
N/A	FOR INSTALLATION	5-5-16

NAVFAC

CPI

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NAVAL FACILITIES ENGINEERING COMMAND
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PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

FIRE PUMP AND FOAM PUMP ISOMETRIC DRAWINGS
NEW FIRE PUMP BUILDING

PROJECT NO.: 1306143

FB503

APPENDIX E. SITE SURVEY NOTES FIRE ALARM/MNS SYSTEM

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Red Hill Fire Alarm RFIs
Current as of 11 21/2016

RFI #:	Subject:	Summary:
0013	Design Intent Confirmation for Fire Alarm System	1) VDUs shall be housed in a NEMA X enclosure and on the exterior of the tunnel as shown 2) Intelligibility shall indeed be required and shall conform to UFC -021-01
0015	Fire Alarm Connection Between Buildings	Intent of pumphouse fire alarm/fire protection design: To completely replace all fire alarm components in the underground pumphouse with new FA/MNS system. Existing fire protection/suppression actuation system remains unchanged and is just controlled by the new FA system instead of the old system.
0016	Fire Alarm Monitoring of Existing Fans and Control Panels	Scope of work shall include: replacing the existing fan control system. o include: replacing existing UL86 panels and annunciators with new UUKL system that is Class 1 Div 2 to be integrated with new fire alarm panels/system. Note spec requirements: 28 31 76: 2.3, and 2.3.2: n., o., u.
0017	Interface Relay Box Clarification	Contractor to field coordinate which relays to make terminations on to accomplish the two fire alarm inputs and one fire alarm output that are called for on FT60 .
0018	Spot Type Heat Detection	Spot type heat detection is the basis of design. Linear detection can be provided if there is not additional cost or minimal cost (if approved by government).
0052	Infrared Flame Detection Field of View	Det-Tronics 90 degree horizontal field of view flame detection can be provided in lieu of the spec requirement for a system that provides 120 degree horizontal.
0053	Explosion Proof Fire Alarm Speakers Watt Taps Requirement	Explosion proof speaker watt taps can be provided with the following options: .5, 1, 2, 7, and 15 watts in lieu of the current spec requirements.
005	Jockey Pump Status Monitoring	Jockey pump status monitoring by the fire alarm system shall ONLY consist of monitoring: Jockey Pump Controller Switch in Off or Manual Position in lieu of the advanced multiple monitoring points shown on the matrix.
0063	Class 1 Div. 2 Fire Alarm Panel Material	Fire alarm devices/panels/enclosures can be provided within an aluminum enclosure when the UL listing would be voided by the manufacturer if not installed in an engineered custom box that where design criteria requires that it be installed in such.
0070	Model and Pathway Requirements for Fire Alarm	Wiring between monitor modules and initiating devices can be class B
0088.2 (rev2)	Fire Alarm UPS for Visual Display Units & DDC System	VDUs shall be powered by UPS battery backup providing 2 hours of backup.
0089	Fire Alarm Junction Box Labeling	It is acceptable to provide fire alarm junction boxes with red face plates in lieu of spec requirement to paint the entire junction box red
0092	Heat Detectors Exterior Indicators and Testing Requirements	1) Test fixed temperature heat detectors per manufacturer's recommendations - NOT by heat test method 2) Exterior indicators are not required for any NEMA 3R or Class 1 Div 2 fixed temperature heat detectors.
0097	Class 1 Division 2 Hazardous Location Boundaries	The following areas are not hazardous class 1 division 2 areas: gauger station/office, gauger station electrical room, and office/controls room in the underground pump house
0100	Heat Detector Temperature Ratings	1) Provide 200 deg F rated fixed heat detectors in the lower tunnel, harbor tunnel, upper tunnel and underground pumphouse. 2) Provide 135 deg F fixed heat detectors in the elevator shaft, machine room, control rooms, mechanical rooms, electrical rooms, and fire pump building.
0101	Fire Alarm Battery Calculation Confirmations	Fire alarm battery calculations will be based on 2 watt tap usage of explosion proof speakers in lieu of spec requirement to calculate based on highest watt tap available of device.
0105.1	Existing Tunnel Power Survey	New fire alarm power panels require power circuits however there are numerous instances where existing electrical system does not have available breakers to provide this power. In the instances where less than four circuits are required to come off an existing panel, provide new enclosed circuit breakers (20A/1P) tapped of the existing panel bussing for each required circuit. For instances in which four or more more circuits are needed, add an explosion proof panelboard by tapping off the existing panel bussing.
0106	25% Spare Capacity for Class 1 Division 2 Fire Alarm Devices	Spec requires all fire alarm circuits to maintain 25% spare capacity. In the lower tunnel each strobe takes up 66% capacity and are installed on dedicated fire alarm circuits as a result. If each strobe takes up 66% capacity on a dedicated circuit then the only way to provide 25% overall spare capacity would be to expand the # of circuits on each panel by 25%. The designer has confirmed that we are only required to provide additional circuits at all power supplies to allow for expansion. See RFI for exact verbiage.
0113	Fire Alarm, DDC, Electrical System Clarifications	1) Revise fire alarm matrix: Row line items Sump Pump SP-DOOR-#-1 2 3 or 5 running : requires the auxiliary function Shutdown Sump Pump SP-DOOR-(1-5&C)-(1-5). This is not required. Instead, a new corresponding function shall be Shutdown All Groundwater Pumps 2) Revise fire alarm matrix: Row line item for Sump Pump SP-DOOR-3-1,2,3, or 5 Running ; the requirement to Shutdown Fan EF-2A/2B is no longer required. 3) Revise fire alarm matrix: Row line item Oil tight Door: Door Remote Input is no longer required to accomplish the remotely open function. Only remotely close is required.) Revise fire alarm matrix: Row line item New Compartments: Doors at Adit 5&6 (1 EA at Each Location) Remote Input ; currently requires corresponding function to remotely re-open these doors. This function is no longer required. 5) Revise fire alarm matrix (and floor plans if necessary): Both the rollup doors and single entry doors at the new compartment wall doors at Adit 5 & Adit 6 shall be monitored and controlled by the fire alarm system. 6) Revise fire alarm matrix: Row line item New Compartments: Doors 1-5 (2 EA Personnel Doors/1 EA Rollup at Each Location) Remote Input ; Currently requires the auxiliary function to remotely re-open the doors. This is no longer required.
011	Rate of Rise and Fixed Heat Heat Detector	In lieu of specified dual function fixed heat and rate of rise type heat detectors, self restoring heat detectors with 19 deg F fixed heat detection with rate compensation equal to the Thermotech 302-sereies heat detectors line.
0115	MEPF Hangers and Anchors	Stainless steel anchors are required for all M/E P/FP/FA installations. Other type steel hangers are permitted to be used in conjunction with the stainless steel hangers, however if the metals used are dissimilar, a protective coating must be provided confirming to MPI 79.
0128	Explosion Proof Flex for Fire Alarm Panels	Explosion proof flexible conduit is approved for use in short lengths for connections into the fire alarm panels.

RFI #:	Subject:	Summary:
0138	Fire Alarm System Supports	It is acceptable to mount new visual/audible devices from existing cable tray rack. Conduits may be supported of the main support members of the cable tray rack. Heat detectors still must be installed at top of ceiling.
0139	Fire Alarm Pull Station locations	Pull stations may be surface mounted to wall at typical harbor tunnel detail provided in this RFI. ... which are above, and behind a 36" pipe; obstructed. In addition, double-action makes operation very difficult while reaching over pipe.
01 7 RFI 0147.1 deals with KCI transmitters at ADIT1 and ADIT5 and modifications to their labels.	Fire Alarm Mass Notification and Zoning	1) Fire alarm system shall be zoned per the following breakouts: UGPH (inc Adit one) Harbor Tunnel (inc Adit 2), Lower Access Tunnel (inc Adit 3) Upper Access Tunnel (inc Adit ,5,6), and the Fire Pump Building. Alarm signals shall be transmitted to the fire department per building for each zone so Fed Fire knows location of fire prior to arriving. 2) The following messages shall be used for the mass notification system: Fire Emergency / Fire alarm Message: Temporal 3 (repeat 2 cycles with a 1.5 second delay between cycles) followed by A fire emergency has occurred; please leave the building by the nearest exit. (repeat message) Visible: Turn on strobes. Test Message: NOAA Standard alert tone - 1050 hz (8 seconds) followed by Test, Test , Test, This is an emergency notification audio system test; You may continue normal operations, Test, Test, Test Visible: Turn on strobes. All Clear: Ding Dong (one cycle) followed by The Emergency has been resolved; return to normal operations (repeat message) Visible: None While only these 3 messages are recommended by CI 7, this does not change the requirement that the system have all of the necessary components to support up to 8 recorded messages, as noted in section 2.15.5.2 of specification 28 31 76, so that messages can be added as needed at a later time. 3) Specification section 28 31 76 / 2.15.5.2.a(1)-(9) requires a 2-second pause between each mass notification message, followed by repeating the message. Please advise how many times the message shall repeat or if the message will be repeated indefinitely during an alarm condition. 3) When a message is activated in the mass notification system, the message shall run for minimum 10 minutes. The following requirement shall apply: Allow the MNS to temporarily override fire alarm audible messages and visual signals, and to provide intelligible voice commands during simultaneous fire and terrorist events. All other features of the fire alarm system, including the transmission of signals to the fire department, shall function properly. MNS messages shall take priority and continue to override fire alarm audible messages until the MNS message is either manually or automatically ended. If not manually ended, the MNS message will automatically end after 10 minutes.
0150	Fire Alarm Wiring Requirements	Use of THHN not permitted for fire alarm wiring, use FPL type wiring in accordance with specification 28 31 76
0152	Fire Alarm Clarifications at UGPH	1A In the underground pump house, lower level, there are multiple areas/cavities within that do not require heat detection - follow the shop drawings locations of heat detectors do not mount additional 1B) All existing detection devices that tie in to the existing AFFF release/ FM 200 Cheetah panel in the underground pumphouse shall remain. The new fire alarm system shall only monitor this existing panel for three points. The new fire alarm system shall NOT be capable of releasing the AFFF or FM 200 system through the Cheetah panel control. The three points to be monitored are: Fire alarm from any of the existing heat/ flame detectors, AFFF deluge system discharge, existing fire alarm/ release system trouble signal 2) Existing heat detectors shall remain in the underground pumphouse electrical room. All existing detection devices that tie in to the existing AFFF release/ FM 200 Cheetah panel in the underground pumphouse shall remain. The new fire alarm system shall only monitor this existing panel for three points. The new fire alarm system shall NOT be capable of releasing the AFFF or FM 200 system through the Cheetah panel control. The three points to be monitored are: Fire alarm from any of the existing heat/flame detectors, FM200 system discharge and existing fire alarm/ release system trouble signal *Clarification: New devices shall be provided as shown on shop drawing in both the underground pump house electrical room and pump room however they do not control the release of FM200 or AFFF. They essentially provide redundant detection in these locations. 3) Fire alarm panels that are currently shown to be inside the control room in the underground pumphouse may be relocated to the hallway outside the control room with the exception of the main fire alarm panel, and network workstation.) Manual override devices for AFFF foam systems are not required. 5) An existing pathway does not exist that would permit a new fiber optic cable be installed between the underground pumphouse and building 1757 in order to accommodate the required fire alarm network workstation that is called out to be installed in building 1757. There is however a existing multi-mode fiber cable that goes to 1757. Contractor shall utilize the existing multi-mode fiber and make necessary modifications to the fire alarm system to convert from single-mode fiber workstation backbone to multi-mode fiber.
0153	Fire Alarm Field Clarifications	RFI 0153 - Fire Alarm and Fire Protection Field Clarifications 1) It is acceptable to mount fire alarm visual devices at 63 in the UGPH lower level beneath the grating due to the lower ceiling. Due to lowering these devices, follow NFPA 72 - 18.5.5.2 reduction in coverage and adjust spacing of devices as needed to ensure full coverage. 2) In the UGPH lower level, shop drawing sheet FT-161, along drawing sector A1 through A3 area, these heat detectors are permitted to be mounted on the wall as long as they are a minimum of and no greater than 12 below the ceiling.
0159	Obstructions to Fields of View for Flame Detectors	*See provided attached RFI 0159 sketch alternate layouts for flame detector placement in the lower tunnel tank gallery
0162	FDC Pressure Switch Locations	Pressure switches shall be added at Adit FDC locations. One pressure switch shall send a supervisory condition of FDC High Pressure and the other pressure switch shall send supervisory condition of FDC High Pressure Failure . (2) Pressure switches each at locations of Adit 3 and Adit , and ( ) pressure switches shall be located at Adit 6.
0167	Flame Detector Sequence of Operations	Add line item in fire alarm system sequence of operation for an event of Lower Access Tunnel Triple IR Detector: Single Device Activated AND Low Nitrogen Pressure. The corresponding sequences of operation shall mirror the condition of Lower Access Tunnel TRIPLE IR DETECTOR: Two Devices Activated. In addition, the fire alarm system sequence of operation shall be modified to change the auxiliary functions column description per the following: CHANGE: Close Fire Smoke Dampers at Lower Tunnel Door 1 TO ...At Lower Tunnel Door 5 and Existing Door C CHANGE: Release Doors at Lower Tunnel Door 1 TO ...At Lower Tunnel Door 5 and Existing Door C
0169	Cheetah Panel Controls at UGPH	The following fans in the underground pumphouse are a part of existing control schemes managed by the existing Cheetah fire alarm panel and the existing IRB interface relay box. These fans shall not be individually monitored or controlled by the new fire alarm system. The new fire alarm system shall monitor the existing Cheetah panel which in turn monitors and controls these fans in order to provide a complete integrated system.

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FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
RED HILL FIRE ALARM RFI SUMMARY

Honeywell FSG

FA0.1

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FLOOR PLAN BILL OF MATERIALS

QTY	SYMBOL	DEVICE	PART NUMBER	MANUFACTURER
0	A EX	ABORT SWITCH	BY OTHERS	BY OTHERS
2	MBB	BACK BOX – 2 UNIT	MBB-2	GAMEWELL/FCI
58	C	CONTROL MODULE	AOM-2SF	GAMEWELL/FCI
5	REL C	CONTROL MODULE-RELEASING	TC810S1000	HONEYWELL
14	DH W	DOOR HOLDER-MAGNETIC-FLUSH WALL MOUNT	BY OTHERS	BY OTHERS
43	ELEC	ELECTRICAL PANEL	BY OTHERS	BY OTHERS
12		END OF LINE RESISTOR	AS REQUIRED	GAMEWELL/FCI
24	EQP	EQUIPMENT CABINET	SEE PANEL BILL OF MATERIALS	GAMEWELL/FCI
73	EQP EXP	EQUIPMENT CABINET-EXPLOSION PROOF	SEE PANEL BILL OF MATERIALS	ADALET
725	JX	EXPLOSION PROOF CONDUIT BODY	JALX-21	HUBBELL ELEC/KILLARK
2	FACU	FIRE ALARM CONTROL UNIT	SEE PANEL BILL OF MATERIALS	GAMEWELL/FCI
2	T	FIRE PHONE CONTROL MODULE	AOM-TELF	GAMEWELL/FCI
25		FIRE SMOKE DAMPER	BY OTHERS	BY OTHERS
63	IR EXP	FLAME DETECTOR-MULTI-SPECTRUM-IR-EXP PROOF/ARM ASSEMBLY	X3301A4N11W1/007290-002	DET-TRONICS
11	UV/IR EXP	FLAME DETECTOR-UV/IR-EXPLOSION PROOF/ALUMINUM SWIVEL MOUNT	X5200A4N11W1/008500-XXX	DET-TRONICS
1	135° EXP	HEAT DETECTOR-FIXED TEMP. CONVENTIONAL-EXPLOSION PROOF 135°	302-EPM-135	THERMOTECH
724	EXP	HEAT DETECTOR-FIXED TEMP. CONVENTIONAL-EXPLOSION PROOF 194°	302-EPM-194	THERMOTECH
2	RR	HEAT DETECTOR-RATE OF RISE/BASE	ATD-RL2F/B210LP	GAMEWELL/FCI
202	WP	HEAT DETECTOR-WEATHERPROOF	302-ET-194	THERMOTECH
1	H	HORN-WALL MOUNT-RED	HR	SYSTEM SENSOR
1	INCC	INTELLIGENT NETWORK COMMAND CENTER	SEE PANEL BILL OF MATERIALS	GAMEWELL/FCI
2	IRAC	IRAC-S INDUSTRIAL RADIO ALARM CONTROL SYSTEM	99103-H10A-3R	King Fisher Radio
3		ISOLATOR MODULE	M500X	GAMEWELL/FCI
97	ISO	ISOLATOR MODULE	M500X	GAMEWELL/FCI
4	HS	JUNCTION BOX - HAZARDOUS	BY OTHERS	BY OTHERS
AS REQ'D.	JB	JUNCTION BOX	BY OTHERS	BY OTHERS
4	F	MANUAL PULL STATION	MS-7AF	GAMEWELL/FCI
95	F EXP WP	MANUAL PULL STATION-DUAL ACTION-WEATHERPROOF-EXPLOSION PROOF	RMS-6T-EXP-WP-LP	POTTER SIGNAL
38	F WP	MANUAL PULL STATION-WEATHERPROOF	MS-7LOB	GAMEWELL/FCI
312	M	MONITOR MODULE	AMM-4F	GAMEWELL/FCI
1158	MM	MONITOR MODULE-MINI	AMM-2F	GAMEWELL/FCI
123	RMU	MULTI-VOLTAGE RELAY	R-10E	SYSTEM SENSOR
9	NWS	NETWORK WORKSTATION	SEE PANEL BILL OF MATERIALS	GAMEWELL/FCI
199	BP	OUTLET BOX / WEATHERPROOF PLATE	S-48 / SJ-41	RED DOT
16	P	PHOTOELECTRIC DETECTOR/BASE	ASD-PL2F/B210LP	GAMEWELL/FCI
1	PIV	POST INDICATOR VALVE	BY OTHERS	BY OTHERS
8	PS	POWER SUPERVISION RELAY	EOLR-1	SYSTEM SENSOR
10	PS	PRESSURE SWITCH	BY OTHERS	BY OTHERS
27	R	RELAY MODULE	AOM-2RF	GAMEWELL/FCI
1	RI	REMOTE INTERFACE CONTROLLER – EXISTING	ULTRAVOICE	FEDERAL SIGNAL
1	NAC F	REMOTE POWER SUPPLY	SEE PANEL BILL OF MATERIALS	GAMEWELL/FCI
255	S HAZ C	SPEAKER-CEILING MOUNT-HAZARDOUS	SPHH-DVSMR	CPG SIGNALS
8	S WP	SPEAKER-WALL MOUNT-WHITE-WEATHERPROOF	SPWK	SYSTEM SENSOR
83	C/A C WP	SPEAKER/STROBE-CEILING MOUNT-WHITE-ALERT-CLEAR LENS-WEATHERPROOF	SPSCWK-CLR-ALERT	SYSTEM SENSOR
6	C/A WP	SPEAKER/STROBE-WALL MOUNT-WEATHERPROOF-WHITE-ALERT-CLEAR LENS	SPSWK-CLR-ALERT	SYSTEM SENSOR
1	C/A	SPEAKER/STROBE-WALL MOUNT-WHITE-ALERT-CLEAR LENS	SPSW-CLR-ALERT	SYSTEM SENSOR
1	WP	SPEAKER/STROBE-WALL MOUNT-WHITE-WEATHERPROOF	SPSWK	SYSTEM SENSOR
1	STA EX	STAR-RADIO TRANSMITTER - EXISTING	EXISTING	KFCI
255	HAZ C	STROBE LIGHT-HEARING IMPAIRED-HAZARDOUS	224XST-HI	FEDERAL SIGNAL
3	WP C	STROBE-CEILING MOUNT-WEATHERPROOF-WHITE	SCWK	SYSTEM SENSOR
2	C	STROBE-CEILING MOUNT-WHITE	SCW	SYSTEM SENSOR
103	SS HV	SURGE SUPPRESSOR-HIGH VOLTAGE-NEMA 4X ENCLOSURE	DTK-TSS4D	DITEK
15	SS TP LV	SURGE SUPPRESSOR-LOW VOLTAGE	DTK-TSS3/DTK-2MHLP24F	DITEK
69	VS	TAMPER SWITCH	BY OTHERS	BY OTHERS
9	VDU	VIDEO DISPLAY UNIT	SEE PANEL BILL OF MATERIALS	GAMEWELL/FCI
6	WF	WATERFLOW SWITCH	BY OTHERS	BY OTHERS

GENERAL NOTES:

1. ALL FIRE ALARM WIRING MUST BE IN STRICT COMPLIANCE WITH APPLICABLE SECTIONS OF THE NATIONAL ELECTRICAL CODE (ARTICLE 760) AND ALL APPLICABLE NFPA STANDARDS.
2. INSTALLATION MUST COMPLY WITH ALL APPLICABLE FEDERAL, STATE, OR LOCAL LAWS, REGULATIONS, CODES, AND SPECIFICATIONS.
3. ALL INSTALLATION MUST BE APPROVED BY THE LOCAL AUTHORITY HAVING JURISDICTION.
4. TO AVOID CONTAMINATION AND DUST ACCUMULATION IN THE SMOKE DETECTORS, IT IS RECOMMENDED THAT THE SMOKE DETECTORS NOT BE INSTALLED UNTIL AFTER CONSTRUCTION IS COMPLETED AND THE SUBJECT AREA HAS BEEN CLEANED. THE SUPPLIER IS NOT RESPONSIBLE FOR DUST ACCUMULATION IN SMOKE DETECTORS AND WILL NOT WARRANTY DEVICES THAT HAVE NOT BEEN PROPERLY MAINTAINED. WHEN DETECTORS ARE INSTALLED, PROTECTIVE COVERS SHALL BE INSTALLED OVER EACH DETECTOR AND REMOVED BY AUTHORIZED SERVICE PERSONNEL.
5. AS INSTRUCTED IN NFPA 70, PROVIDE A SYSTEM GROUND FOR EARTH DETECTION AND LIGHTNING PROTECTION OF THE DEVICES.
6. ALL FIRE ALARM SYSTEM WIRING SHALL BE CLEAR FROM SHORTS, OPENS AND GROUNDS.
7. WHERE CONDUCTORS ARE RUN IN CONDUIT, USE ONLY APPROVED CABLE WITHIN RACEWAYS, PIPES, OR CONDUITS. ALL SHIELDED WIRE MUST BE CONTINUOUS THROUGHOUT CIRCUIT. ALL SHIELDS SHALL BE ISOLATED FROM GROUND. ALL SHIELDS SHALL TERMINATE AT THE FIRE ALARM CONTROL UNIT (FACU) ONLY.
8. CONDUIT AND JUNCTION BOX LOCATIONS ARE DIAGRAMMATIC ONLY. EXACT LOCATIONS MAY VARY DUE TO FIELD CONDITIONS. ACTUAL INSTALLATION LOCATIONS SHALL BE DETERMINED BY THE INSTALLING CONTRACTOR.
9. DO NOT LOCATE SMOKE DETECTORS WITHIN 3 FEET OF SUPPLY AIR VENTS.
10. WIRE RUNS ARE CRITICAL. ANY SIGNIFICANT INCREASE IN LENGTH OF WIRE MAY AFFECT CIRCUIT CONFIGURATIONS.
11. NFPA 72 SECTION 12.3.7 (2013 EDITION) CLASS A AND CLASS X CIRCUITS USING PHYSICAL CONDUCTORS (e.g., METALLIC, OPTICAL FIBER) SHALL BE INSTALLED SUCH THAT THE OUTGOING AND RETURN CONDUCTORS, EXISTING FROM AND RETURNING TO THE CONTROL UNIT, RESPECTIVELY, ARE ROUTED SEPARATELY. THE OUTGOING AND RETURN (REDUNDANT) CIRCUIT CONDUCTORS SHALL BE PERMITTED IN THE SAME CABLE ASSEMBLY (i.e., MULTI-CONDUCTOR CABLE), ENCLOSURE, OR RACEWAY UNDER THE FOLLOWING CONDITIONS:
    A. FOR A DISTANCE NOT TO EXCEED 10 FEET (3.0m) WHERE THE OUTGOING AND RETURN CONDUCTORS ENTER OR EXIT THE INITIATING DEVICE, NOTIFICATION APPLIANCE, OR CONTROL UNIT ENCLOSURE.
    B. FOR SINGLE CONDUIT/RACEWAY DROPS TO INDIVIDUAL DEVICES OR APPLIANCES.
    C. FOR SINGLE CONDUIT/RACEWAY DROPS TO MULTIPLE DEVICES OR APPLIANCES INSTALLED WITHIN A SINGLE ROOM NOT TO EXCEED 1000 SQ. FEET (93m2) IN AREA.
12. PER NFPA 72 SECTION A.12.3.7 (2013 EDITION) THE RECOMMENDED MINIMUM SEPARATION BETWEEN OUTGOING AND RETURN CLASS A AND CLASS X CABLES IS 12" FOR VERTICAL INSTALLATION AND 48" FOR HORIZONTAL INSTALLATION.

PANEL BILL OF MATERIALS

QTY	DESCRIPTION	PART NUMBER	MANUFACTURER
1	ADDRESSABLE NODE EXPANDER-SINGLE RING	ANX-SR	GAMEWELL/FCI
41	ADDRESSABLE SWITCH MODULE; 16 SWITCHES (ASM-16)	1100-0455	GAMEWELL/FCI
48	AUDIO AMPLIFIER; 50 WATTS; 25V	1100-0456	GAMEWELL-FCI
2	B SIZE DOOR WITHOUT WINDOW; BLACK	DR-B4B	GAMEWELL/FCI
2	BACKBOX; 2 CHASSIS; BLACK	SBB-B4	GAMEWELL/FCI
8	BACKBOX; 3 CHASSIS; BLACK	SBB-C4	GAMEWELL/FCI
6	BATTERY CHARGER; 25-120 AH	CHG-120	GAMEWELL/FCI
1	BATTERY ENCLOSURE FOR (4) 100 AH BATTERIES	BB-200	GAMEWELL/FCI
1	BATTERY ENCLOSURE FOR 100 AH BATTERIES	BB-100	GAMEWELL/FCI
2	BATTERY ENCLOSURE OR CABINET	BB-25	GAMEWELL/FCI
12	BATTERY; 12V; 100AH	BAT-121000	GAMEWELL/FCI
52	BATTERY; 12V; 12AH	BAT-12120	GAMEWELL/FCI
10	BATTERY; 12V; 18AH	BAT-12180	GAMEWELL/FCI
6	BATTERY; 12V; 26AH	BAT-12260	GAMEWELL/FCI
16	BATTERY; 12V; 55AH	BAT-12550	GAMEWELL/FCI
176	BATTERY; 12V; 7AH	BAT-1270	GAMEWELL/FCI
4	BLANK PLATE; SINGLE SIZE	1100-0450	GAMEWELL/FCI
8	C SIZE DOOR WITHOUT WINDOW; BLACK	FCI-DR-C4B	GAMEWELL/FCI
4	CHASSIS FOR 6 MULTI-MOD SERIES MODULES	252-90003	GAMEWELL/FCI
88	CLASS A ADAPTOR	HPP31076	GAMEWELL/FCI
6	COMMAND CENTER MOUNTING PLATE; C SIZE	E3-INCC-CPLATE	GAMEWELL/FCI
1	COMMAND CENTER MOUNTING PLATE; D SIZE	E3-INCC-DPLATE	GAMEWELL/FCI
6	COMMAND CENTER; BLANK PLATE ; SINGLE SIZE	1100-0450	GAMEWELL/FCI
10	CONTROL MODULE	AOM-2SF	GAMEWELL/FCI
9	ENCLOSURE; COMMAND CENTER; C SIZE; BLACK	E3BB-BC/INCC	GAMEWELL/FCI
1	ENCLOSURE; COMMAND CENTER; D SIZE; BLACK	E3BB-BD/INCC	GAMEWELL/FCI
8	ENCLOSURE; INX;	1100-0460	GAMEWELL/FCI
1	EQUIPMENT CABINET-EXPLOSION PROOF	243610	XCESX
9	ETHERNET SWITCH – SINGLE MODE FIBER WITH SC CONNECTORS	EIS8-110T/FCS	CONTEMPORARY CONTROL
88	EXPANDER POWER SUPPLY; 12 AMP; 120VAC	HPFF12CM	GAMEWELL/FCI
2	EXPANDER POWER SUPPLY; 8 AMP; 120VAC	HPFF8	GAMEWELL/FCI
12	FIBER LOOP MODULE-MULTI-MODE FIBER	FML-E3	GAMEWELL/FCI
3	FIBER LOOP MODULE-SINGLE-MODE FIBER	FSL-E3	GAMEWELL/FCI
1	FOCALPOINT GATEWAY	FPT-GATE-3	GAMEWELL/FCI
9	FOCALPOINT WORKSTATION UL LISTED PC	FPT-WKS	GAMEWELL/FCI
1	FPT-GATE-3 EXTENDER PLATE	FPT-GATE-3 EXT	GAMEWELL/FCI
37	INI-VGX-FO TRANSPONDER VOICE GATEWAY-FIBER OPTIC	1100-1323	GAMEWELL/FCI
2	INI-VGX-UTP TRANSPONDER VOICE GATEWAY-UNSHIELDED TWISTED PAIR	1100-1324	GAMEWELL/FCI
10	INNER DOOR PANEL; BLANK; DOUBLE SIZE	E3-BP	GAMEWELL/FCI
8	INNER DOOR; COMMAND CENTER 3 SLOTS; C SIZE	E3ID3-C	GAMEWELL/FCI
1	INNER DOOR; COMMAND CENTER; 2 SLOTS; C SIZE	E3ID2-C	GAMEWELL/FCI
1	INNER DOOR; COMMAND CENTER; 2 SLOTS; D SIZE	E3ID2-D	GAMEWELL/FCI
2	INTELLIGENT LOOP INTERFACE-EXPANSION BOARD	ILI-S-E3	GAMEWELL/FCI
11	INTELLIGENT LOOP INTERFACE-MAIN BOARD	ILI-MB-E3	GAMEWELL/FCI
2	INTELLIGENT LOOP MODULE MOUNTING PLATE; C SIZE	E3-ILI-CPLATE	GAMEWELL/FCI
8	LARGE BATTERY BOX FOR 55 AH BATTERIES	FCI-LBB	GAMEWELL/FCI
1	LCD KEYPAD DISPLAY; E3 SERIES; 80 CHARACTER	LCD-E3	GAMEWELL/FCI
1	MONITOR MODULE	AMM-4F	GAMEWELL/FCI
10	MONITOR MODULE; 10 CIRCUITS	MMI-10F	GAMEWELL/FCI
33	MOUNTING PAN	XSM2436	ADALET
6	NETWORK GRAPHIC ANNUNCIATOR	1100-0505	GAMEWELL-FCI
17	NETWORK REPEATER; UNSHIELDED-TWISTED PAIR	RPT-E3-UTP	GAMEWELL/FCI
8	PAGING MICROPHONE MODULE	1100-0452	GAMEWELL-FCI
34	PM-9/PM-9G ADAPTER PLATE KIT	90375	GAMEWELL/FCI
43	POWER SUPPLY; 9 AMPS	PM-9	GAMEWELL-FCI
9	PRINTER	PRN-7	GAMEWELL/FCI
4	RELAY MODULE; 6 CIRCUITS	MMO-6RF	GAMEWELL/FCI
26	SEISMIC KIT FOR 12AH BATTERIES	90519	GAMEWELL/FCI
7	SEISMIC KIT FOR LBB BACKBOX	SEISKIT-LBB	GAMEWELL/FCI
1	ADALET – CLASS 1 DIV. 2 ENCLOSURE	122410	ADALET
35	ADALET – CLASS 1 DIV. 2 ENCLOSURE	242410	ADALET
37	ADALET – CLASS 1 DIV. 2 ENCLOSURE	243610	ADALET
4	ADALET – CLASS 1 DIV. 2 ENCLOSURE	302410	ADALET
5	TRANSPONDER MOUNTING PLATE;	E3-INX-CPLATE	GAMEWELL-FCI
5	"C"-SIZE ENCLOSURE EXTENDER PLATE	AM-60 PLATE	GAMEWELL/FCI

NOTE ON BATTERY QUANTITIES:
QUANTITIES OF BATTERIES SHOWN ARE FOR INDIVIDUAL BATTERIES. BATTERIES WITH PART NUMBERS ENDING IN -BP ARE SOLD IN BULK PACKS ONLY. REFER TO DESCRIPTION COLUMN FOR NUMBER OF BATTERIES PER BULK PACK.

DESIGNATION	CIRCUIT TYPE	WIR TYPE	MFGR	MFGR P/N
A	SIGNALING LINE CIRCUIT (SLC LOOP)	2#14 TWISTED/UNSHIELDED – FPL	WEST PENN	994
C	STROBE CIRCUIT	2#12 AWG - FPLP	WEST PENN	60995B
D	24 VDC POWER	2#14 AWG - FPLP	WEST PENN	60993B
E	INITIATING DEVICE CIRCUIT	2#16 AWG – THHN	WEST PENN	60991B
EE	INITIATING DEVICE CIRCUIT	2#16 AWG - FPL – DIRECT BURIAL	WEST PENN	AC0225
F	INITIATING DEVICE CIRCUIT	2#18 AWG - FPLP	WEST PENN	60980B OR Falcon 650218R
G	CONTROL CIRCUIT	2#14 AWG – FPL	WEST PENN	972 or 994
H	ANNUNCIATOR DATA CIRCUIT	2#14 TWISTED/UNSHIELDED - FPL	WEST PENN	994
J	24 VDC ANNUNCIATOR POWER	2#12 AWG - FPL	WEST PENN	974 or 998
S	SYNCHRONIZATION CIRCUIT	2#12 AWG – FPL	WEST PENN	974 or 998
V	SPEAKER CIRCUIT	2#14 TWISTED/SHIELDED – FPLP	WEST PENN	60992B
DESIGNATION	CIRCUIT TYPE	WIR TYPE	MFGR	MFGR P/N
N	NETWORK CIRCUIT	62.5/125 µm MULTI-MODE FIBER (2 strands)		
NN	NETWORK CIRCUIT	9/125 MICROMETERS SINGLE-MODE FIBER		

NOTE: 1E AT MINI-MONITOR MODULES REQUIRE 47K END OF LINE RESISTOR TO BE INSTALLED ON DRY CONTACTS.

ADDRESS LABEL CLARIFICATION

N001L1S001
- NETWORK NODE NUMBER
- SLC LOOP NUMBER
- DETECTOR (OR "M" FOR MODULE)
- DEVICE ADDRESS ON SLC LOOP

N1A1S1-01
- NETWORK NODE NUMBER
- AMPLIFIER DESIGNATION
- SPEAKER CIRCUIT NUMBER
- DEVICE NUMBER ON CIRCUIT

1FN1-01
- REMOTE POWER SUPPLY DESIGNATION
- FIRE NOTIFICATION APPLIANCE
- CIRCUIT NUMBER
- DEVICE NUMBER ON CIRCUIT

SYSTEM NOTES

1. TO 120 VAC DEDICATED BRANCH CIRCUIT
   NOTE: CIRCUIT BREAKER REQUIRES A LOCK
2. TO HVAC CONTROL CIRCUIT FOR SHUTDOWN
3. TO ELEVATOR CONTROL CIRCUIT FOR PRIMARY FLOOR RECALL
4. TO ELEVATOR CONTROL CIRCUIT FOR ALTERNATE FLOOR RECALL
5. TO ELEVATOR CONTROL CIRCUIT TO FLASH ELEVATOR CAB FIRE HAT
6. TO ELEVATOR CONTROL CIRCUIT FOR ELEVATOR POWER SHUNT TRIP
7. VERIFY EXACT ON LOCATION WITH OWNERS REPRESENTATIVE
8. TO FIRE PUMP TO MONITOR PHASE REVERSAL
9. TO FIRE PUMP TO MONITOR PUMP RUNNING
10. TO FIRE PUMP TO MONITOR POWER LOSS
11. FOR DOOR HOLDER CONTROL AND MONITORING
12. FOR FIRE SMOKE DAMPER CONTROL AND MONITORING
13. FOR FAN CONTROL AND MONITORING
14. TO MONITOR SUMP PUMPS AT OIL TIGHT DOORS IN LOWER TUNNEL
15. FIBER FOR NETWORK WORK STATION SEE SHEET FT-622
16. FOR SCISSOR LIFT CONTROL
17. MOUNT OVER PANEL LOCATION
18. MOUNT AT TOP OF SHAFT

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22 X 3_ REDUCED PRINT - USE GRAPHIC SCALES

Honeywell FSG

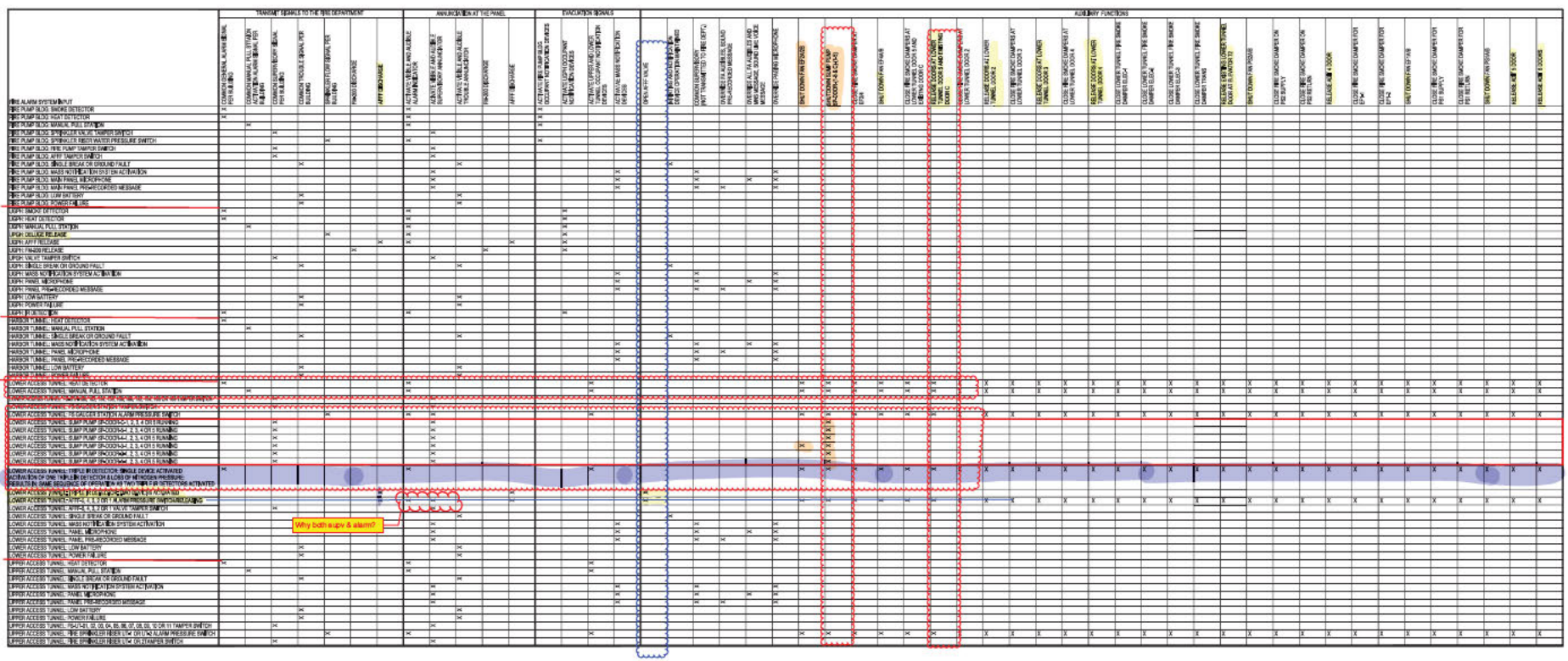
NAVFAC HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL)
PEARL HARBOR, HAWAII
OAHU, HAWAII

FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

PANEL BILL OF MATERIALS, FLOORPLAN BILL OF MATERIALS, NOTES, LEGENDS

FA0 3



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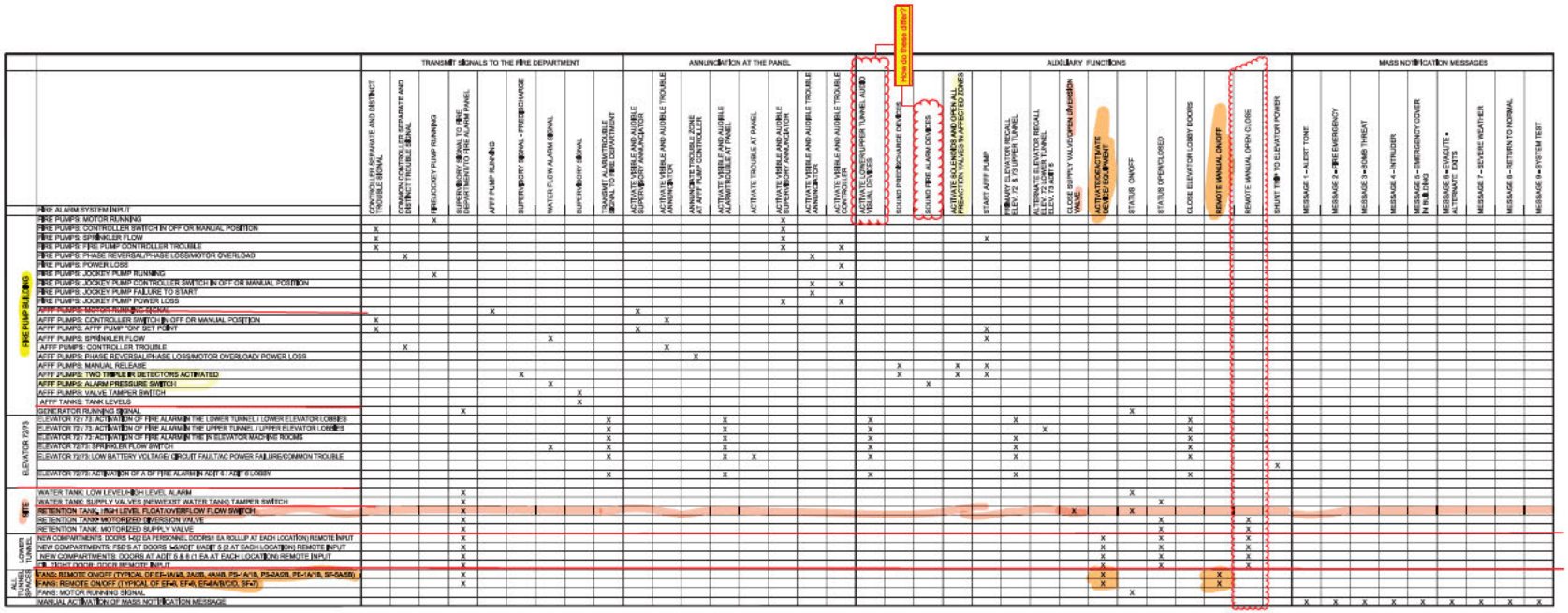
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
SYSTEM MATRIX

FA0.4

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE PROPER EXECUTION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34"
REDUCED PRINT - USE GRAPHIC SCALES



THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE SATISFACTORY COMPLETION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34"
REDUCED PRINT - USE GRAPHIC SCALES

NAVFAC HAWAII
NAVAL FACILITIES ENGINEERING COMMAND
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 15511), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
SYSTEM MATRIX

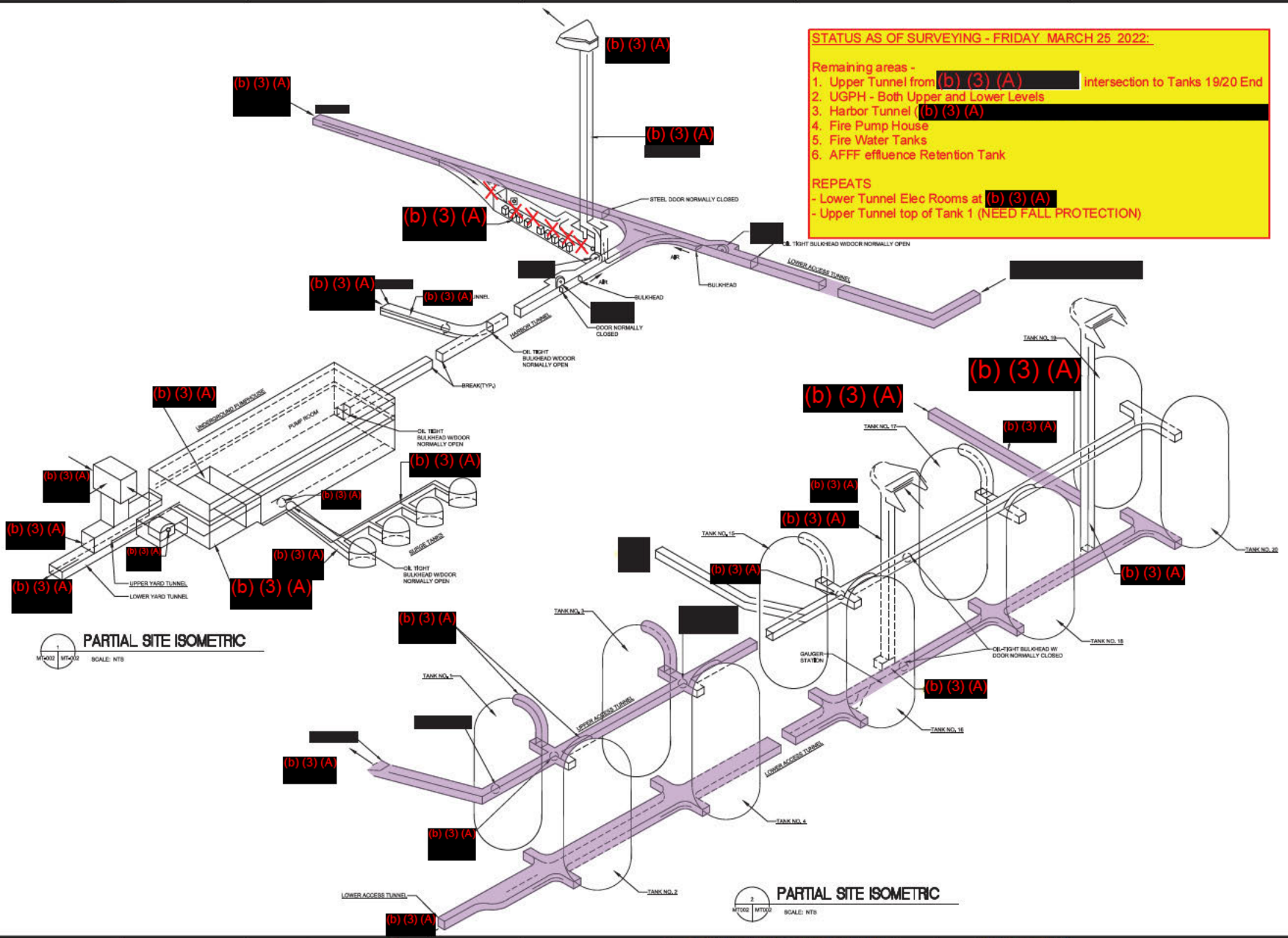
Honeywell FSG

FA0 5

STATUS AS OF SURVEYING - FRIDAY MARCH 25 2022:

Remaining areas -
1. Upper Tunnel from (b) (3) (A) intersection to Tanks 19/20 End
2. UGPH - Both Upper and Lower Levels
3. Harbor Tunnel ((b) (3) (A)
4. Fire Pump House
5. Fire Water Tanks
6. AFFF effluence Retention Tank

REPEATS
- Lower Tunnel Elec Rooms at (b) (3) (A)
- Upper Tunnel top of Tank 1 (NEED FALL PROTECTION)



PARTIAL SITE ISOMETRIC
MT-002 | MT-002 SCALE: NTS

PARTIAL SITE ISOMETRIC
MT002 | MT002 SCALE: NTS

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JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL SITE ISOMETRIC

Honeywell FSG

FA0.6

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE ORDERLY COMPLETION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES

Section of tunnel from UGPH to Harbor Tunnel intersections needs to be as built.

REFERENCE	
ADDRESS LABEL CLAR FICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3
EQP CAB #	SEE SHEET /FT 5061
EQP CAB #	SEE SHEET /FT 612
EQP CAB #	SEE SHEET /FT 620
EQP CAB #5	SEE SHEET /FT 50
EQP CAB #5	SEE SHEET /FT 612

NOTES

F RE ALARM EQU PMENT TO BE ENCLOSED N A CLASS 1 DIV 2 CABINET OR ENCLOSURE MANUFACTURED BY OTHERS.

(b) (3) (A)

Address 32 in field. All off by "one" up to Harbor Tunnel intersection

STA-0

(b) (3) (A)

DETECTOR ADDRESSES FRIM HERE TO HARBOR TUNNEL INTERSECTION ARE OFF BY ONE

Strobes do not cover; obstructed from each other

FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 1 - LOWER LEVEL

SCALE: 1/8 = 1'0

(b) (3) (A)

(b) (3) (A)

363
FA Cab 4/5
@ PS679

FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 2 - LOWER LEVEL

SCALE: 1/8 = 1'0

AREA 2
AREA 1

KEYPLAN
NTS

JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 1 & 2 - LOWER LEVEL

FT-101

UNCLASSIFIE//FOR OFFICIAL USE ONLY

IF SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES

(b) (3) (A)

(b) (3) (A)

(b) (3) (A)

(b) (3) (A)

(b) (3) (B)

(b) (3) (A)

(b) (3) (A)

(b) (3) (A)

(b) (3) (A)

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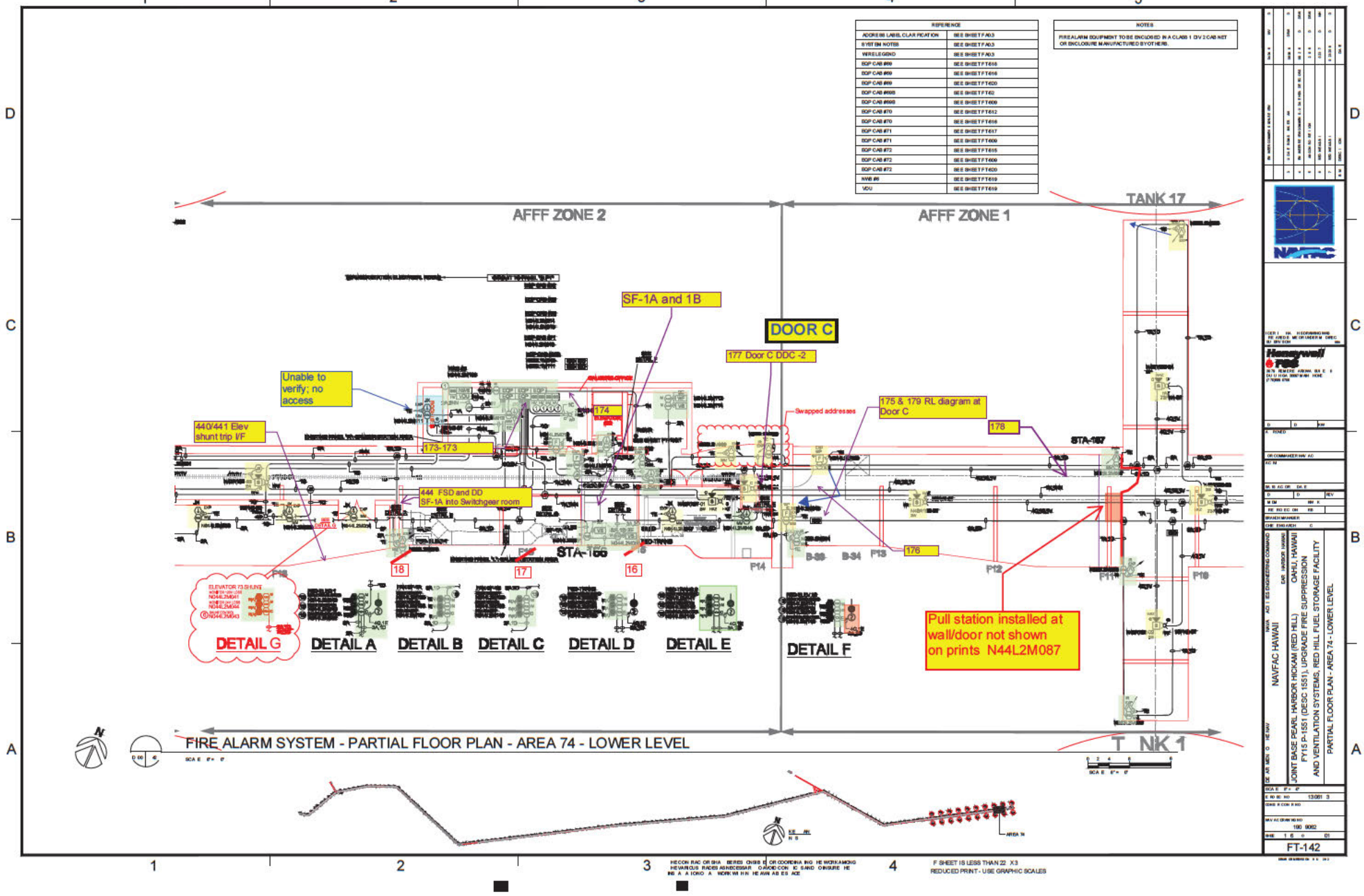


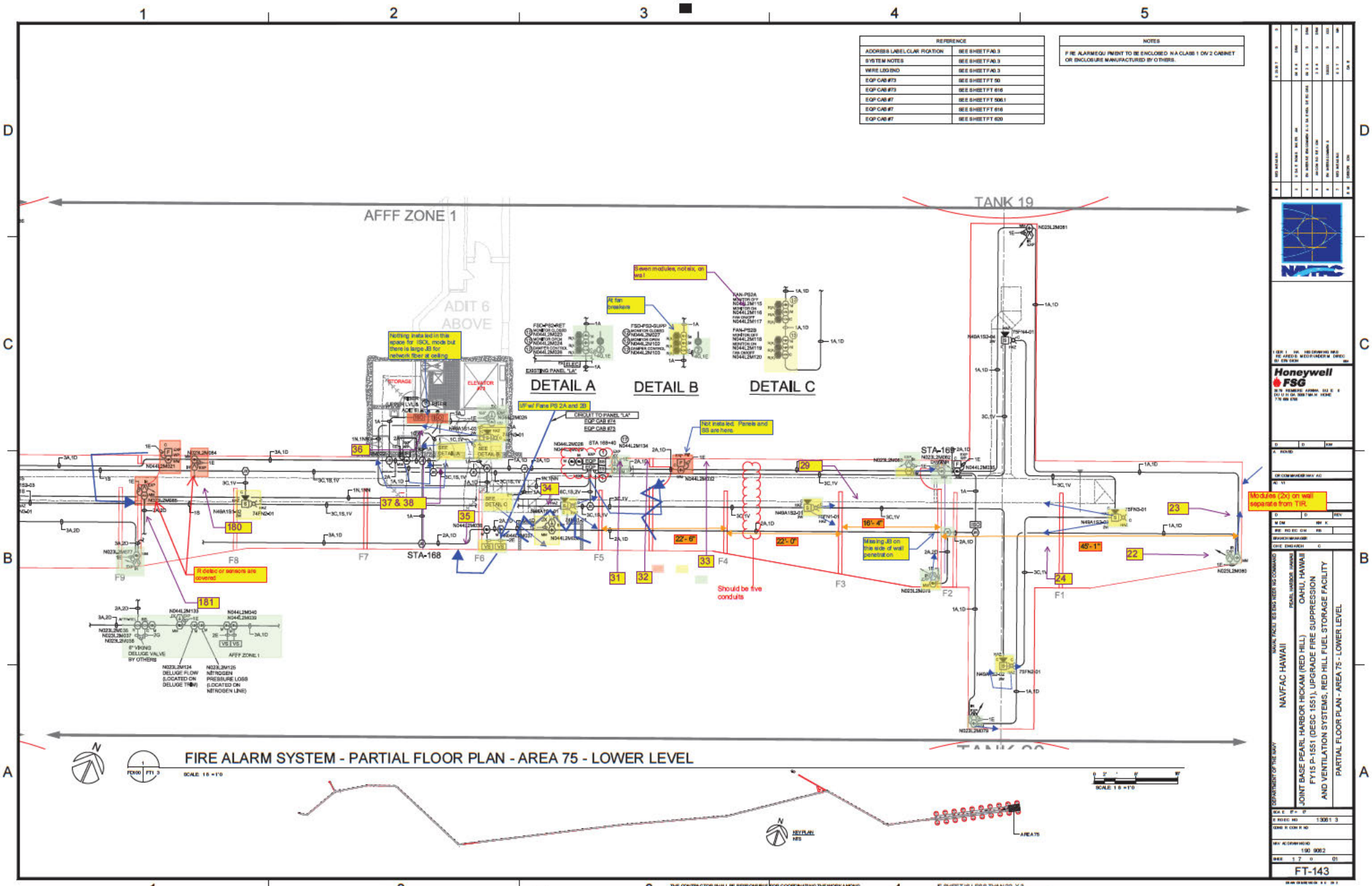
REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA03
SYSTEM NOTES	SEE SHEET FA03
WIRE LEGEND	SEE SHEET FA03
EQP CAB #69	SEE SHEET FT616
EQP CAB #69	SEE SHEET FT616
EQP CAB #69	SEE SHEET FT620
EQP CAB #69S	SEE SHEET FT62
EQP CAB #69S	SEE SHEET FT609
EQP CAB #70	SEE SHEET FT612
EQP CAB #70	SEE SHEET FT616
EQP CAB #71	SEE SHEET FT617
EQP CAB #71	SEE SHEET FT609
EQP CAB #72	SEE SHEET FT615
EQP CAB #72	SEE SHEET FT609
EQP CAB #72	SEE SHEET FT620
NWS #6	SEE SHEET FT619
VDU	SEE SHEET FT619

NOTES

FIRE ALARM EQUIPMENT TO BE ENCLOSED IN A CLASS 1 DIV 2 CAB INET OR ENCLOSURE MANUFACTURED BY OTHERS.

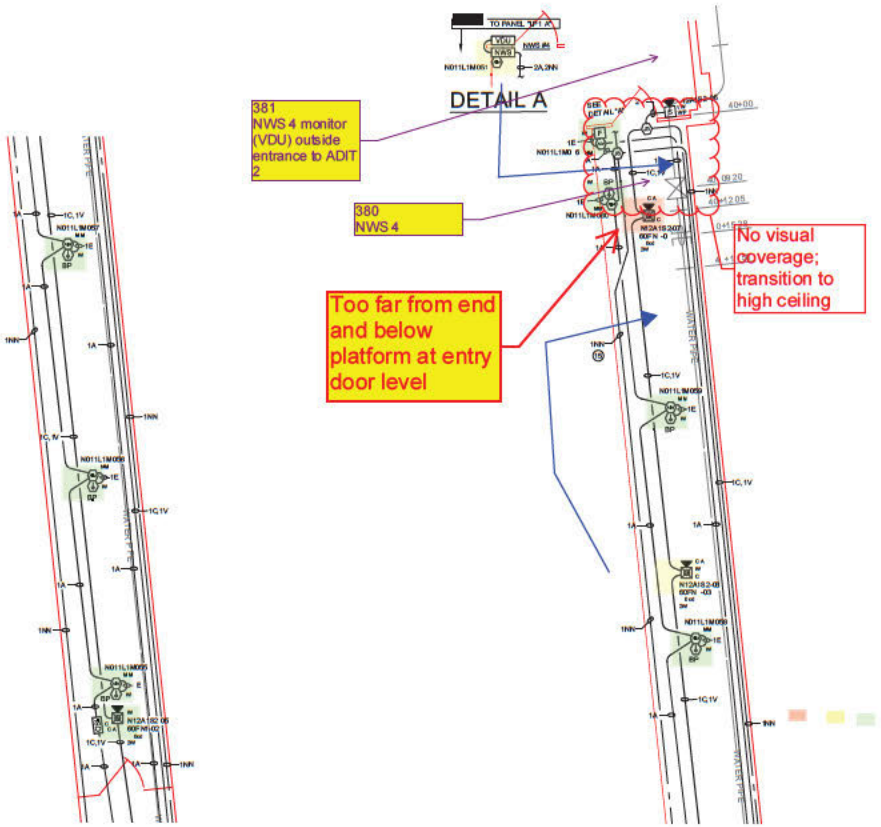
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 74 - LOWER LEVEL

13091 3
190 9092
FT-142


AFFF ZONE 1
TANK 19
ADIT 6 ABOVE
DETAIL A
DETAIL B
DETAIL C
Seven modules, not six, on wall
At fan breakers
Nothing installed in this space for ISOL mods but there is large JB for network fiber at ceiling
VF w/ Fans PS 2A and 2B
Not installed. Panels and SS are here.
Missing JB on this side of wall penetration
Should be five conduits
R detec or sensors are covered
Modules (2x) on wall separate from TIR
STA-168
STA-169
22'-6"
22'-0"
16'-4"
45'-1"
36
37 & 38
35
34
33
31
32
29
180
181
23
22
24
F1
F2
F3
F4
F5
F6
F7
F8
F9
8" VIKING DELUGE VALVE BY OTHERS
AFFF ZONE 1
N223L2M124 DELUGE FLOW (LOCATED ON DELUGE TRIM)
N223L2M125 NITROGEN PRESSURE LOSS (LOCATED ON NITROGEN LINE)
REFERENCE
ADDRESS LABEL CLARIFICATION SEE SHEET A0.3
SYSTEM NOTES SEE SHEET A0.3
WIRE LEGEND SEE SHEET A0.3
EQP CAB #73 SEE SHEET FT 50
EQP CAB #73 SEE SHEET FT 616
EQP CAB #7 SEE SHEET FT 506.1
EQP CAB #7 SEE SHEET FT 616
EQP CAB #7 SEE SHEET FT 620
NOTES
FIRE ALARM EQUIPMENT TO BE ENCLOSED IN A CLASS 1 DIV 2 CABINET OR ENCLOSURE MANUFACTURED BY OTHERS.
FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 75 - LOWER LEVEL
SCALE: 1/8" = 1'-0"
KEY PLAN
AREA 75
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 75 - LOWER LEVEL
Honeywell FSG
FT-143
IF SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES

REFERENCE	
ADDRESS LABEL CLAR FICATION	SEE SHEETFAD.3
SYSTEM NOTES	SEE SHEETFAD.3
WIRE LEGEND	SEE SHEETFAD.3
NWS #	SEE SHEETFT 519
VDU	SEE SHEETFT 519

NOTES
NETWORK WORKSTATION PC LOCATED IN THE TUNNEL, TOUCH SCREEN MONITOR TO BE MOUNTED OUTSIDE THE BUILDING IN CLIMATE CONTROLLED NEMA- X ENCLOSURE.



FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 76A (b) (3) (A) - LOWER LEVEL

FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 76B (b) (3) (A) - LOWER LEVEL

FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 76 (b) (3) (A) - LOWER LEVEL

SCALE: 1 0 = 1'0

SCALE: 1 0 = 1'0

NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 76 (ADIT 2) - LOWER LEVEL

FT-144

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE ORDERLY COMPLETION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES

REFERENCE	
ADDRESS LABEL CLAR FICATION	SEE SHEETFA0.3
SYSTEM NOTES	SEE SHEETFA0.3
WIRE LEGEND	SEE SHEETFA0.3
EQP CAB #01	SEE SHEETFT 516
EQP CAB #01	SEE SHEETFT 615

NOTES
F RE ALARMEQU PMENT TO BE ENCLOSED N A CLASS 1 DIV 2 CABINET OR ENCLOSURE MANUFACTURED BY OTHERS.

No visual obstruction of EXP strobes in HAZ side or on entry side except first one at entry

Non-hazardous

Class I Div 2

144'-11/16"

WATER PUMP ROOM; NO DEVICES

104 - both std SV and and strobe w/EXP speaker

106

105

NOT HAZ

Addresses reversed in fold

FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 77 (b) (3) (A) - LOWER LEVEL

SCALE: 1/8 = 1'-0

CIRCUIT TO PANEL "LP1" EQP CAB #01 N033L1M031

FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 78 (b) (3) (A) - LOWER LEVEL

SCALE: 1/8 = 1'-0

AREA 78

AREA 77

KEY PLAN

NTS

NAVFAC HAWAII

DEPARTMENT OF THE NAVY

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII

FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

PARTIAL FLOOR PLAN - AREA 77 & 78 (ADIT 3) - LOWER LEVEL

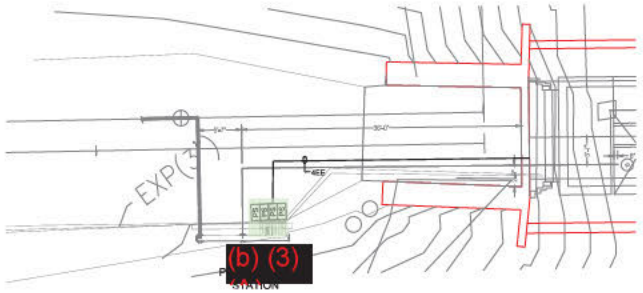
FT-145

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG US TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE ION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES

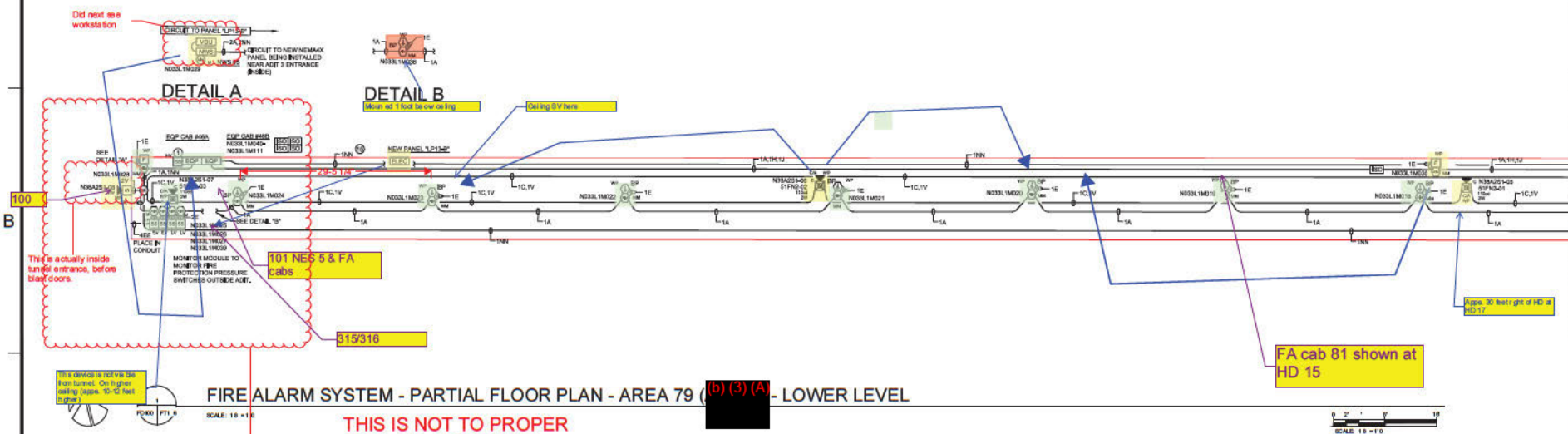
REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3
NWS #5	SEE SHEET FT 519
VDU	SEE SHEET FT 519
EQP CAB # 6A	SEE SHEET FT 525
EQP CAB # 6B	SEE SHEET FT 52

NOTES
NETWORK WORKSTATION PC LOCATED IN THE TUNNEL, TOUCH SCREEN MONITOR TO BE MOUNTED OUTSIDE THE BUILDING IN CLIMATE CONTROLLED NEMA- X ENCLOSURE.



PARTIAL FIRE PROTECTION - LOWER LEVEL - (b) (3) (A)
SEE FIRE PROTECTION SHEET FT401 FOR DETAILS

PARTIAL FIRE ALARM SYSTEM - LOWER LEVEL (b) (3)
(b) (3) P.R.V & F.D.C. LOCATION



FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 79 ((b) (3) (A) - LOWER LEVEL

SCALE: 1/8" = 1'-0"

THIS IS NOT TO PROPER SCAL OR ACCURATE RENDERING

SCALE: 1/8" = 1'-0"

NAVFAC HAWAII
DEPARTMENT OF THE NAVY
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 79 (ADIT 3) - LOWER LEVEL

Honeywell FSG

FT-146

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE (b) (3) TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 3"
REDUCED PRINT - USE GRAPHIC SCALES

REFERENCE	
ADDRESS LABEL CLAR FICATION	SEE SHEETFA0.3
SYSTEM NOTES	SEE SHEETFA0.3
WIRE LEGEND	SEE SHEETFA0.3
NWS #9	SEE SHEETFT 519
VDU	SEE SHEETFT 519

NOTES

NETWORK WORKSTATION PC LOCATED IN THE TUNNEL, TOUCH SCREEN MONITOR TO BE MOUNTED OUTSIDE THE BUILDING IN CLIMATE CONTROLLED NEMA- X ENCLOSURE.

(b) (3) (A)

4 PRESSURE WF SWITCHES

Metal Plate

190 - 192

PARTIAL FIRE PROTECTION - UPPER LEVEL - ADIT 4
SEE FIRE PROTECTION SHEET FT402 FOR DETAILS

16'-10"

20'

45'

70'

75'

12-6 3/8"

3-1/2 ft from bulkhead at door

Pull stat on obstruc ed by temp ventilation ducting

188 confirmed cd

189

NOTE: MONITOR MODULES TO MONITOR PRESSURE SWITCHES ON FIRE PROTECTION SYSTEM INSTALLED OUTSIDE ADIT.

PARTIAL FIRE ALARM SYSTEM - UPPER LEVEL (b) (3) (A)

(b) (3) (A) P.R.V & F.D.C. LOCATION

Confirm max spacing allowed for HD this appl. Some appear to be a little more than 30 feet.

FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 1 - UPPER LEVEL (b) (3) (A)

SCALE: 1/8 =1'0

APPX 115' from previous device; 110 cd would allow max. of 108 feet.

195

Pull stat on obstruc ed by temp ventilation ducting

KEYPLAN
NTS

FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 2 - UPPER LEVEL (b) (3) (A)

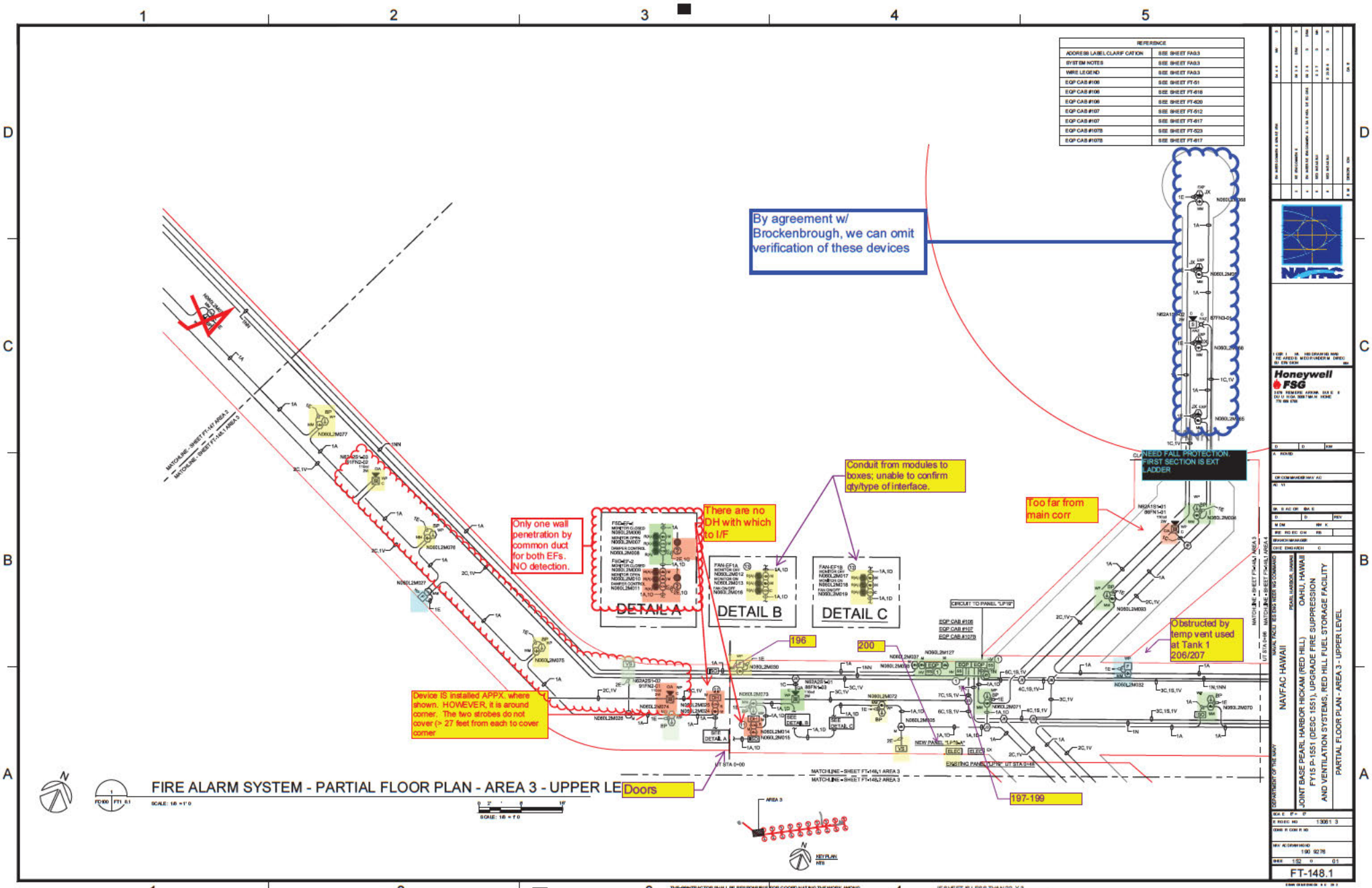
SCALE: 1/8 =1'0

NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL), OAHU, HAWAII
FY15 P-1551 (DESC 15S1), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 1 & 2 (ADIT 4) - UPPER LEVEL

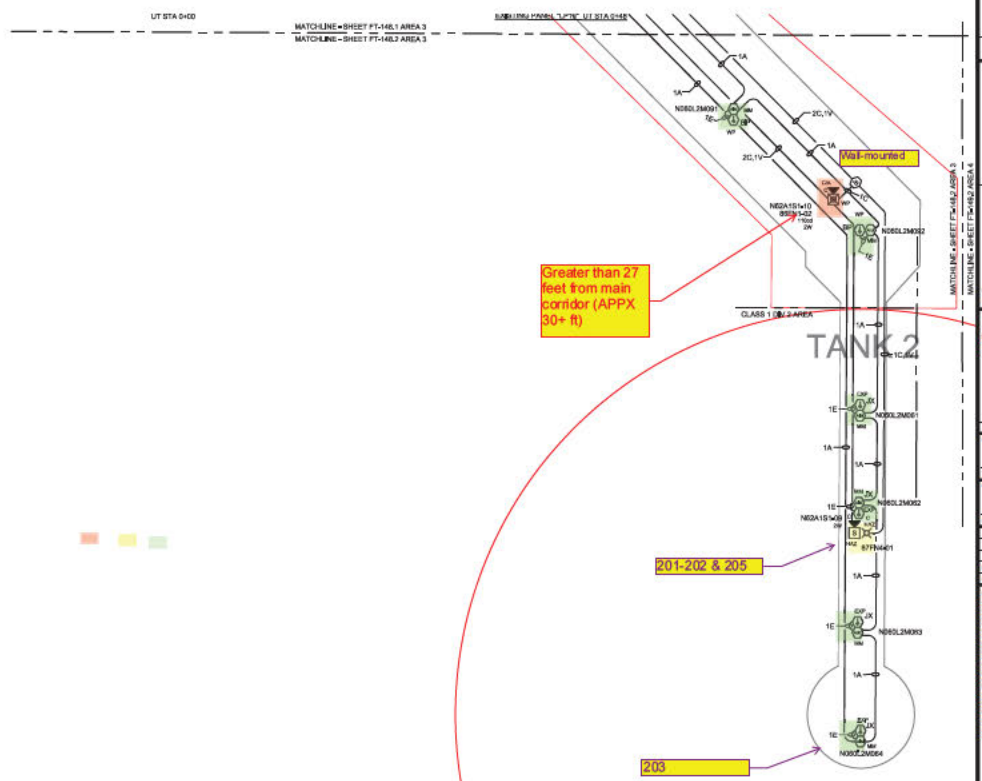
FT-147

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34"
REDUCED PRINT - USE GRAPHIC SCALES


By agreement w/ Brockenbrough, we can omit verification of these devices
Conduit from modules to boxes; unable to confirm qty/type of interface.
There are no DH with which to I/F
Only one wall penetration by common duct for both EFs. NO detection.
Too far from main corr
NEED FALL PROTECTION. FIRST SECTION IS EXT LADDER
Obstructed by temp vent used at Tank 1 206/207
Device IS installed APPX. where shown. HOWEVER, it is around corner. The two strobes do not cover (> 27 feet from each to cover corner
Doors
196
200
197-199
DETAIL A
DETAIL B
DETAIL C
REFERENCE
ADDRESS LABEL CLARIFICATION SEE SHEET FA0.3
SYSTEM NOTES SEE SHEET FA0.3
WIRE LEGEND SEE SHEET FA0.3
EQP CAB #106 SEE SHEET FT-51
EQP CAB #106 SEE SHEET FT-616
EQP CAB #106 SEE SHEET FT-620
EQP CAB #107 SEE SHEET FT-612
EQP CAB #107 SEE SHEET FT-617
EQP CAB #107S SEE SHEET FT-623
EQP CAB #107S SEE SHEET FT-617
FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 3 - UPPER LE
SCALE: 1/8" = 1'-0"
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 3 - UPPER LEVEL
Honeywell FSG
FT-148.1
IF SHEET IS LESS THAN 22" X 3" REDUCED PRINT - USE GRAPHIC SCALES

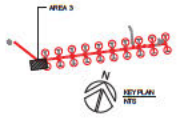
REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3



FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 3 - UPPER LEVEL

SCALE: 1/8 = 1'-0

SCALE: 1/8 = 1'-0



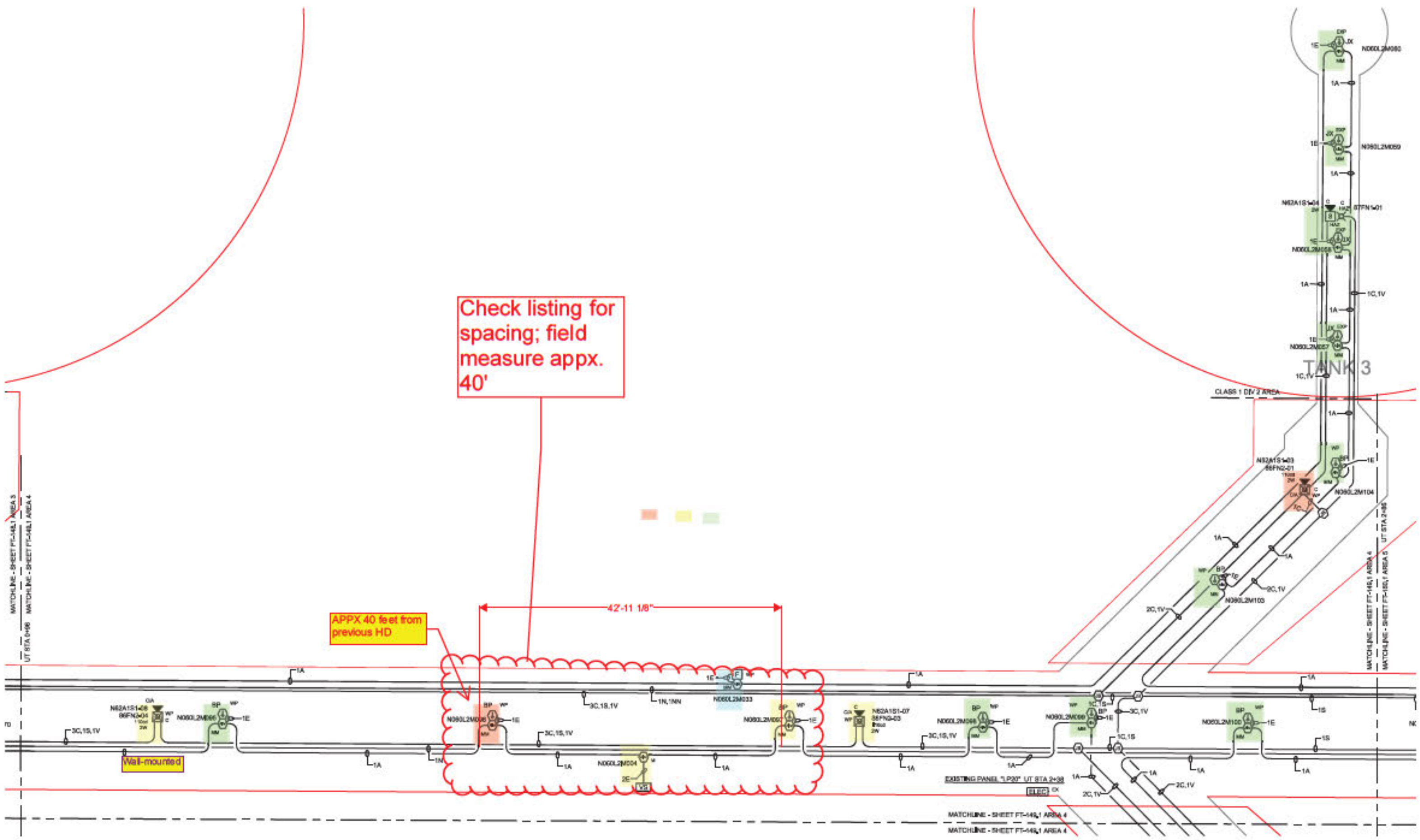
THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE PROPER INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT - USE GRAPHIC SCALES

NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 15551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 3 - UPPER LEVEL

FT-148.2

REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3



FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 4 - UPPER LEVEL

SCALE: 1/8" = 1'-0"

SCALE: 1/8" = 1'-0"

KEY PLAN
NTS

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE COMPLETION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22 X 34
REDUCED PRINT - USE GRAPHIC SCALES

Honeywell
FSG

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 4 - UPPER LEVEL

NAVFAC DRAWING NO. 1909277

FT-149.1

REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3

MATCHLINE - SHEET FT-149.1 AREA 4

MATCHLINE - SHEET FT-149.2 AREA 4

MATCHLINE - SHEET FT-149.2 AREA 4

MATCHLINE - SHEET FT-150.2 AREA 5

CLASS 1 DIV 2 AREA

TANK 4

FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 4 - UPPER LEVEL

FD10 | FTI_02

SCALE: 1/8 = 1'-0

SCALE 1/8 = 1'0

AREA 4

KEYPLAN NTS

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO ENSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT - USE GRAPHIC SCALES

NAVFAC HAWAII

NAVAL FACILITIES ENGINEERING COMMAND PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII

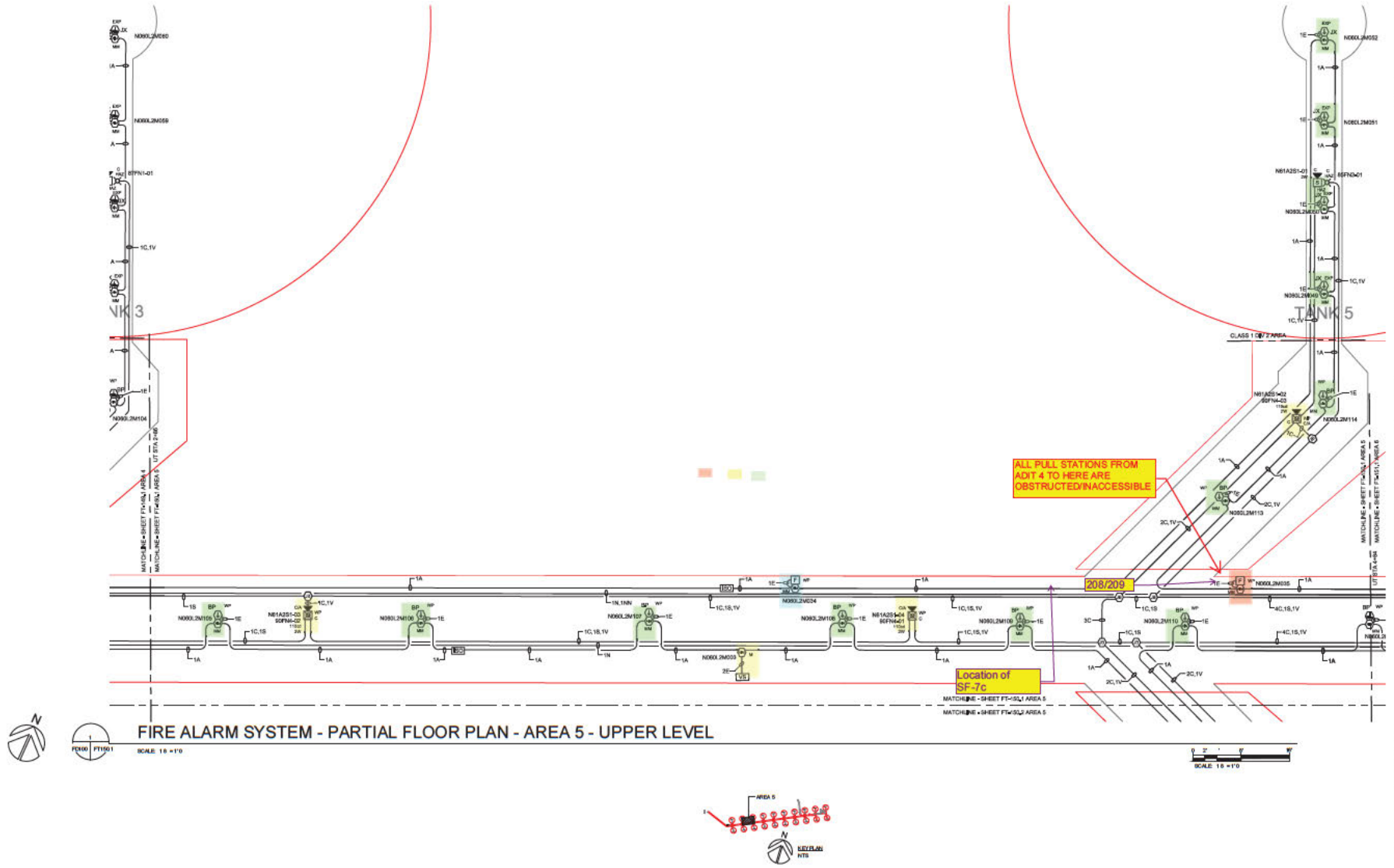
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

PARTIAL FLOOR PLAN - AREA 4 - UPPER LEVEL

DEFENSE MEDICAL FACILITY OFFICE

Honeywell FSG

FT-149.2



NAVFAC HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 5 - UPPER LEVEL

FT-150.1

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34"
REDUCED PRINT - USE GRAPHIC SCALES

REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3

MATCHLINE - SHEET FT-150.1 AREA 5

MATCHLINE - SHEET FT-150.2 AREA 5

MATCHLINE - SHEET FT-150.2 AREA 4

MATCHLINE - SHEET FT-150.2 AREA 5

MATCHLINE - SHEET FT-150.3 AREA 5

MATCHLINE - SHEET FT-150.3 AREA 6

IS within 27 feet of main corridor

CLASS 1 DIV 2 AREA

TANK 6

TANK 4

FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 5 - UPPER LEVEL

SCALE: 1/8 = 1'-0

SCALE: 1/8 = 1'-0

AREA 5

KEY PLAN
NTS

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO ENSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34"
REDUCED PRINT - USE GRAPHIC SCALES

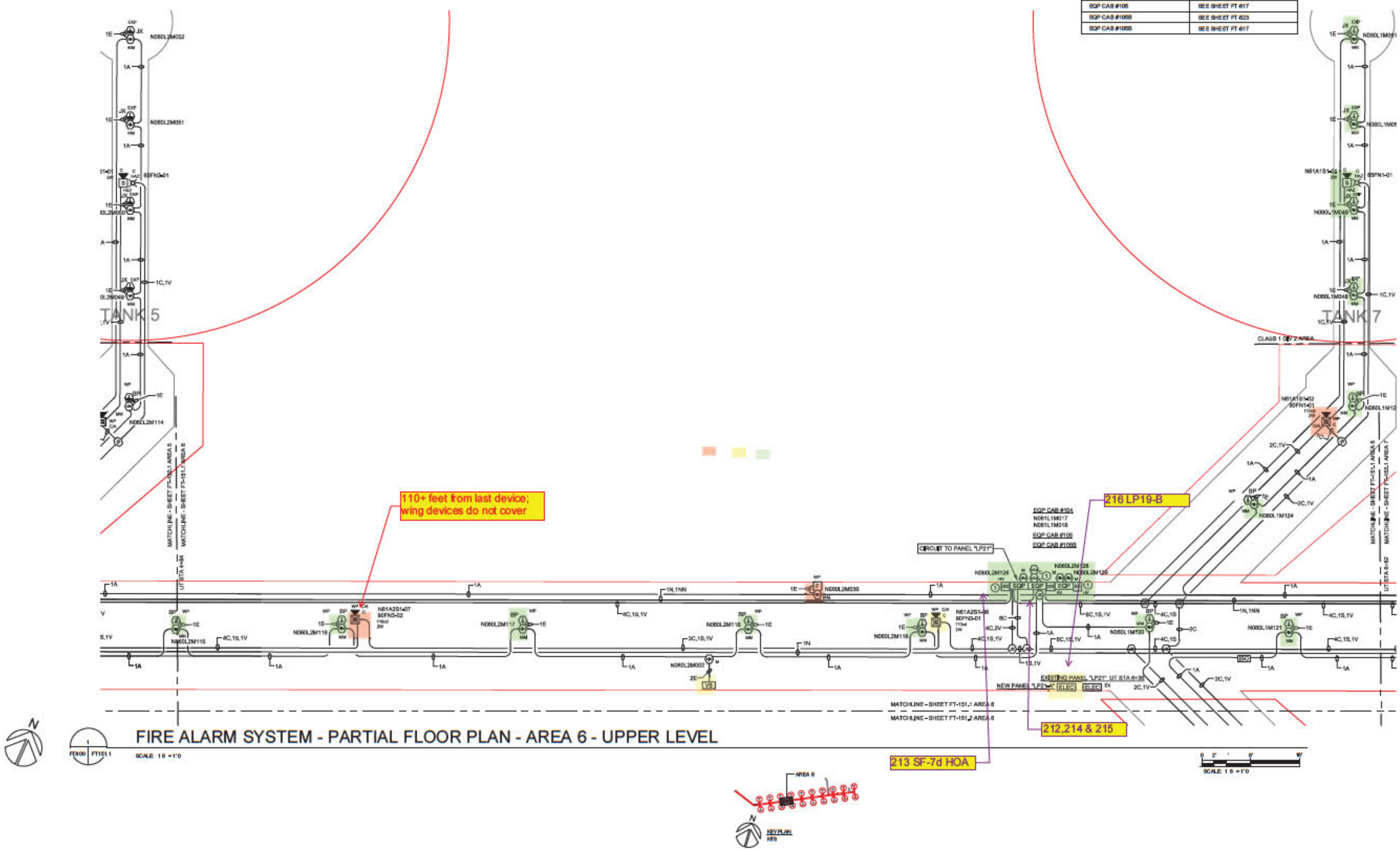
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
PEARL HARBOR, HAWAII
NAVFAC HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 15551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 5 - UPPER LEVEL

Honeywell
FSG

FT-150 2

REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3
EQP CAB #10	SEE SHEET FT-611
EQP CAB #10	SEE SHEET FT-610
EQP CAB #10	SEE SHEET FT-611
EQP CAB #10	SEE SHEET FT-618
EQP CAB #10	SEE SHEET FT-620
EQP CAB #105	SEE SHEET FT-612
EQP CAB #105	SEE SHEET FT-617
EQP CAB #105B	SEE SHEET FT-623
EQP CAB #105B	SEE SHEET FT-617



FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 6 - UPPER LEVEL

SCALE: 1/8" = 1'-0"

KEY PLAN
NTS

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG [redacted] US TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE [redacted] ION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22 X 34 REDUCED PRINT - USE GRAPHIC SCALES

Honeywell FSG

NAVFAC HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII

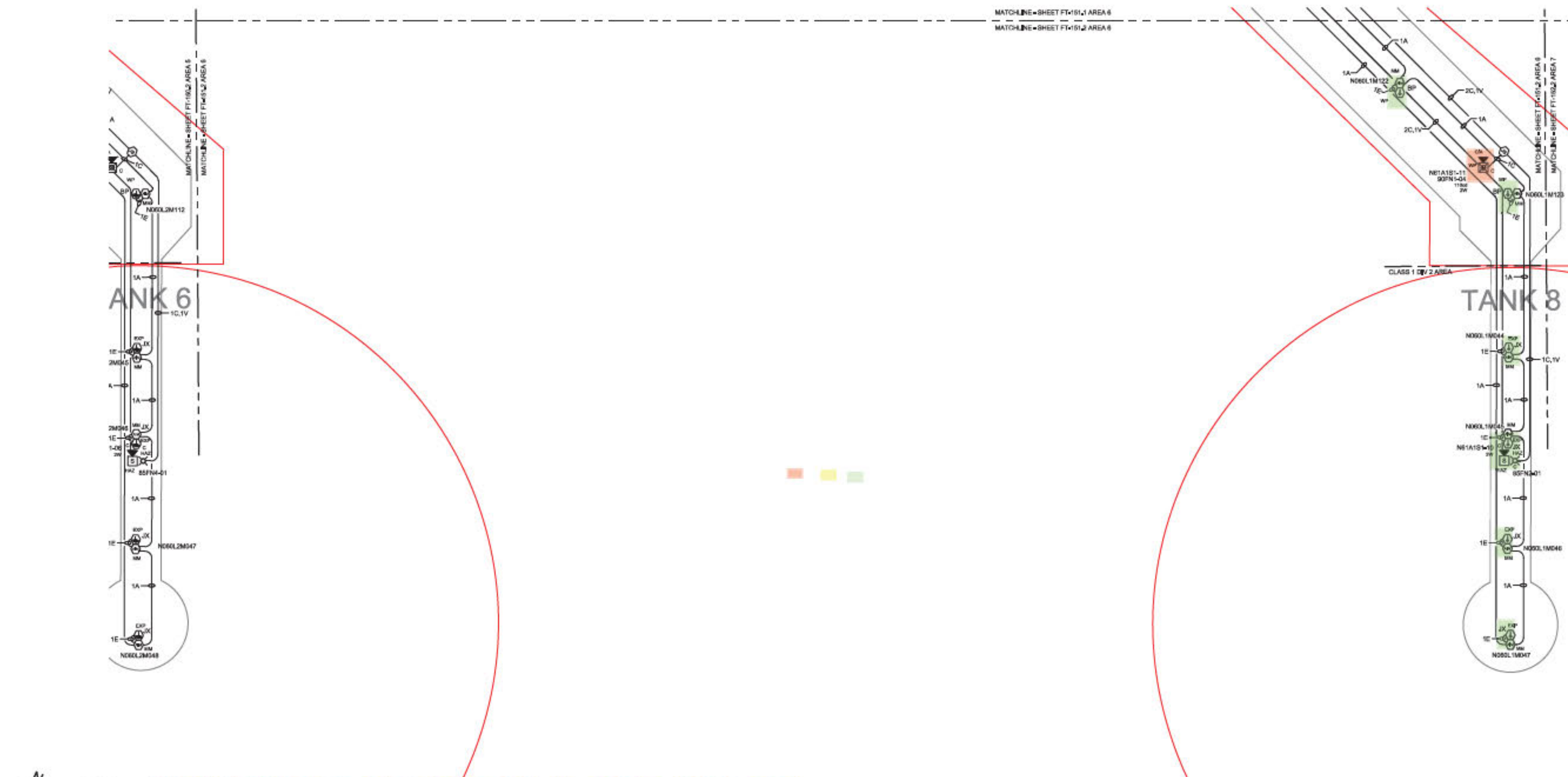
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

PARTIAL FLOOR PLAN - AREA 6 - UPPER LEVEL

190 9279

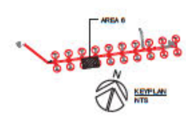
FT-151.1

REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3



FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 6 - UPPER LEVEL

SCALE: 1/8" = 1'-0"



THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG TH[redacted] US TRADES AS NECESSARY TO AVOID CONFLICTS AND TO NSURE THE INS[redacted] ION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

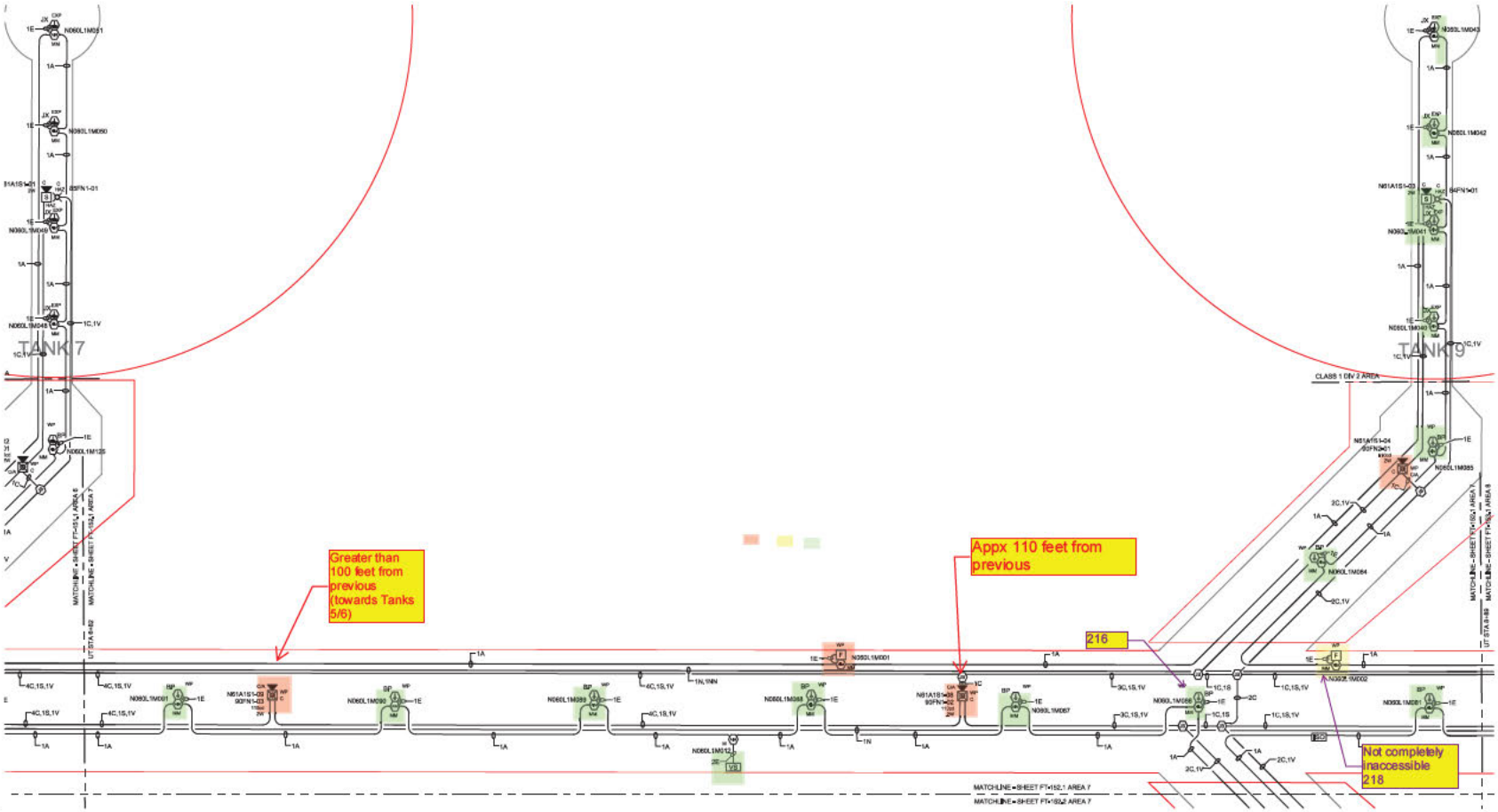
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 6 - UPPER LEVEL

Honeywell FSG

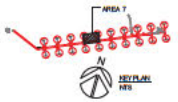
PROJECT NO. 13081 3
NAVFAC DRAWING NO. 190 9279
SHEET 159 OF 01

FT-151 2

REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3



FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 7 - UPPER LEVEL



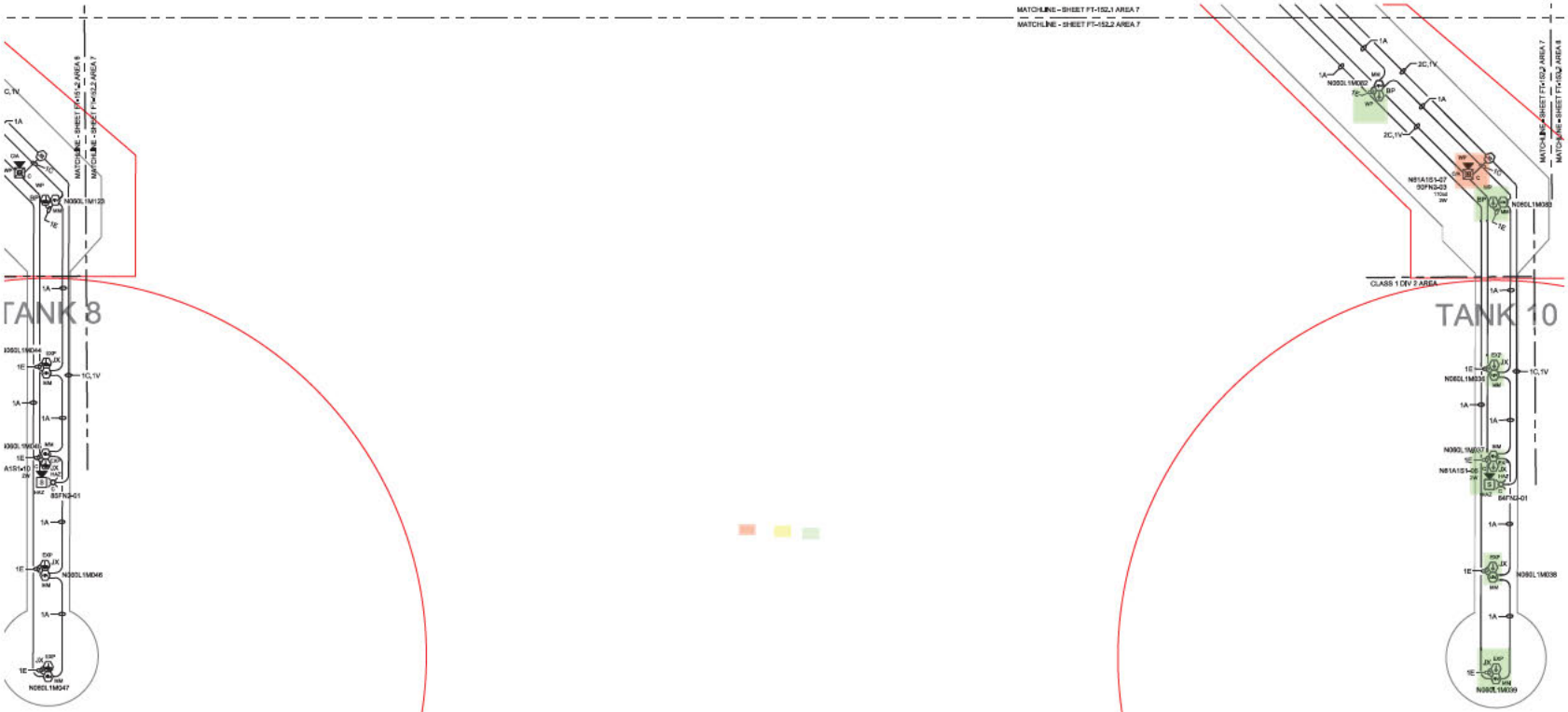
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 7 - UPPER LEVEL

FT-152.1

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE ORDERLY COMPLETION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 3"
REDUCED PRINT - USE GRAPHIC SCALES

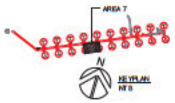
REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3



FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 7 - UPPER LEVEL

SCALE: 1/8 = 1'-0

SCALE: 1/8 = 1'-0



THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO ENSURE THE COMPLETION OF ALL WORK WITHIN THE AVAILABLE SPACE.

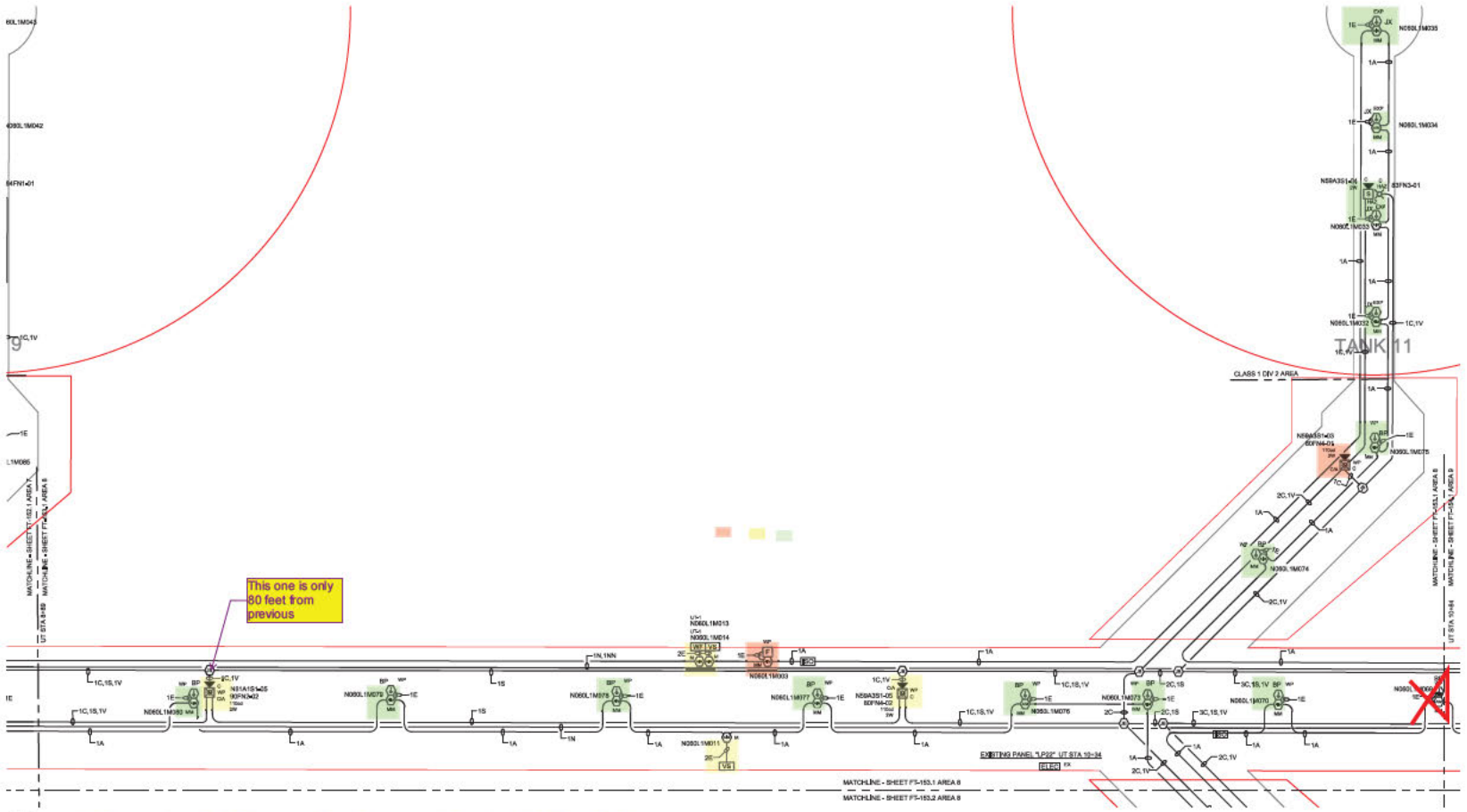
IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT - USE GRAPHIC SCALES

NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 15551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 7 - UPPER LEVEL

Honeywell FSG

FT-152 2

REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3



FIRE ALARM SYSTEM - WORK PLAN - AREA 8 - UPPER LEVEL

SCALE: 1/8 = 1'-0

SCALE: 1/8 = 1'-0

KEY PLAN
NTS
AREA 8

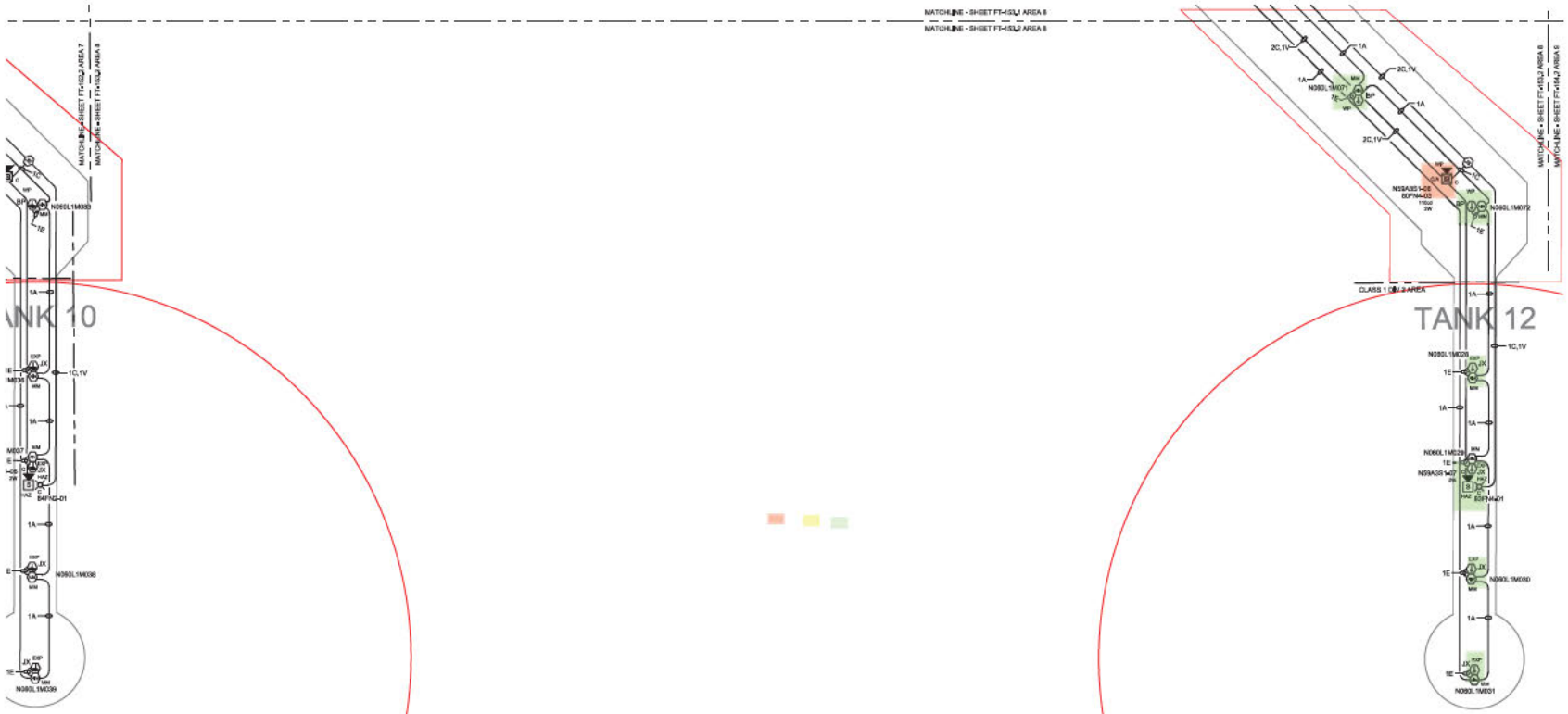
THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO ENSURE THE COMPLETION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 3"
REDUCED PRINT - USE GRAPHIC SCALES

NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 8 - UPPER LEVEL

FT-153.1

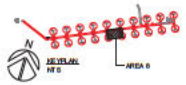
REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3



FIRE ALARM SYSTEM - WORK PLAN - AREA 8 - UPPER LEVEL

SCALE: 1/8 = 1'-0

SCALE: 1/8 = 1'-0



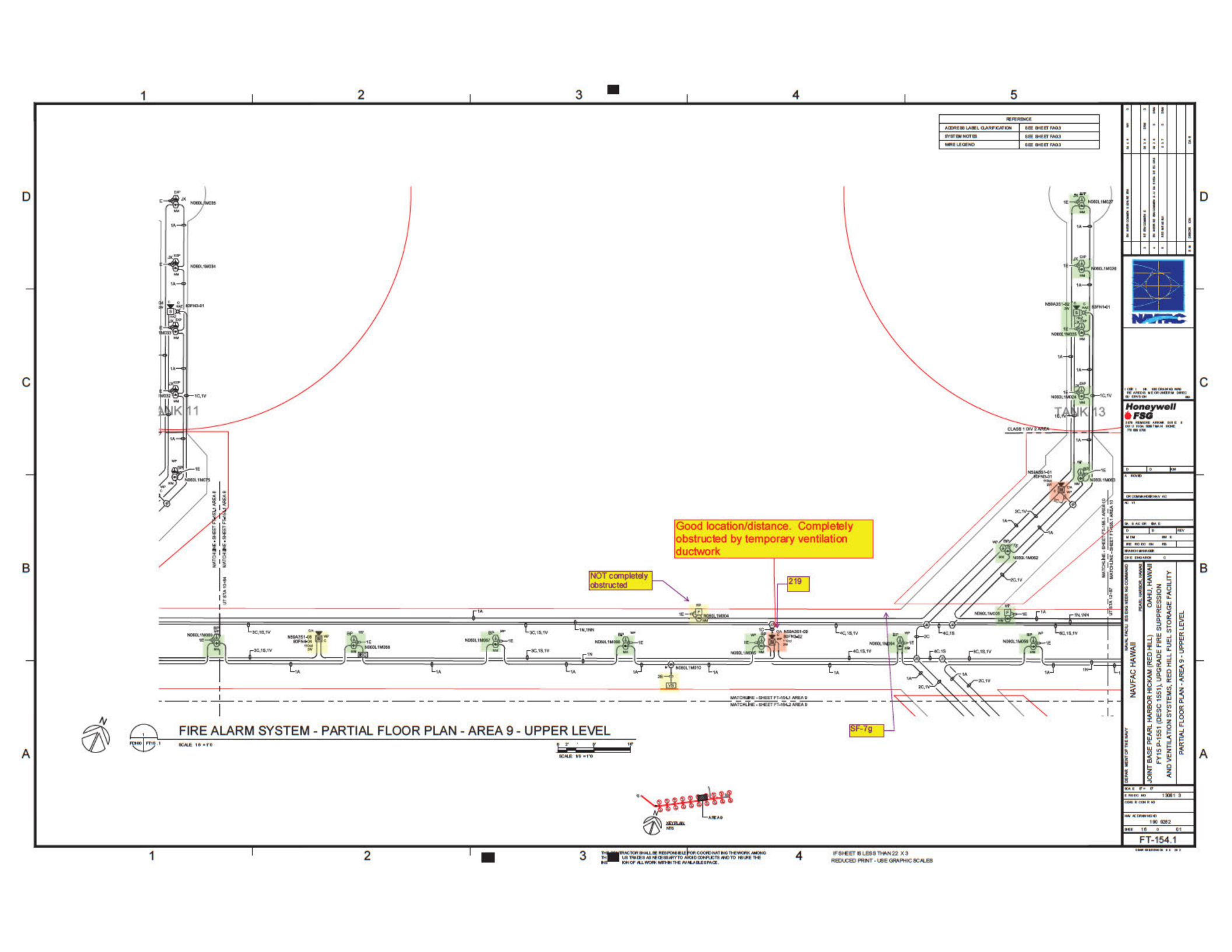
THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34"
REDUCED PRINT - USE GRAPHIC SCALES

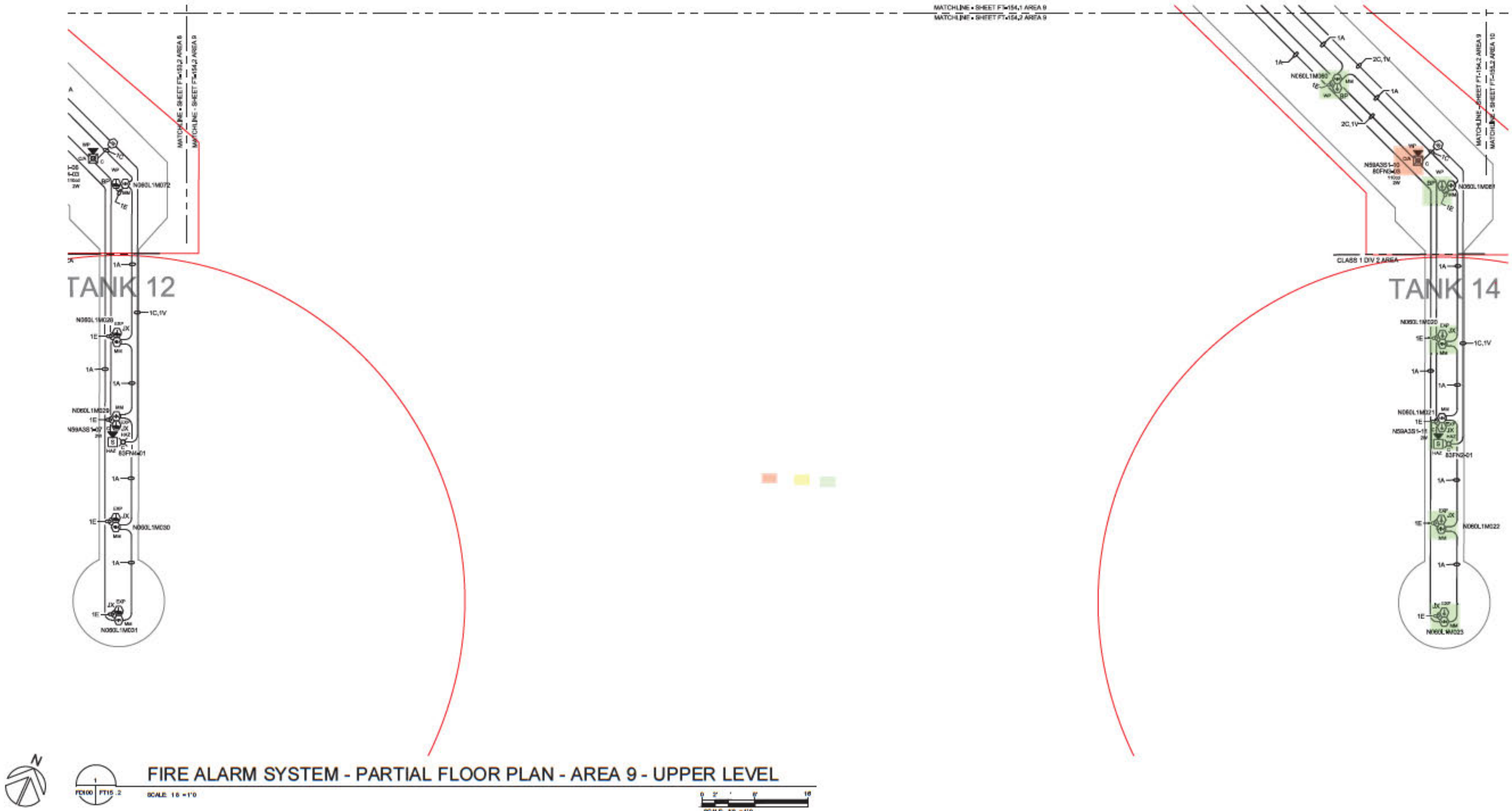
DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
PEARL HARBOR, HAWAII
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 1 & 2 - LOWER LEVEL

Honeywell FSG

FT-153 2

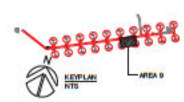

REFERENCE
ADDRESS LABEL CLARIFICATION
SEE SHEET FA0.3
SYSTEM NOTES
SEE SHEET FA0.3
WIRE LEGEND
SEE SHEET FA0.3
TANK 11
TANK 13
CLASS 1 DIV 2 AREA
Good location/distance. Completely obstructed by temporary ventilation ductwork
NOT completely obstructed
219
SF-7g
MATCHLINE - SHEET FT-154.1 AREA 9
MATCHLINE - SHEET FT-154.2 AREA 9
FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 9 - UPPER LEVEL
SCALE 1/8" = 1'-0"
KEY PLAN
AREA 9
Honeywell
FSG
NAVFAC HAWAII
JOINT BASE PEARL HARBOR (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 9 - UPPER LEVEL
FT-154.1
IF SHEET IS LESS THAN 22" X 3"
REDUCED PRINT - USE GRAPHIC SCALES

REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3



FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 9 - UPPER LEVEL

SCALE: 1/8" = 1'-0"



THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG ... TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE ... OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22 X 34 REDUCED PRINT - USE GRAPHIC SCALES

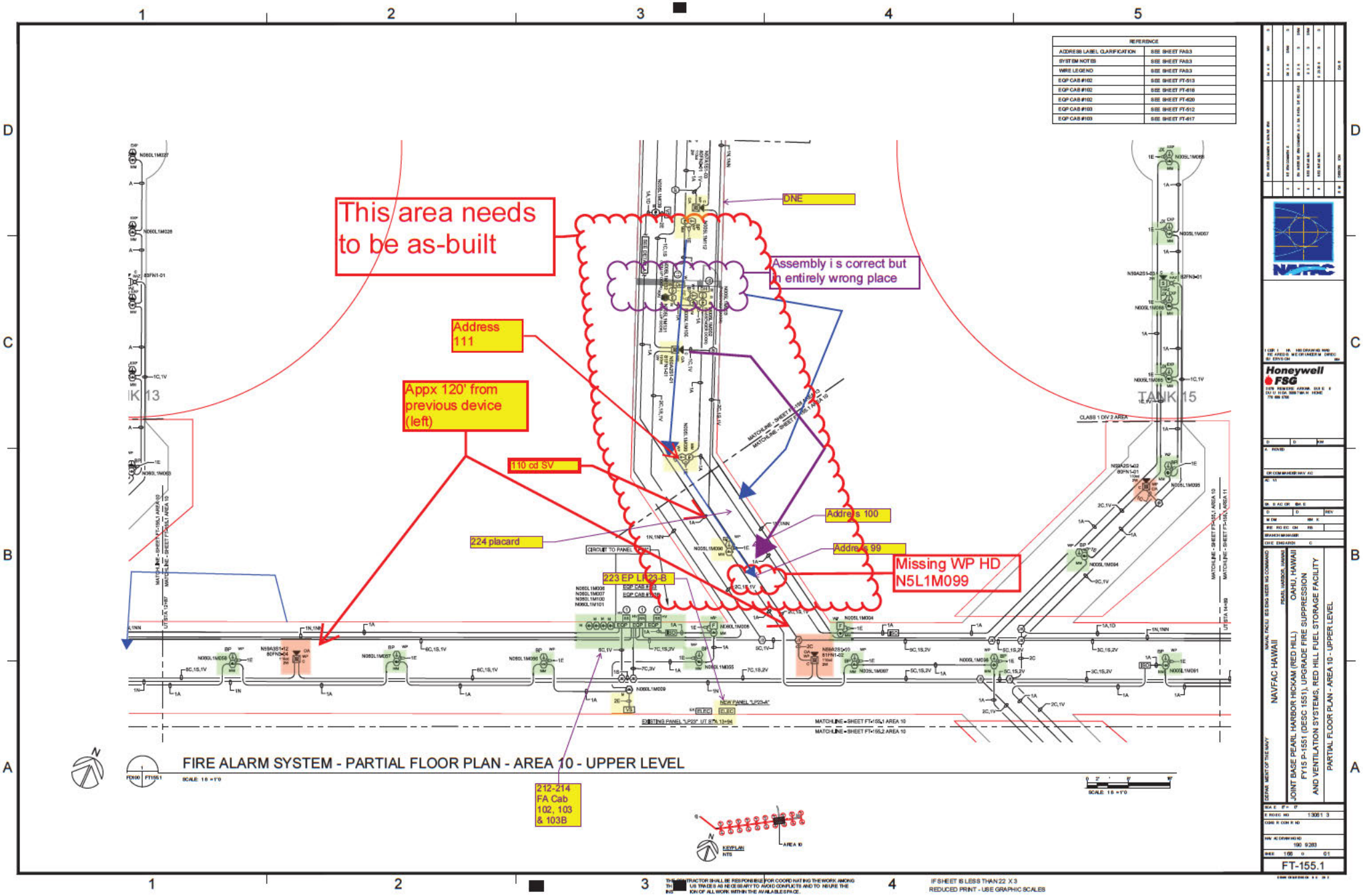
Honeywell FSG

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION
AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 9 - UPPER LEVEL

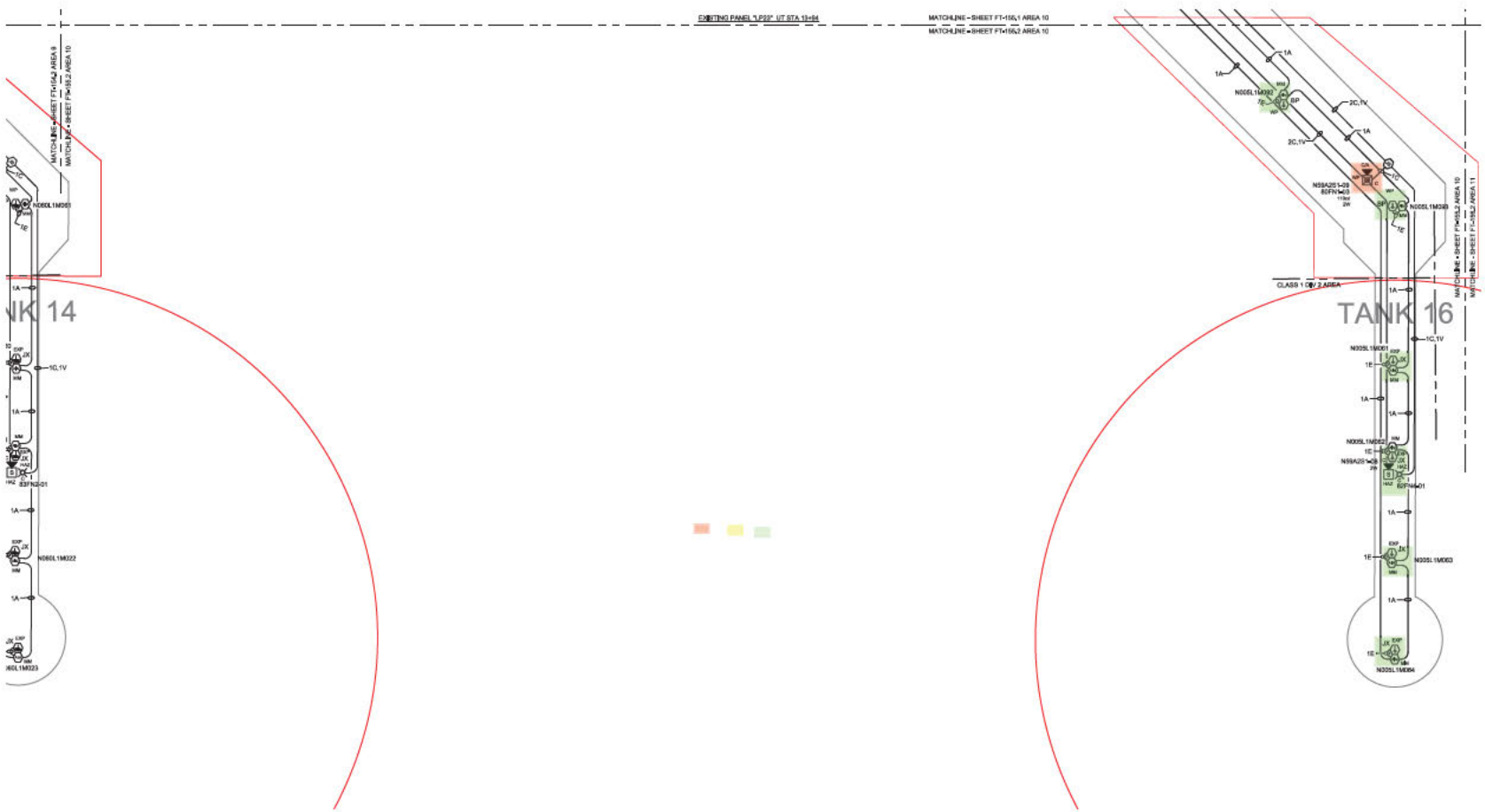
NAVFAC DRAWING NO. 1909282
SHEET 165 OF 201

FT-154.2



REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3
EQP CAB #102	SEE SHEET FT-013
EQP CAB #102	SEE SHEET FT-016
EQP CAB #102	SEE SHEET FT-020
EQP CAB #103	SEE SHEET FT-012
EQP CAB #103	SEE SHEET FT-017

REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3



N

FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 10 - UPPER LEVEL

FD100 FT1552

SCALE: 1 S = 1'0

SCALE: 1 S = 1'0

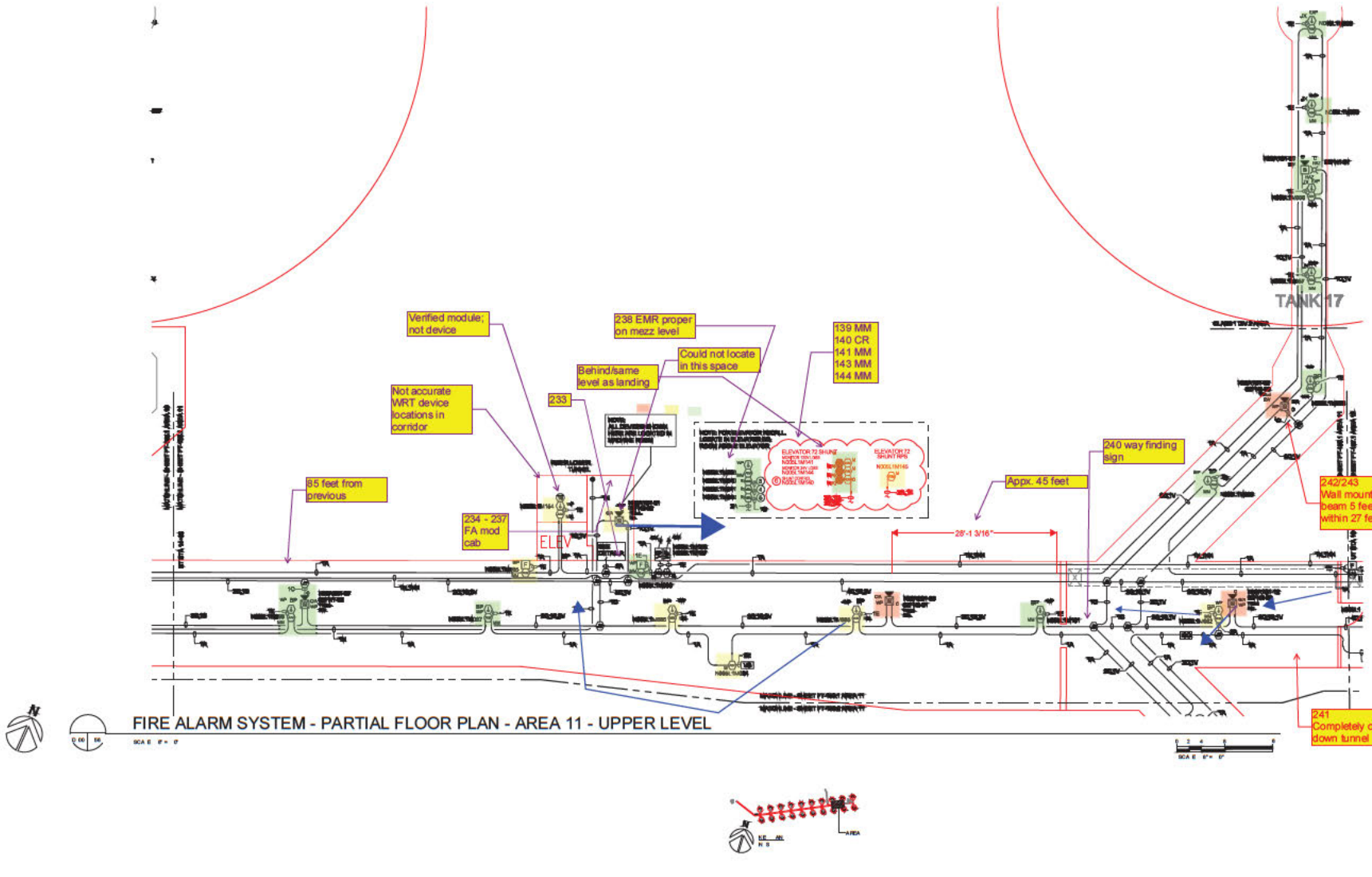
THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE US TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE ION OF ALL WORK WITHIN THE AVAILABLE SPACE.

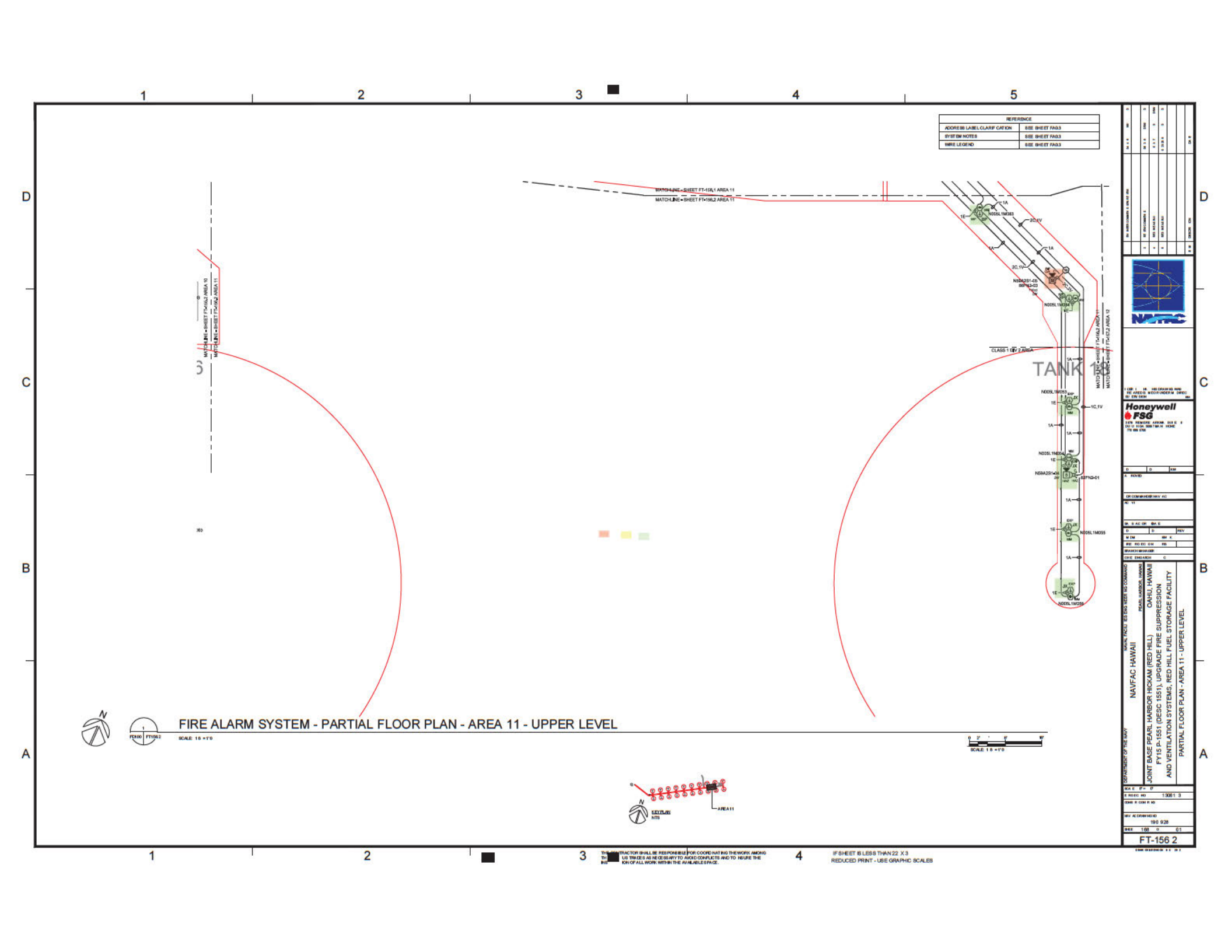
IF SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES

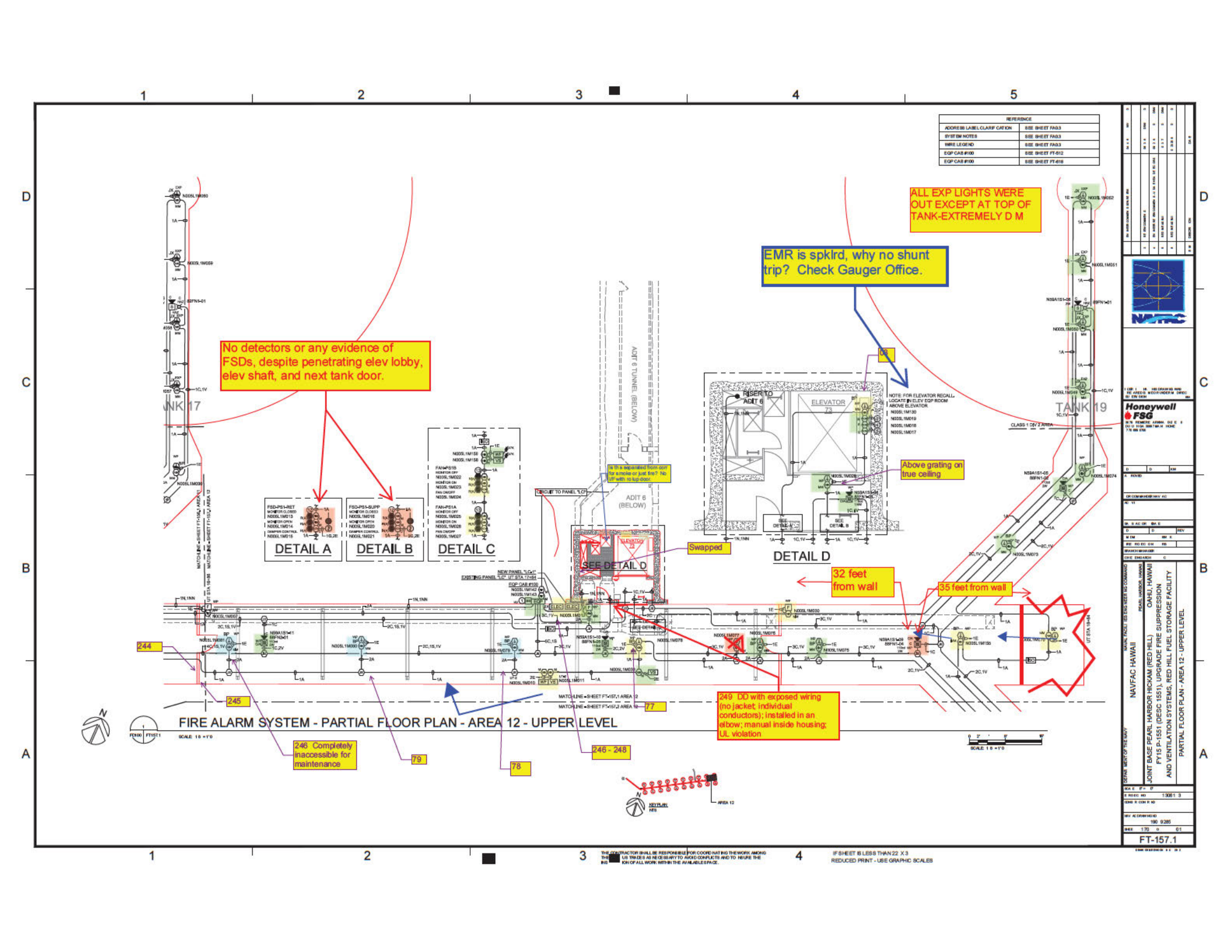
Honeywell
FSG

NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 15551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 10 - UPPER LEVEL

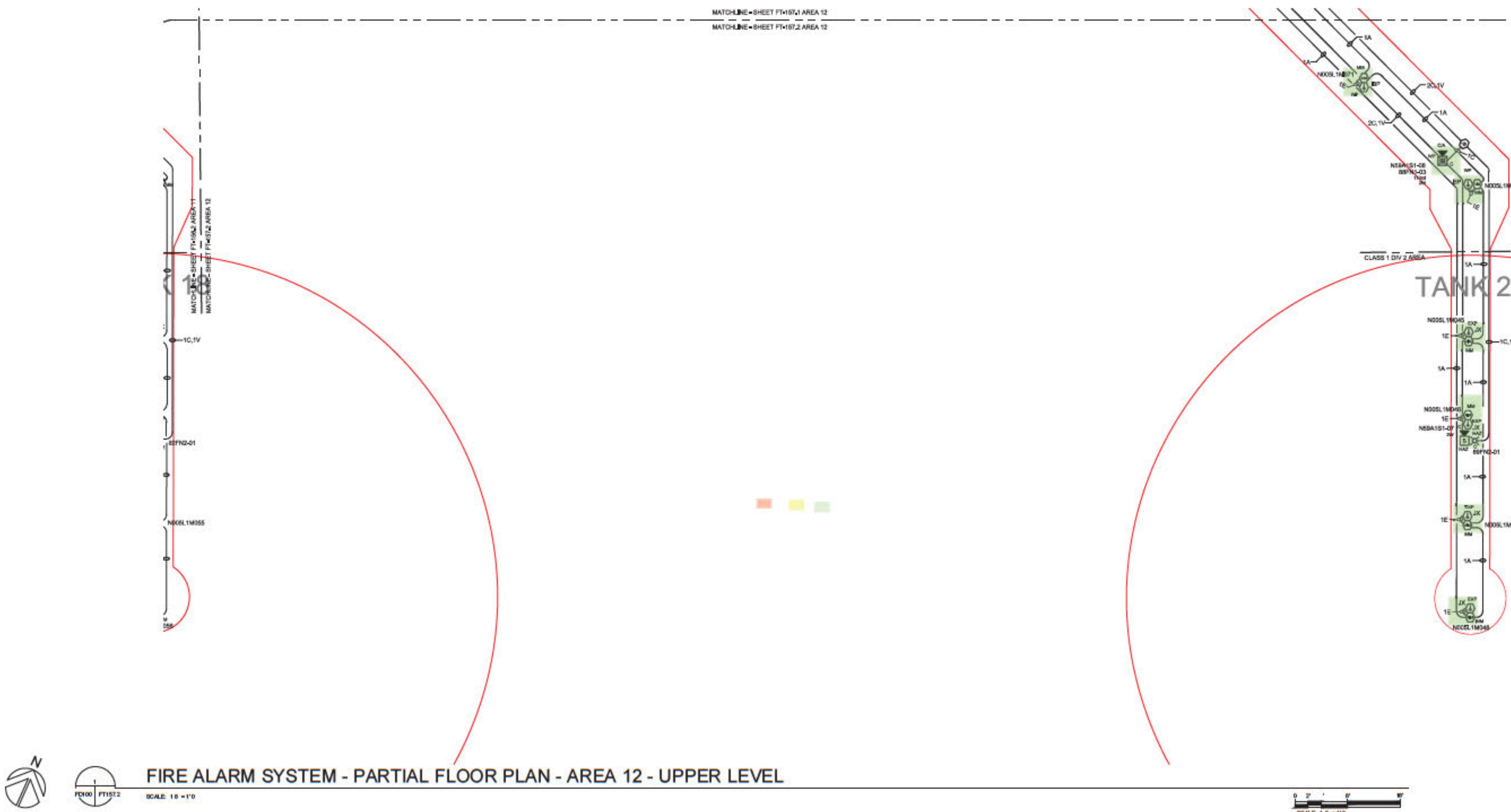
FT-155 2


Verified module; not device
238 EMR proper on mezz level
Could not locate in this space
139 MM
140 CR
141 MM
143 MM
144 MM
Behind/same level as landing
Not accurate WRT device locations in corridor
233
85 feet from previous
234 - 237 FA mod cab
ELEV
Appx. 45 feet
240 way finding sign
28'-1 3/16"
242/243
Wall mount SV mounted on beam 5 feet off wall. Is within 27 feet of corridor.
241
Completely obstructed from down tunnel
TANK 17
FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 11 - UPPER LEVEL
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
FY15 FIRE ALARM (ESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 11 - UPPER LEVEL
FT-156.1


REFERENCE
ADDRESS LABEL CLARIFICATION
SEE SHEET FA0.3
SYSTEM NOTES
SEE SHEET FA0.3
WIRE LEGEND
SEE SHEET FA0.3
MATCHLINE - SHEET FT-156,1 AREA 11
MATCHLINE - SHEET FT-156,2 AREA 11
CLASS 1 DIV 2 AREA
TANK 11
FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 11 - UPPER LEVEL
SCALE: 1/8 = 1'-0
KEY PLAN
NTS
AREA 11
Honeywell
FSG
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION
AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 11 - UPPER LEVEL
FT-156 2
IF SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES

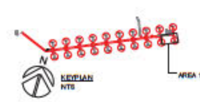

No detectors or any evidence of FSDs, despite penetrating elev lobby, elev shaft, and next tank door.
ALL EXP LIGHTS WERE OUT EXCEPT AT TOP OF TANK-EXTREMELY D M
EMR is spkld, why no shunt trip? Check Gauger Office.
Above grating on true ceiling
Swapped
32 feet from wall
35 feet from wall
249 DD with exposed wiring (no jacket; individual conductors); installed in an elbow; manual inside housing; UL violation
246 Completely inaccessible for maintenance
244
245
79
78
246 - 248
77
DETAIL A
DETAIL B
DETAIL C
DETAIL D
SEE DETAIL D
TANK 17
TANK 19
ADIT 6 TUNNEL (BELOW)
RISER TO ADIT 6
ELEVATOR
CLASS 1 DIV 2 AREA
FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 12 - UPPER LEVEL
REFERENCE
ADDRESS LABEL/CLARIFICATION
SYSTEM NOTES
WIRE LEGEND
EQP CAB #100
EQP CAB #100
SEE SHEET FA0.3
SEE SHEET FA0.3
SEE SHEET FA0.3
SEE SHEET FT-012
SEE SHEET FT-016
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 12 - UPPER LEVEL
Honeywell
FSG
FT-157.1

REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3



FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 12 - UPPER LEVEL

SCALE: 1/8" = 1'-0"



NAVFAC HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 12 - UPPER LEVEL

Honeywell FSG

13061 3

190 9285

170 01

FT-157 2

IF SHEET IS LESS THAN 22 X 34 REDUCED PRINT - USE GRAPHIC SCALES

NOTE: The Backgrounds for these areas are not scaled per actual conditions, devices in these areas are all shown, however all devices are shown for clarification only do not use for scaling purposes.

REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3
EQP CAB #101	SEE SHEET FT 510
EQP CAB #101	SEE SHEET FT 610
EQP CAB #101	SEE SHEET FT 618
EQP CAB #101	SEE SHEET FT 620
NWS #9	SEE SHEET FT 519
VDU	SEE SHEET FT 519
RACK	SEE SHEET FT 520

NOTES
A K NG FISHER RADIO TRANSMITTER AND A MASS NOTIFICATION TRANSMITTER, BY OTHERS
NETWORK WORKSTATION PC LOCATED IN THE TUNNEL TOUCH SCREEN MONITOR TO BE MOUNTED OUTSIDE THE BUILDING IN CLIMATE CONTROLLED NEMA- X ENCLOSURE

Spacing ranges from 20-30 feet for HDs in this segment

Discontinuance in strobe coverage

SV - distance IS compliant

21'-8 11/16"

228-232

225-227 FACP Node 5 Cabinet 101

FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 13 - UPPER LEVEL - A (b) (3) (A)

SCALE: 1/8 = 1'-0

Spacing ranges from 20-30 feet for HDs in this segment

39'-10 3/16"

28'-7 1/2"

Address 108

Address 109; appx 30 feet

FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 13 - UPPER LEVEL (b) (3) (A)

SCALE: 1/8 = 1'-0

KEYPLAN

AREA13

Honeywell FSG

DEPARTMENT OF THE NAVY
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL FLOOR PLAN - AREA 13 (ADIT 5) - UPPER LEVEL

FT-158

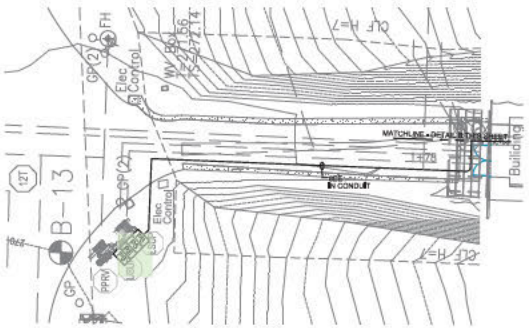
THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES

NOTE: The Backgrounds for these areas are not scaled per actual conditions, devices in these areas are all shown, however all devices are shown for clarification only do not use for scaling purposes.

REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FID.3
SYSTEM NOTES	SEE SHEET FID.3
WIRE LEGEND	SEE SHEET FID.3
EQP CAB #110	SEE SHEET FT 509
EQP CAB #110	SEE SHEET FT 611
EQP CAB #110	SEE SHEET FT 618
EQP CAB #110	SEE SHEET FT 620
NWS #7	SEE SHEET FT 519
VDU	SEE SHEET FT 519

NOTES
NETWORK WORKSTATION PC LOCATED IN THE TUNNEL. TOUCH SCREEN MONITOR TO BE MOUNTED OUTS DE THE BUILDING IN CLIMATE CONTROLLED NEMA- X ENCLOSURE.



No SD; there is one HD on elev side of door. NOT ACCEPTABLE ALT. Only one duct and one FSD

DETAIL A

SEE DETAIL A

Wall mtd

Door is 38' from elev doors

On ceiling

RISER TO LOWER TUNNEL & UPPER TUNNEL

RISER TO LOWER TUNNEL

Green devices are at door in relative locations but door is in wrong location

PARTIAL FIRE ALARM SYSTEM - UPPER LEVEL (b) (3) (A)

(b) (3) (A) P.R.V & F.D.C. LOCATION

Wall-mounted and obstructed from covering down corridor.

Wall mtd

DETAIL B

262

182-184 NWS -7 & FA Cab 110

261

Could not verify, possibly obstructed by ductwork

FIRE ALARM SYSTEM - PARTIAL FLOOR PLAN - AREA 14 - UPPER LEVEL - (b) (3) (A)

SCALE: 1/8 = 1'0

Not installed

KEYPLAN NTS

AREA 1

NAVFAC HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII

FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

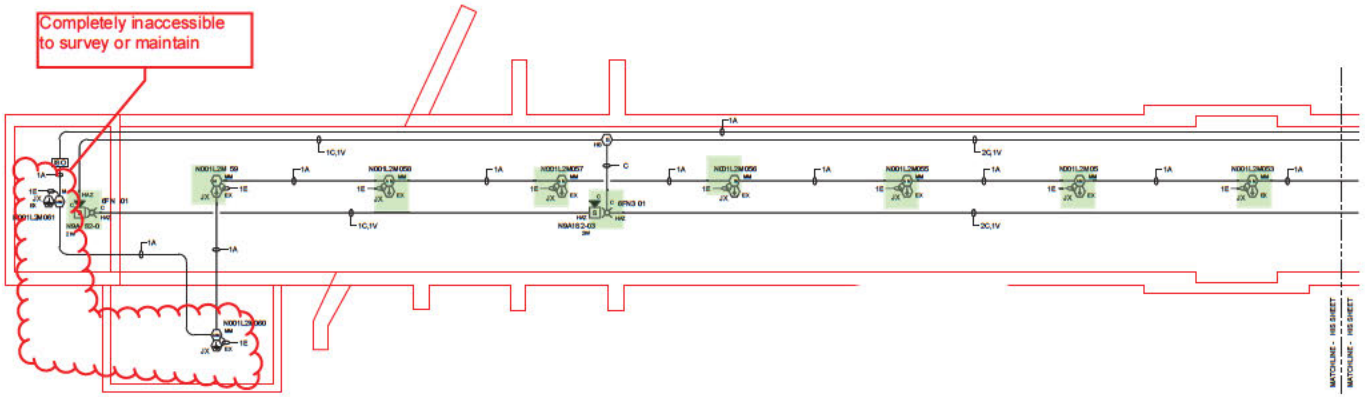
PARTIAL FLOOR PLAN - AREA 14 - UPPER LEVEL - ADIT-6

FT-159

IF SHEET IS LESS THAN 22 X 3 REDUCED PRINT - USE GRAPHIC SCALES

REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3

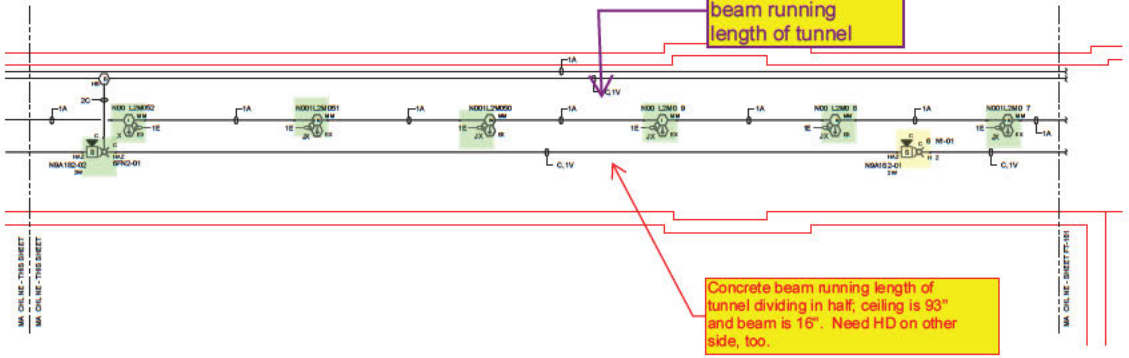
Completely inaccessible to survey or maintain



FIRE ALARM SYSTEM - PARTIAL PUMP HOUSE - LOWER LEVEL

SCALE: 1/8 = 1'-0

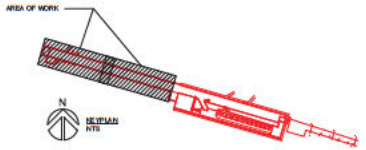
268 Concrete beam running length of tunnel



Concrete beam running length of tunnel dividing in half; ceiling is 93" and beam is 16". Need HD on other side, too.

FIRE ALARM SYSTEM - PARTIAL PUMP HOUSE - LOWER LEVEL

SCALE: 1/8 = 1'-0

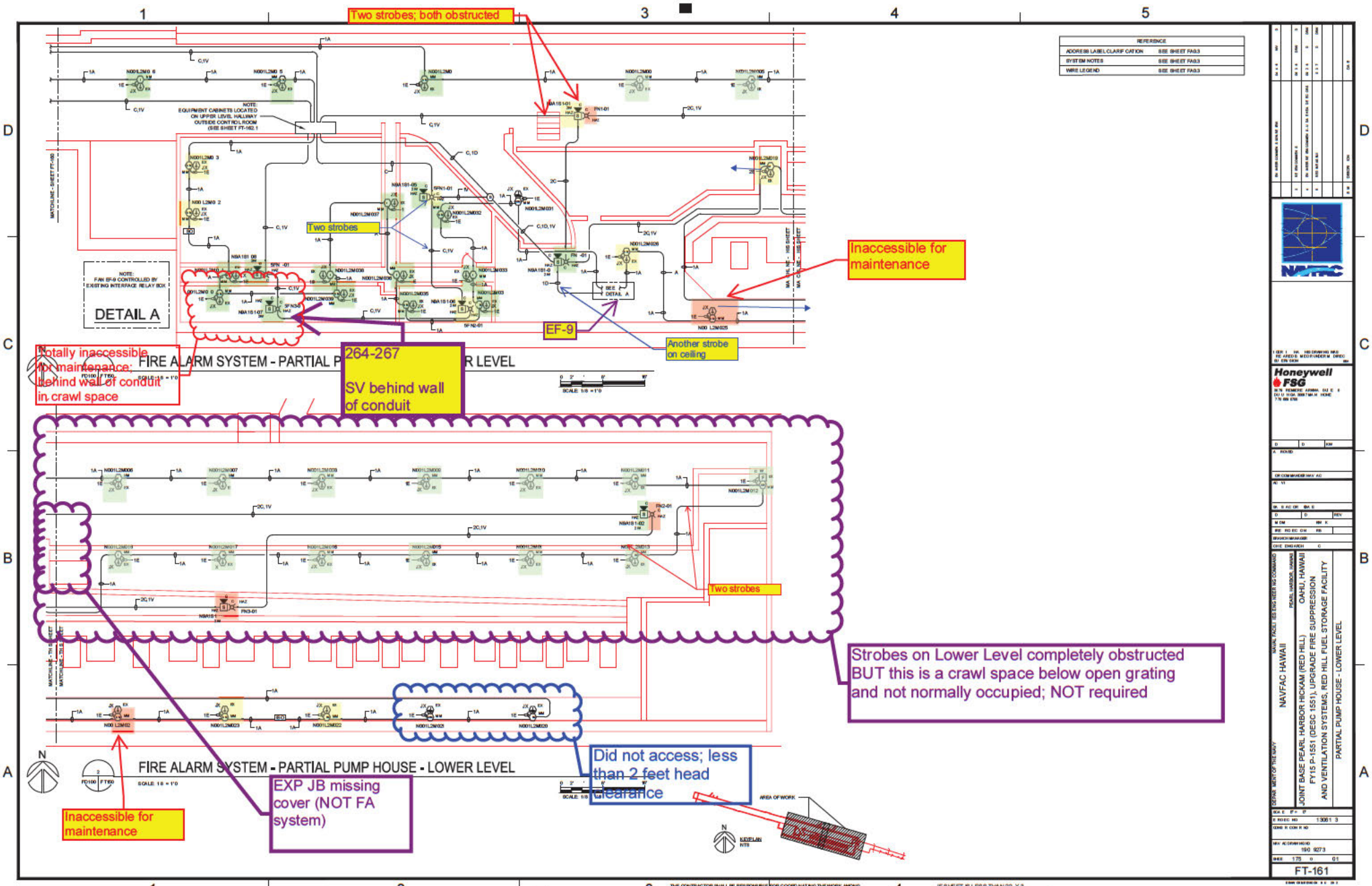


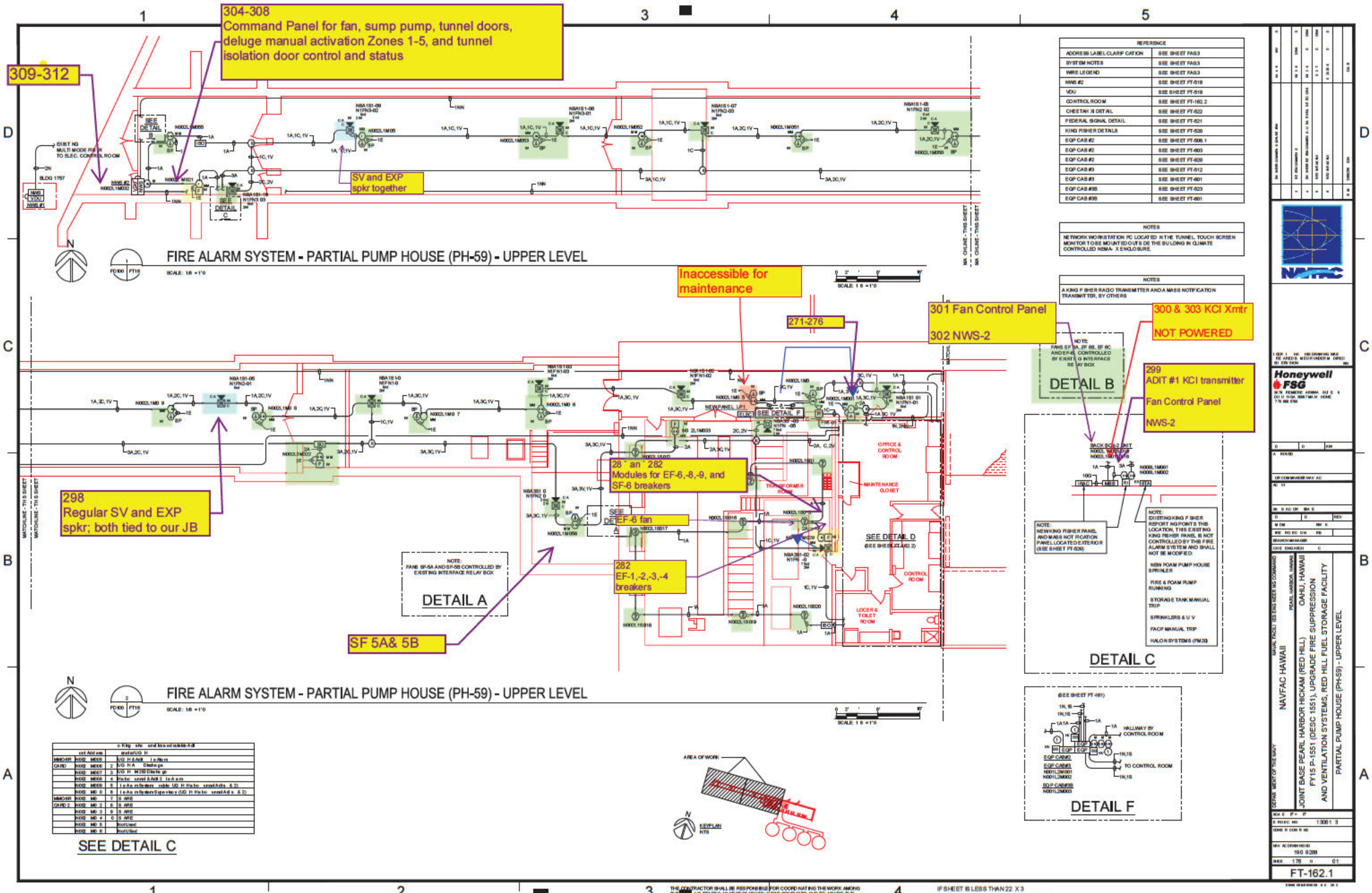
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 15551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL PUMP HOUSE - LOWER LEVEL

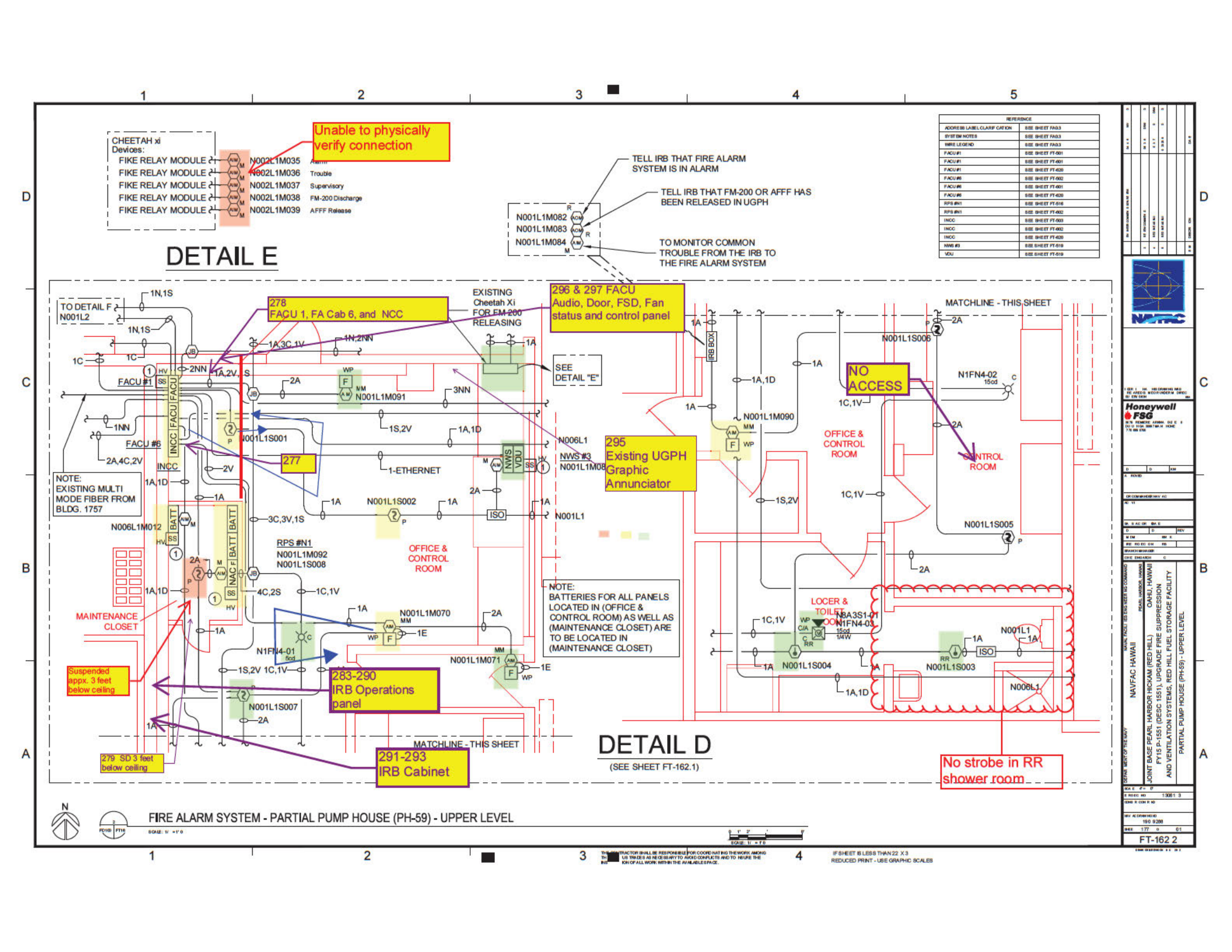
FT-160

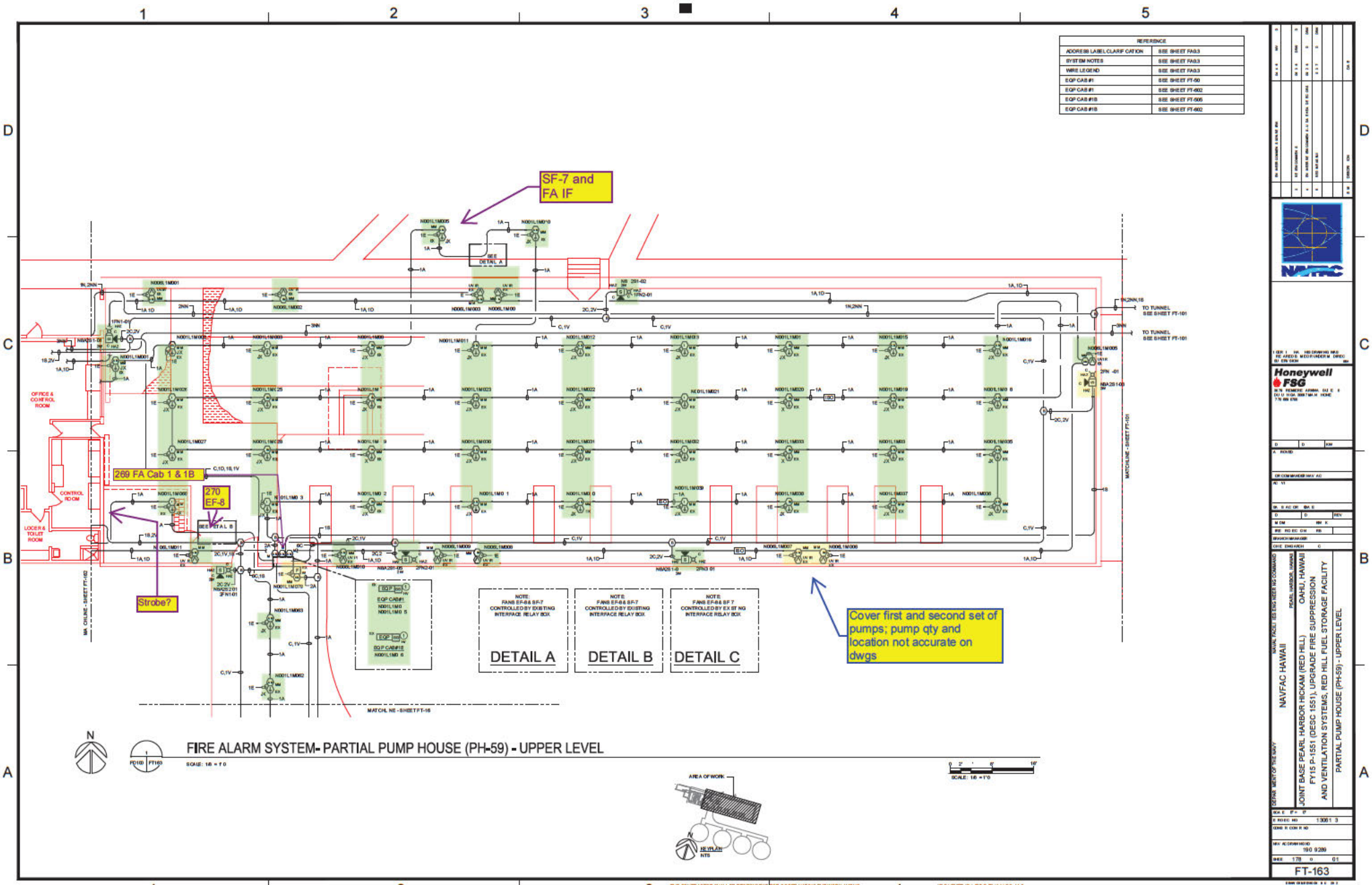
THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT - USE GRAPHIC SCALES


Two strobes; both obstructed
Two strobes
Inaccessible for maintenance
EF-9
Another strobe on ceiling
DETAIL A
Totally inaccessible for maintenance: behind wall of conduit in crawl space
FIRE ALARM SYSTEM - PARTIAL P R LEVEL
264-267
SV behind wall of conduit
Two strobes
Strobes on Lower Level completely obstructed BUT this is a crawl space below open grating and not normally occupied; NOT required
FIRE ALARM SYSTEM - PARTIAL PUMP HOUSE - LOWER LEVEL
Did not access; less than 2 feet head clearance
EXP JB missing cover (NOT FA system)
Inaccessible for maintenance
AREA OF WORK
KEYPLAN
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL PUMP HOUSE - LOWER LEVEL
FT-161


304-308
Command Panel for fan, sump pump, tunnel doors, deluge manual activation Zones 1-5, and tunnel isolation door control and status
309-312
SV and EXP spkr together
FIRE ALARM SYSTEM - PARTIAL PUMP HOUSE (PH-59) - UPPER LEVEL
SCALE: 1/8 = 1'0
Inaccessible for maintenance
271-276
301 Fan Control Panel
302 NWS-2
300 & 303 KCI Xmtr
NOT POWERED
299
ADIT #1 KCI transmitter
Fan Control Panel
NWS-2
DETAIL B
DETAIL C
28 ea 282 Modules for EF-6,-8,-9, and SF-6 breakers
EF-6 fan
282
EF-1,-2,-3,-4 breakers
SF 5A& 5B
298
Regular SV and EXP spkr; both tied to our JB
DETAIL A
SEE DETAIL D
SEE DETAIL C
DETAIL F
AREA OF WORK
KEYPLAN
NTS
REFERENCE
ADDRESS LABEL CLARIFICATION
SYSTEM NOTES
WIRE LEGEND
NWS #2
VDU
CONTROL ROOM
CHEETAH JI DETAIL
FEDERAL SIGNAL DETAIL
KING FISHER DETAILS
EQP CAB #2
EQP CAB #2
EQP CAB #2
EQP CAB #3
EQP CAB #3
EQP CAB #38
EQP CAB #38
NOTES
NETWORK WORKSTATION PC LOCATED IN THE TUNNEL. TOUCH SCREEN MONITOR TO BE MOUNTED OUTSIDE THE BU-LONG IN CLIMATE CONTROLLED NEMA- X ENCLOSURE.
NOTES
A KING FISHER RADIO TRANSMITTER AND A MASS NOTIFICATION TRANSMITTER, BY OTHERS
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL PUMP HOUSE (PH-59) - UPPER LEVEL
FT-162.1


CHEETAH xi Devices:
FIKE RELAY MODULE
N002L1M035
N002L1M036
N002L1M037
N002L1M038
N002L1M039
Unable to physically verify connection
DETAIL E
N001L1M082
N001L1M083
N001L1M084
TELL IRB THAT FIRE ALARM SYSTEM IS IN ALARM
TELL IRB THAT FM-200 OR AFFF HAS BEEN RELEASED IN UGPH
TO MONITOR COMMON TROUBLE FROM THE IRB TO THE FIRE ALARM SYSTEM
REFERENCE
ADDRESS LABEL CLARIFICATION
SYSTEM NOTES
WIRE LEGEND
FACU #1
FACU #1
FACU #1
FACU #6
FACU #6
RPS #N1
RPS #N1
INCC
INCC
INCC
NWS #3
VDU
TO DETAIL F N001L2
278 FACU 1, FA Cab 6, and NCC
EXISTING Cheetah Xi FOR FM-200 RELEASING
296 & 297 FACU Audio, Door, FSD, Fan status and control panel
SEE DETAIL "E"
MATCHLINE - THIS SHEET
NO ACCESS
OFFICE & CONTROL ROOM
CONTROL ROOM
277
295 Existing UGPH Graphic Annunciator
NWS #3
N001L1M08
NOTE: EXISTING MULTI MODE FIBER FROM BLDG. 1757
RPS #N1
N001L1M092
N001L1S008
OFFICE & CONTROL ROOM
NOTE: BATTERIES FOR ALL PANELS LOCATED IN (OFFICE & CONTROL ROOM) AS WELL AS (MAINTENANCE CLOSET) ARE TO BE LOCATED IN (MAINTENANCE CLOSET)
MAINTENANCE CLOSET
LOCER & TOILET
Suspended appx. 3 feet below ceiling
283-290 IRB Operations panel
279 SD 3 feet below ceiling
291-293 IRB Cabinet
MATCHLINE - THIS SHEET
DETAIL D
(SEE SHEET FT-162.1)
No strobe in RR shower room
FIRE ALARM SYSTEM - PARTIAL PUMP HOUSE (PH-59) - UPPER LEVEL
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL PUMP HOUSE (PH-59) - UPPER LEVEL
FT-162 2



REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3
EQP CAB #1	SEE SHEET FT-50
EQP CAB #1	SEE SHEET FT-602
EQP CAB #1B	SEE SHEET FT-505
EQP CAB #1B	SEE SHEET FT-602

FIRE ALARM SYSTEM- PARTIAL PUMP HOUSE (PH-59) - UPPER LEVEL

SCALE: 1/8" = 1'-0"

SCALE: 1/8" = 1'-0"

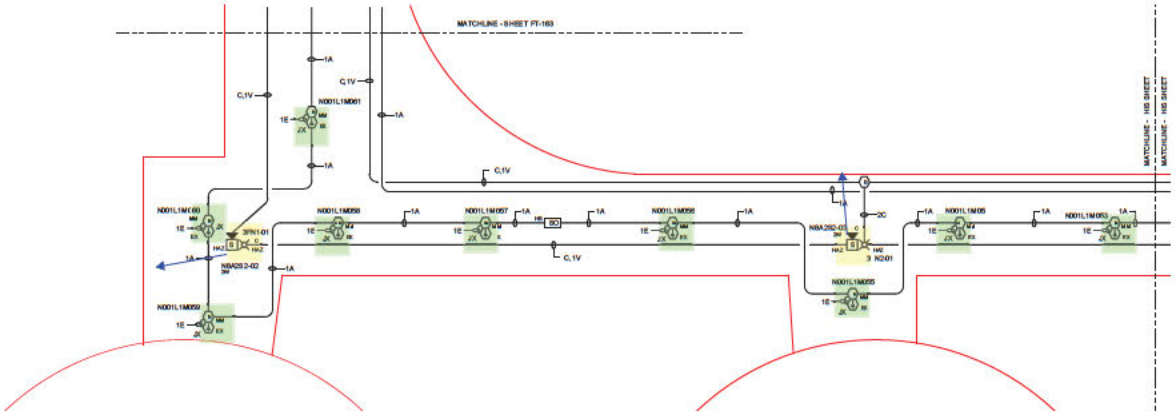
NOTE: THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34" REDUCED PRINT - USE GRAPHIC SCALES

NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL PUMP HOUSE (PH-59) - UPPER LEVEL

FT-163

REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3

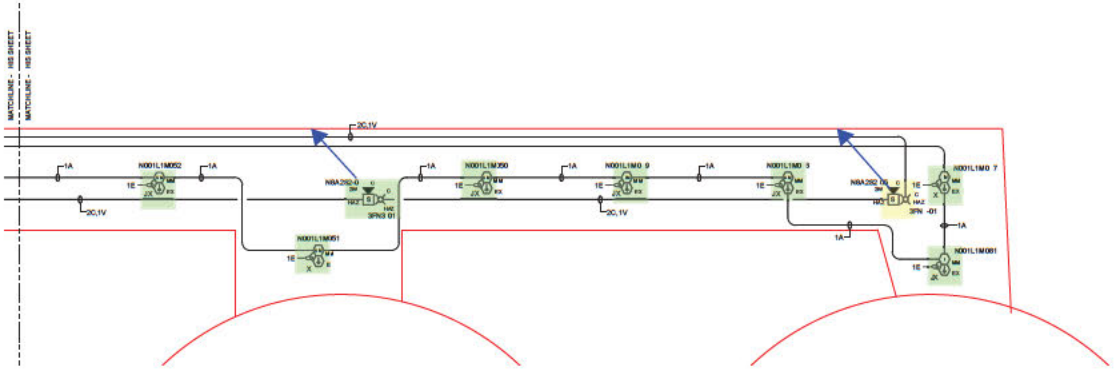


N

FIRE ALARM SYSTEM - PARTIAL PUMP HOUSE (PH-59) - UPPER LEVEL

SCALE: 1/8 = 1'0

SCALE: 1/8 = 1'0

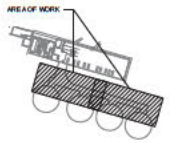


N

FIRE ALARM SYSTEM - PARTIAL PUMP HOUSE (PH-59) - UPPER LEVEL

SCALE: 1/8 = 1'0

SCALE: 1/8 = 1'0



N

KEYPLAN
NTS

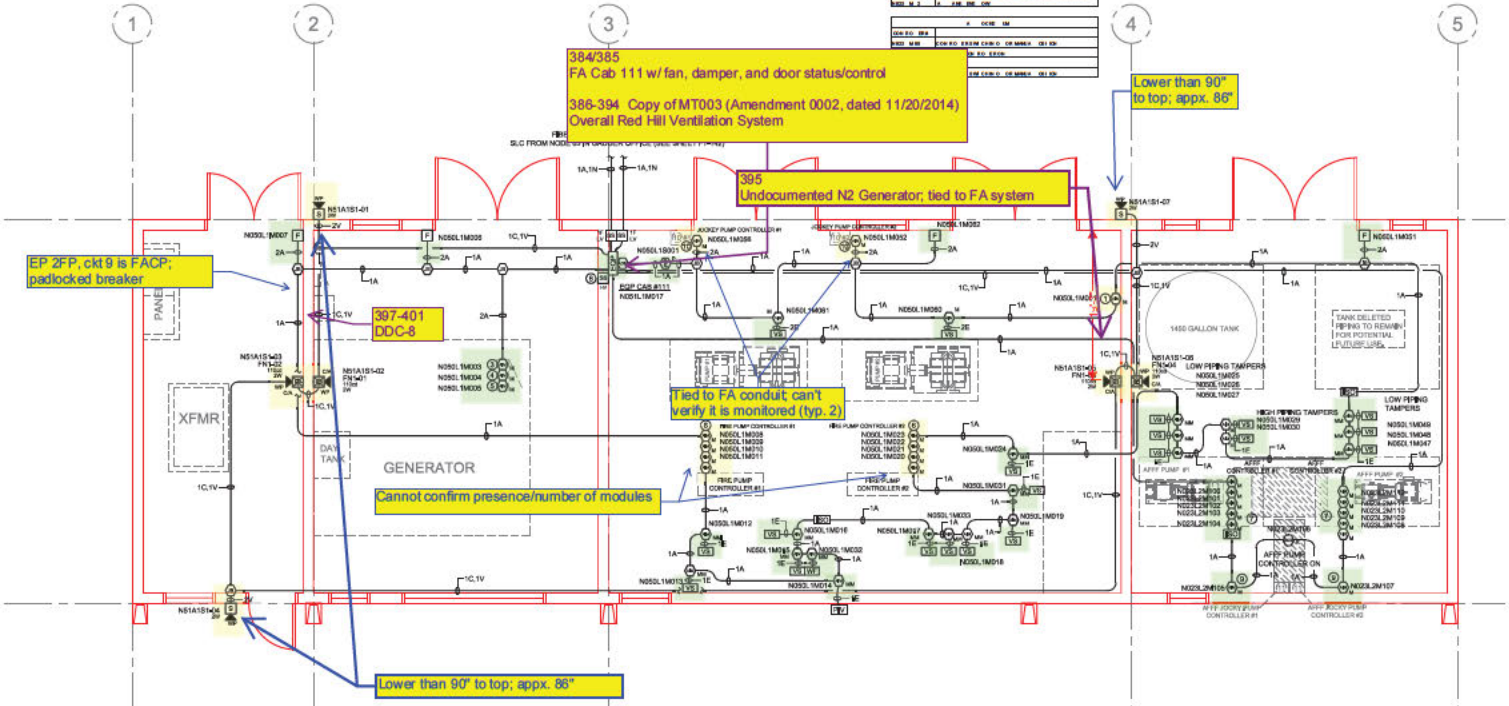
NAVFAC HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
PARTIAL PUMP HOUSE (PH-59) - UPPER LEVEL

FT-164

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 34"
REDUCED PRINT - USE GRAPHIC SCALES



NOTES
1 TO MONITOR LOW AIR PRESSURE SWITCH
2 TO MONITOR HIGH AIR PRESSURE SWITCH
3 TO MONITOR GENERATOR PHASE REVERSAL
TO MONITOR GENERATOR RUNNING
5 TO MONITOR GENERATOR POWER LOSS
6 TO MONITOR FIRE PUMP FOR RUNNING, LOSS OF PHASE, PHASE REVERSAL, AND CONTROLLER CONNECTED TO ALTERNATE SOURCE
7 AFFF PUMP MOTOR RUNNING, AFFF PUMP CONTROLLER SWITCH IN OFF OR MANUAL POSITION, AFFF PUMP CONTROLLER TROUBLE, AFFF PUMP PHASE REVERSAL, POWER LOSS/PHASE LOSS/MOTOR OVERLOAD, AFFF TANK LEVEL LOW
8 TO 120VAC DEDICATED BRANCH NOTE: BREAKER REQUIRES A LOCK
9 TO MONITOR AFFF JOCKEY PUMP CONTROLLER
10 TO MONITOR FIRE PUMP JOCKEY PUMP CONTROLLER

REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3
EQP CAB #72	SEE SHEET FT-515
EQP CAB #72	SEE SHEET FT-609
EQP CAB #72	SEE SHEET FT-620
EQP CAB #111	SEE SHEET FT-609
EQP CAB #111	SEE SHEET FT-619
EQP CAB #111	SEE SHEET FT-620

FIRE ALARM SYSTEM - FLOOR PLAN - FIRE PUMP BUILDING

SCALE: 1/ = F 0

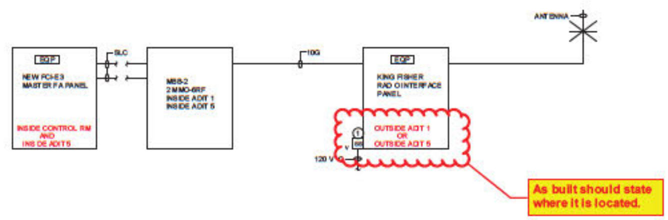
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FLOOR PLAN - FIRE PUMP BUILDING

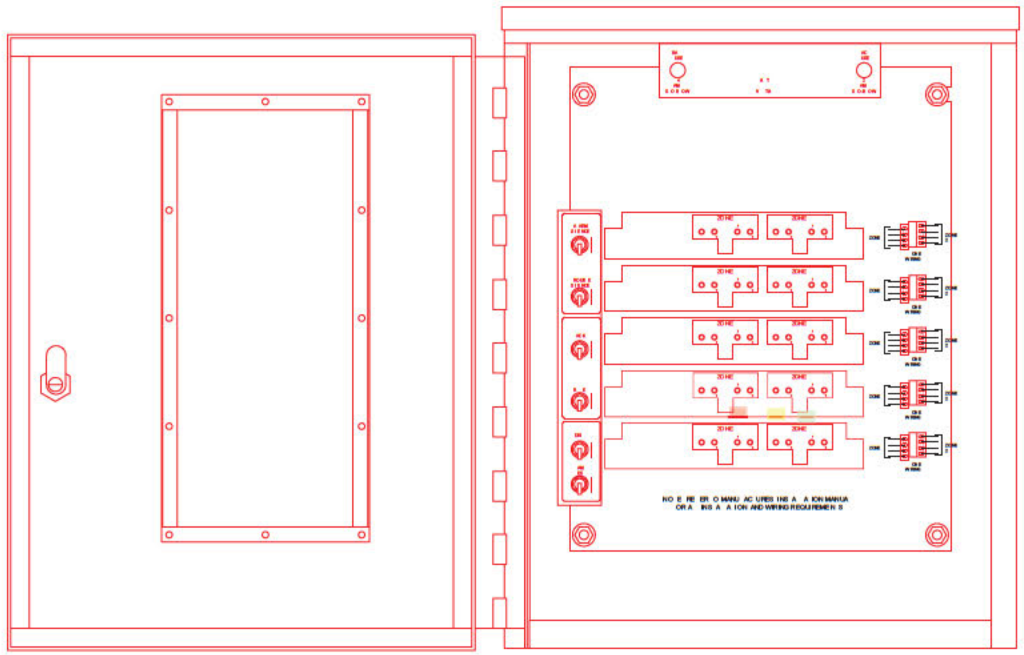
Honeywell FSG

FB-001

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES





KING FISHER RADIO

o King Ishe anel located outside Adi I			
ort Address		anel at UG H - See - 62	
MMO-6R	NODE M005		UG H & Adit ire Alarm
CARD	NODE M006	2	UG H A Discharge
	NODE M007	3	UG H M 200 Discharge
	NODE M008	4	Harbo unnel & Adit 2 ire Alarm
	NODE M009	5	ire Alarm System ouble UG H Harbo unnel Adits & 2)
	NODE M0 0	6	ire Alarm System Supervisory (UG H Harbo unnel Adits & 2)
MMO-6R	NODE M0	7	S ARE
CARD 2	NODE M0 2	8	S ARE
	NODE M0 3	9	S ARE
	NODE M0 4	0	S ARE
	NODE M0 5		Not Used
	NODE M0 6		Not USed

o King Ishe anel located outside Adit 5			
ort Address		anel EQ CABI 0 nside ADI 5 - See - 58	
MMO-6R	NODE M 4		ire ump Building ire Alarm
CARD	NODE M 5	2	ire ump Building Sprinkle Wate ow
	NODE M 6	3	owe unnel & Adit 3 ire Alarm
	NODE M 7	4	owe unnel A Discharge Sprinkle Wate low
	NODE M 8	5	owe unnel Rev O ight Doo Closed-Supervisory
	NODE M 9	6	Uppe unnel & Adits 4 5 & 6 ire Alarm
MMO-6R	NODE M 20	7	Uppe unnel Sprinkle Wate ow
CARD 2	NODE M 2	8	ire pump unning
	NODE M 22	9	ire Alarm System ouble (ire ump Building owe unnel Uppe unnel Adits 3 4 5 & 6)
	NODE M 23	0	ire Alarm System Supervisory (ire ump Building owe unnel Uppe unnel Adits 3 4 5 & 6)
	NODE M 24		Not Used
	NODE M 25		Not USed

Honeywell FSG

DEPARTMENT OF THE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

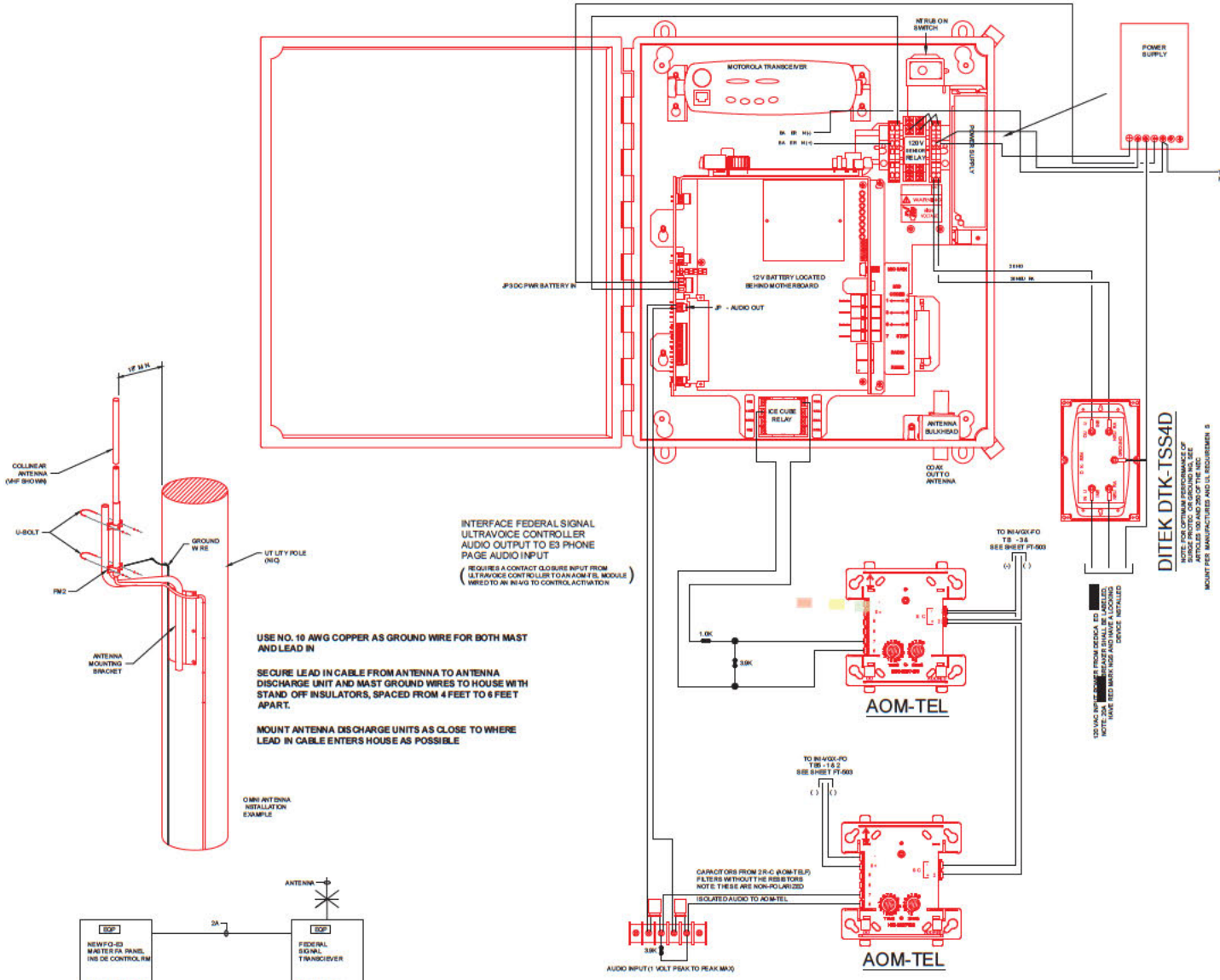
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
KING FISHER RADIO & CALL BOX DETAIL

SHEET 204 OF 01

FT-520

TH[redacted]TRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG TH[redacted]US TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INS[redacted]ION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22 X 3 REDUCED PRINT - USE GRAPHIC SCALES



INTERFACE FEDERAL SIGNAL ULTRAVOICE CONTROLLER AUDIO OUTPUT TO E3 PHONE PAGE AUDIO INPUT

(REQUIRES A CONTACT CLOSURE INPUT FROM ULTRAVOICE CONTROLLER TO AN AOM-TSL MODULE WIRED TO AN IN-VG TO CONTROL ACTIVATION)

USE NO. 10 AWG COPPER AS GROUND WIRE FOR BOTH MAST AND LEAD IN

SECURE LEAD IN CABLE FROM ANTENNA TO ANTENNA DISCHARGE UNIT AND MAST GROUND WIRES TO HOUSE WITH STAND OFF INSULATORS, SPACED FROM 4 FEET TO 6 FEET APART.

MOUNT ANTENNA DISCHARGE UNITS AS CLOSE TO WHERE LEAD IN CABLE ENTERS HOUSE AS POSSIBLE

FEDERAL SIGNAL ULTRAVOICE REMOTE INTERFACE CONTROLLER

DC POWER CONNECTION
THE BATTERY IS LOCATED UNDER THE CONTROL BOARD MOUNTING PLATE AND IS PRE-WIRED TO THE UVRI. CONNECT DC POWER TO THE UVRI BY PLUGGING IN THE TWO POSITION POWER CONNECTOR AT JP3 ON THE MOTHERBOARD AS SHOWN IN FIGURE 7.5.

AUDIO OUTPUT CONNECTION
CONNECT THE AUDIO OUTPUT OF THE UVRI TO THE AUDIO INPUT OF THE REMOTE FIRE ALARM/PA SYSTEM AT JP4 ON THE MOTHERBOARD AS SHOWN IN FIGURE 7.5 BELOW. ADJUST THE AUDIO OUTPUT LEVEL POTENTIOMETER TO THE DESIRED OUTPUT LEVEL. THE POT IS LOCATED NEXT TO THE AUDIO SIGNAL OUTPUT CONNECTOR (JP4).

120 VAC ELECTRICAL SERVICE WIRING
1. INSTALL A DEDICATED 15A CIRCUIT BREAKER IN AN EXISTING BREAKER PANEL OR INSTALL A NEW BREAKER PANEL IF NECESSARY FOR THE UVRI.

2. INSTALL CONDUIT FROM THE BREAKER PANEL TO THE ½" CONDUIT ENTRANCE IN THE BOTTOM OF THE UVRI.

3. ROUTE USER-SUPPLIED 12-14 AWG WIRES (1 BLACK, 1 WHITE, 1 GREEN) THROUGH THE CONDUIT FROM THE UVRI CABINET AND THE FUSED BREAKER PANEL.

4. CONNECT THE WHITE NEUTRAL WIRE FROM THE BREAKER PANEL NEUTRAL TO THE DIN RAIL MOUNTED TERMINAL BLOCK LABELED L1 IN THE UVRI CONTROL CABINET.

5. CONNECT THE BLACK LINE WIRE FROM THE 15A BREAKER TO THE DIN RAIL MOUNTED TERMINAL BLOCK LABELED L2 IN THE UVRI CONTROL CABINET.

6. OPTIONALLY, CONNECT A GREEN GROUND WIRE FROM THE BREAKER PANEL EARTH GROUND TO THE GREEN GROUND BLOCK IN THE UVRI CABINET OR RUN A GROUND LEAD FROM THE EXTERNAL 1/4" GROUND STUD ON THE UVRI CABINET TO EARTH GROUND.

GROUNDING REQUIREMENTS
1. THE UVRI CABINET MUST BE PROPERLY CONNECTED TO AN EARTH GROUND. THE CABINET CONTAINS AN EXTERNAL 1/4" GROUND STUD FOR MAKING THIS CONNECTION.
2. EXTERNALLY INSTALLED ANTENNAS REQUIRE A DEDICATED GROUND TO EITHER A GROUND ROD OR BUILDING STEEL BELOW GRADE IN ADDITION TO THE UVRI CABINET GROUND.

DIN RAIL TERMINAL BLOCKS
THESE POINTS PROVIDE A CONVENIENT LOCATION FOR MAKING THE AC POWER CONNECTIONS. A SMALL SCREWDRIVER MUST BE PUSHED INTO THE SQUARE OPENING IN THE TERMINAL BLOCK TO OPEN THE CONTACT OF THE BLOCK. WITH THE WIRE INSERTED, THE BLOCK WILL CLAMP THE WIRE WITH A SPRING-LOADED CONNECTION WHEN THE SCREWDRIVER IS REMOVED FROM THE TERMINAL BLOCK. EACH TERMINAL BLOCK ACCEPTS BARE 12-14 AWG WIRE. THE TERMINAL BLOCKS ARE LABELED L1 AND L2.

OMNI ANTENNA INSTALLATION
FIBERGLASS, NO TUNE MODELS
1. *SEE FIGURE 7.7* FOR REFERENCE. INSTALL ANTENNA (USING INSTALLATION BRACKET OR EQUIVALENT) AS HIGH AS POSSIBLE, THAT THE ANTENNA CABLE AND OBSTACLES WILL ALLOW, AND INSTALL ON SIDE OF POLE CLOSEST TO THE RECEIVING STATION. AT MINIMUM, MOUNT OMNI ANTENNA 4 FEET ABOVE THE EARTH, ABOVE THE TUNNEL.

NOTE A OBJECTS AROUND THE ANTENNA WILL AFFECT THE ANTENNA. KEEP ANTENNA AWAY FROM OBJECTS.
2. ENSURE ANTENNA CABLE CONNECTIONS ARE TIGHT. SEAL ALL CONNECTION POINTS WITH HEAT SHRINK OR TAPE AND SEAL WITH SCOTCH COAT, OR EQUIVALENT.

NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FEDERAL SIGNAL ULTRAVOICE REMOTE INTERFACE CONTROLLER DETAIL

FT-521

IF SHEET IS LESS THAN 22 X 3 REDUCED PRINT - USE GRAPHIC SCALES

DDC OIN DESCRI ION				Imary DDC ACI 3 Address NE3 M-	A DDC Gauger Station Address NE5 M-
SUM UM S -DOOR-2- RUNNING	OU U		MM - 0 -	NE03 M040	NE65 M040
SUM UM S -DOOR-3-2 RUNNING	OU U	2		NE03 M04	NE65 M04
SUM UM S -DOOR-2-3 RUNNING	OU U	3		NE03 M042	NE65 M042
SUM UM S -DOOR-2-4 RUNNING	OU U	4		NE03 M043	NE65 M043
SUM UM S -DOOR-5- RUNNING	OU U	5		NE03 M044	NE65 M044
SUM UM S -DOOR-3-2 RUNNING	OU U	6		NE03 M045	NE65 M045
SUM UM S -DOOR-3-3 RUNNING	OU U	7		NE03 M046	NE65 M046
SUM UM S -DOOR-3-4 RUNNING	OU U	8		NE03 M047	NE65 M047
SUM UM S -DOOR-4- RUNNING	OU U	9		NE03 M048	NE65 M048
SUM UM S -DOOR-4-2 RUNNING	OU U	0		NE03 M049	NE65 M049
SUM UM S -DOOR-4-3 RUNNING	OU U		MM - 0 -2	NE03 M050	NE65 M050
SUM UM S -DOOR-4-4 RUNNING	OU U	2		NE03 M05	NE65 M05
SUM UM S -DOOR-5- RUNNING	OU U	3		NE03 M052	NE65 M052
SUM UM S -DOOR-5-2 RUNNING	OU U	4		NE03 M053	NE65 M053
SUM UM S -DOOR-5-3 RUNNING	OU U	5		NE03 M054	NE65 M054
SUM UM S -DOOR-5-4 RUNNING	OU U	6		NE03 M055	NE65 M055
SUM UM S -DOOR-C- RUNNING	OU U	7		NE03 M056	NE65 M056
SUM UM S -DOOR-C2 RUNNING	OU U	8		NE03 M057	NE65 M057
SUM UM S -DOOR-C3 RUNNING	OU U	9		NE03 M058	NE65 M058
SUM UM S -DOOR-C4 RUNNING	OU U	0		NE03 M059	NE65 M059
SUM UM S -DOOR-C5 GROUNDWA ER CO EC ION UM RUNNING	OU U		MM - 0 -3	NE03 M060	NE65 M060
SUM UM S -DOOR-3-5 GROUNDWA ER CO EC ON UM RUNNING	OU U	2		NE03 M06	NE65 M06
SUM UM S -DOOR-3-5 GROUNDWA ER CO EC ON UM RUNNING	OU U	3		NE03 M062	NE65 M062
SUM UM S -DOOR-4-5 GROUNDWA ER CO EC ON UM RUNNING	OU U	4		NE03 M063	NE65 M063
SUM UM S -DOOR-5-5 GROUNDWA ER CO EC ON UM RUNNING	OU U	5		NE03 M064	NE65 M064
SUM UM S -DOOR-C1 6 GROUNDWA ER CO EC ION UM RUNNING	OU U	6		NE03 M065	NE65 M065
SUM 2 HIGH EVE OA SWI CH	OU U	7		NE03 M066	NE65 M066
SUM 3 HIGH EVE OA SWI CH	OU U	8		NE03 M067	NE65 M067
SUM 4 HIGH EVE OA SWI CH	OU U	9		NE03 M068	NE65 M068
S	OU U	0		NE03 M069	NE65 M069
SUM C HIGH EVE OA SWI CH	OU U		MM - 0 - 4	NE03 M070	NE65 M070
A RE EN ION ANK SECONDAR CON AINMEN OA AC VA ON	OU U	2		NE03 M07	NE65 M07
A RE EN ION ANK HIGH EVE OA AC IVA ION	OU U	3		NE03 M072	NE65 M072
A DVERSION VA VE OSI ON	OU U	4		NE03 M073	NE65 M073
A DVERSION VA VE 2 OSI ON	OU U	5		NE03 M074	NE65 M074
A DVERSION VA VE 3 OSI ON	OU U	6		NE03 M075	NE65 M075
A SU VA VE OSI ION	OU U	7		NE03 M076	NE65 M076
A SU VA VE 2 OSI ION	OU U	8		NE03 M077	NE65 M077
A SU VA VE 3 OSI ION	OU U	9		NE03 M078	NE65 M078
OI GH DOOR MANUA USH BU ON AC VA ON	OU U	0		NE03 M079	NE65 M079
OI GH DOOR S A US C ENC OSED	OU U		MM - 0 -5	NE03 M080	NE65 M080
OI GH DOOR GROUNDWA ER HIGH-HIGH EVE SWI CH AC VA ON	OU U	2		NE03 M08	NE65 M08
WA ER ANK (NEW) HIGH EVE OA SWI CH	OU U	3		NE03 M082	NE65 M082
WA ER ANK (NEW) OW EVE OA SWI CH	OU U	4		NE03 M083	NE65 M083
DDC IN A EDGI IGH DOOR REMO E CHANGE OSI ION C C OSED	OU U	5		NE03 M084	NE65 M084
NO USED	OU U	6		NE03 M085	NE65 M085
NO USED	OU U	7		NE03 M086	NE65 M086
NO USED	OU U	8		NE03 M087	NE65 M087
NO USED	OU U	9		NE03 M088	NE65 M088
NO USED	OU U	0		NE03 M089	NE65 M089
Addresses M080- M089 at bank OU U					
	N U S		MMO-6R -	NE03 M 00	NE65 M 00
OI GH DOOR A REMO E CHANGE OSI ION C C OSE	N U S	2		NE03 M 0	NE65 M 0
A SU VA VES 2 3 A REMO E CHANGE OSI ON O C EN	N U S	3		NE03 M 02	NE65 M 02
A SU VA VES 2 3 A REMO E CHANGE OSI ON C C OSED	N U S	4		NE03 M 03	NE65 M 03
A DVERSION VA VES 2 3 A REMO E CHANGE OSI ION OC EN	N U S	5		NE03 M 04	NE65 M 04
A DVERSION VA VES 2 3 A REMO E CHANGE OSI ION OC OSED	N U S	6		NE03 M 05	NE65 M 05
NO USED	N U S		MMO-6R -2	NE03 M 06	NE65 M 06
NO USED	N U S	2		NE03 M 07	NE65 M 07
NO USED	N U S	3		NE03 M 08	NE65 M 08
NO USED	N U S	4		NE03 M 09	NE65 M 09
NO USED	N U S	5		NE03 M 0	NE65 M 0
NO USED	N U S	6		NE03 M	NE65 M

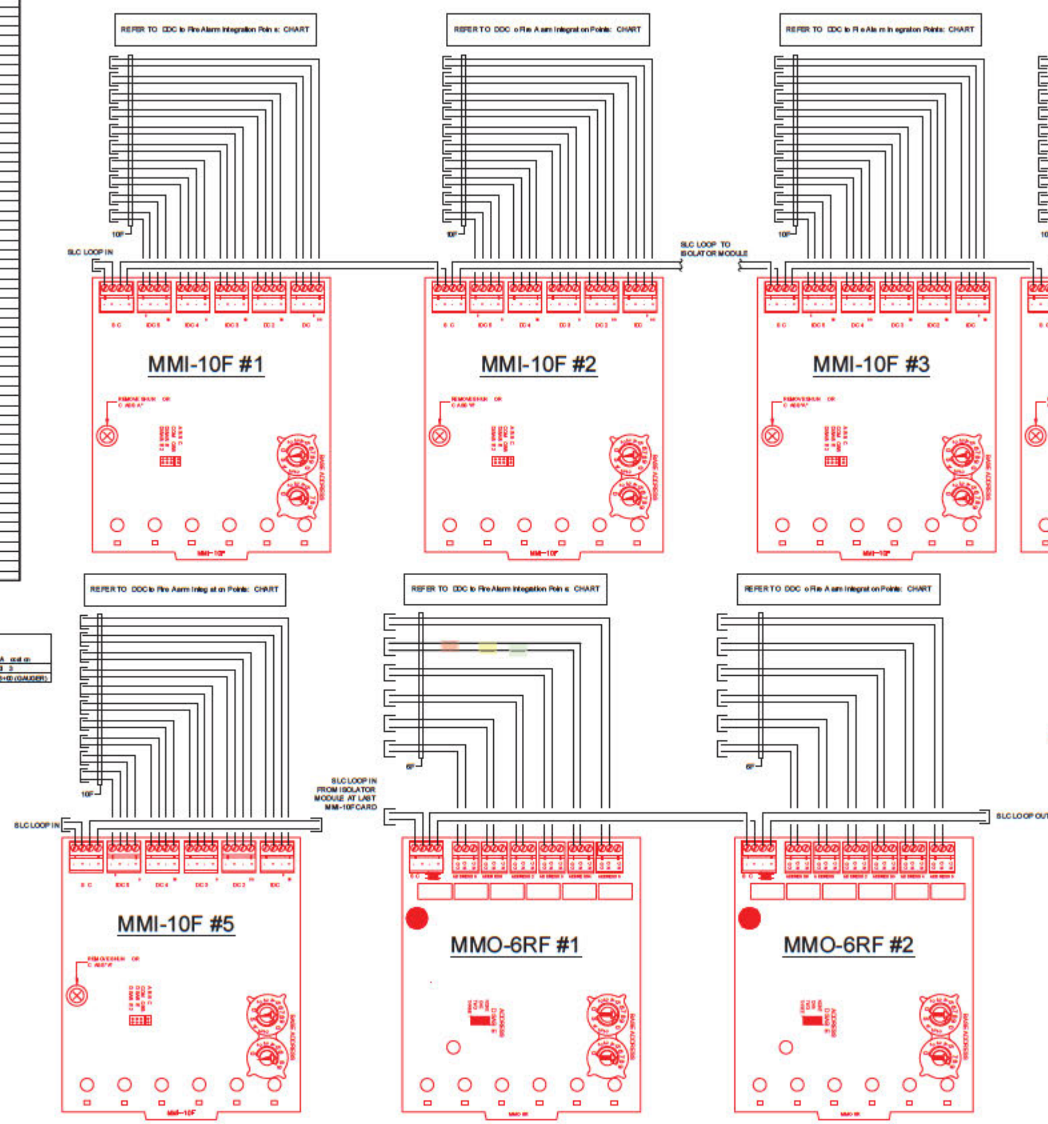
Wires present; addressed; no label

*Al points spel ... the DDC system ... the DDC ... be ... [illegible]

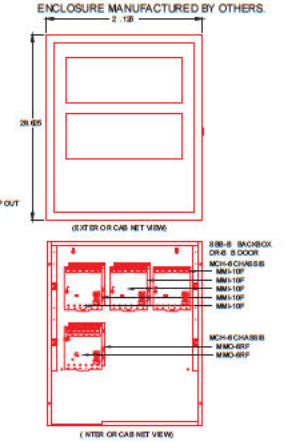
**All the above points to be accomplished via primary ... ACI 3 ... and ... located within the gauger station [illegible]

anel Designation	A anel ype	Add anel ype	Add of Sub anel Separate X Battery Box ype	NEMA A Enclosure N	Battery Back Box N	S A cation
46B	424	S RHCSS-3226 0	N A	SBB4	NA	ACI 3
69B	424	N A - NEMA	N A	SBB4	NA	BB+00 (GAUGER)

REFERENCE	
EQP CAB # 6B	SEE SHEET FT4 6
EQP CAB # 6B	SEE SHEET FT 607
EQP CAB #69B	SEE SHEET FT4 2
EQP CAB #69B	SEE SHEET FT 609



NOTE FIRE ALARM EQUIPMENT TO BE ENCLOSED IN A NEMA-3R CABINET OR ENCLOSURE MANUFACTURED BY OTHERS.



KEY PLAN

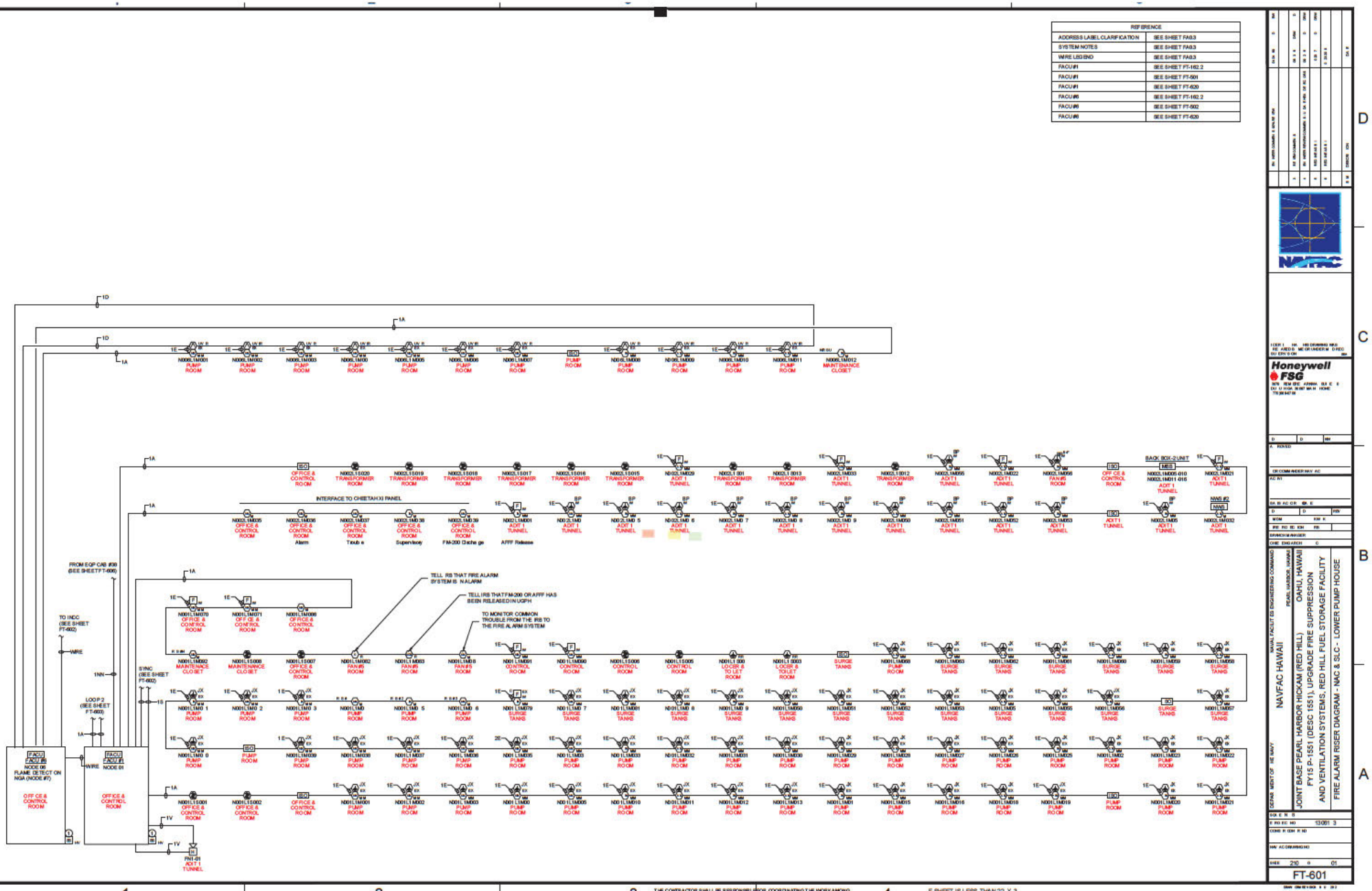
THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG ... TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE ... ION OF ALL WORK WITHIN THE AVAILABLE SPACE.

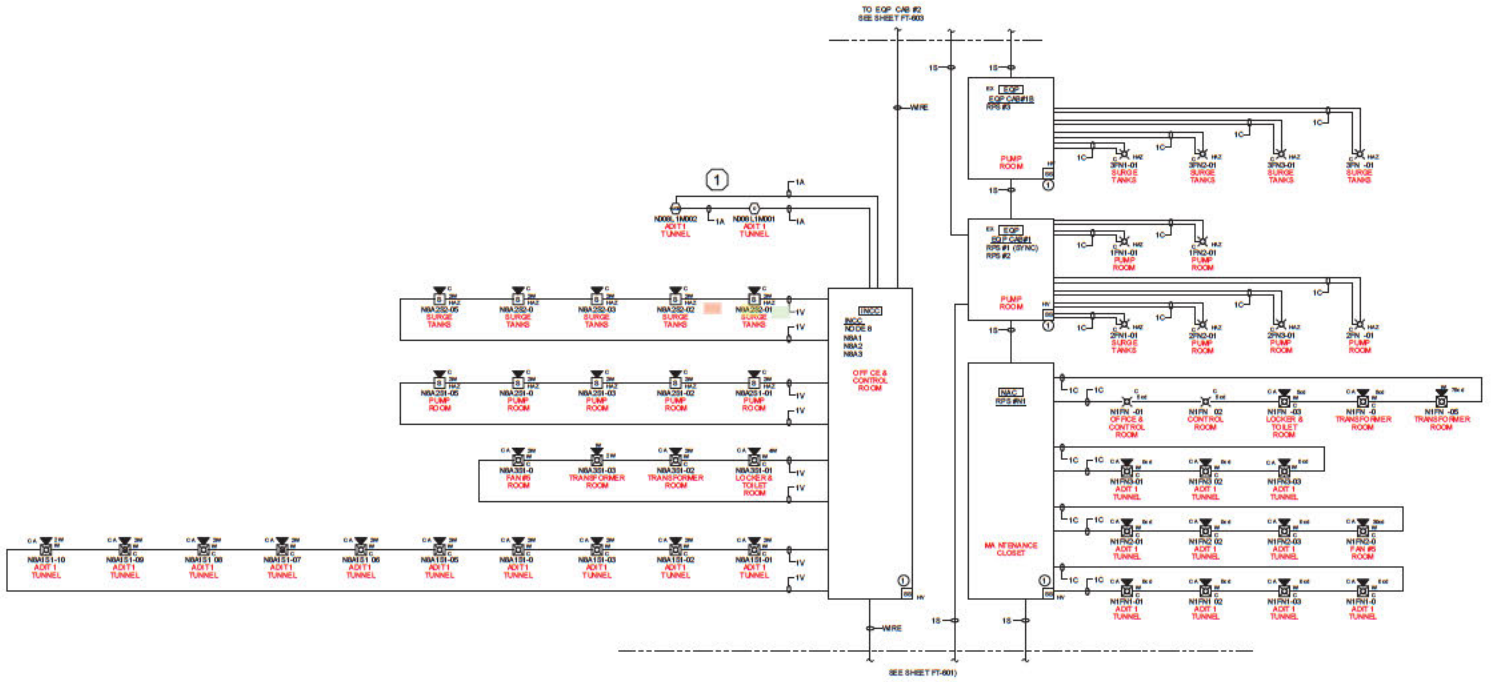
IF SHEET IS LESS THAN 22 X 3 REDUCED PRINT - USE GRAPHIC SCALES

Honeywell FSG

NAVAL FACILITIES ENGINEERING COMMAND
PEARL HARBOR, HAWAII
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION
AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
EQUIPMENT CABINET WIRING DIAGRAM
EQP CAB #46B & 69B - NEMA -3R ENCLOSURE

FT-524


REFERENCE
ADDRESS LABEL CLARIFICATION | SEE SHEET FA0.3
SYSTEM NOTES | SEE SHEET FA0.3
WIRE LEGEND | SEE SHEET FA0.3
FACU #1 | SEE SHEET FT-162.2
FACU #1 | SEE SHEET FT-601
FACU #1 | SEE SHEET FT-620
FACU #6 | SEE SHEET FT-162.2
FACU #6 | SEE SHEET FT-602
FACU #6 | SEE SHEET FT-620
TELL RS THAT FIRE ALARM SYSTEM IS N ALARM
TELL IRS THAT FM-200 OR AFF HAS BEEN RELEASED IN UGPH
TO MONITOR COMMON TROUBLE FROM THE IRS TO THE FIRE ALARM SYSTEM
INTERFACE TO CHEETAH XI PANEL
FROM EQP CAB #39 (SEE SHEET FT-606)
TO INDC (SEE SHEET FT-602)
WIRE
SYNC (SEE SHEET FT-602)
LOOP 2 (SEE SHEET FT-603)
FACU #6 NODE 06 FLAME DETECT ON NGA (NODE #7)
FACU #1 NODE 01
OFFICE & CONTROL ROOM
PNT-01 ADIT 1 TUNNEL
BACK BOX-2 UNIT
NAVFAC HAWAII
NAVAL FACILITIES ENGINEERING COMMAND
PEARL HARBOR, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FIRE ALARM RISER DIAGRAM - NAC & SLC - LOWER PUMP HOUSE
Honeywell FSG
FT-601
THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.
F SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES



1 TO FEDERAL SIGNAL ULTRA VOICE

REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3
EQP CAB #1	SEE SHEET FT-163
EQP CAB #1	SEE SHEET FT-60
EQP CAB #1B	SEE SHEET FT-163
EQP CAB #1B	SEE SHEET FT-605
RPS # N1	SEE SHEET FT-162.2
RPS # N1	SEE SHEET FT-516
INOC	SEE SHEET FT-162.2
INOC	SEE SHEET FT-603
INOC	SEE SHEET FT-620

NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FIRE ALARM RISER DIAGRAM - NAC - UPPER PUMP HOUSE

Honeywell FSG

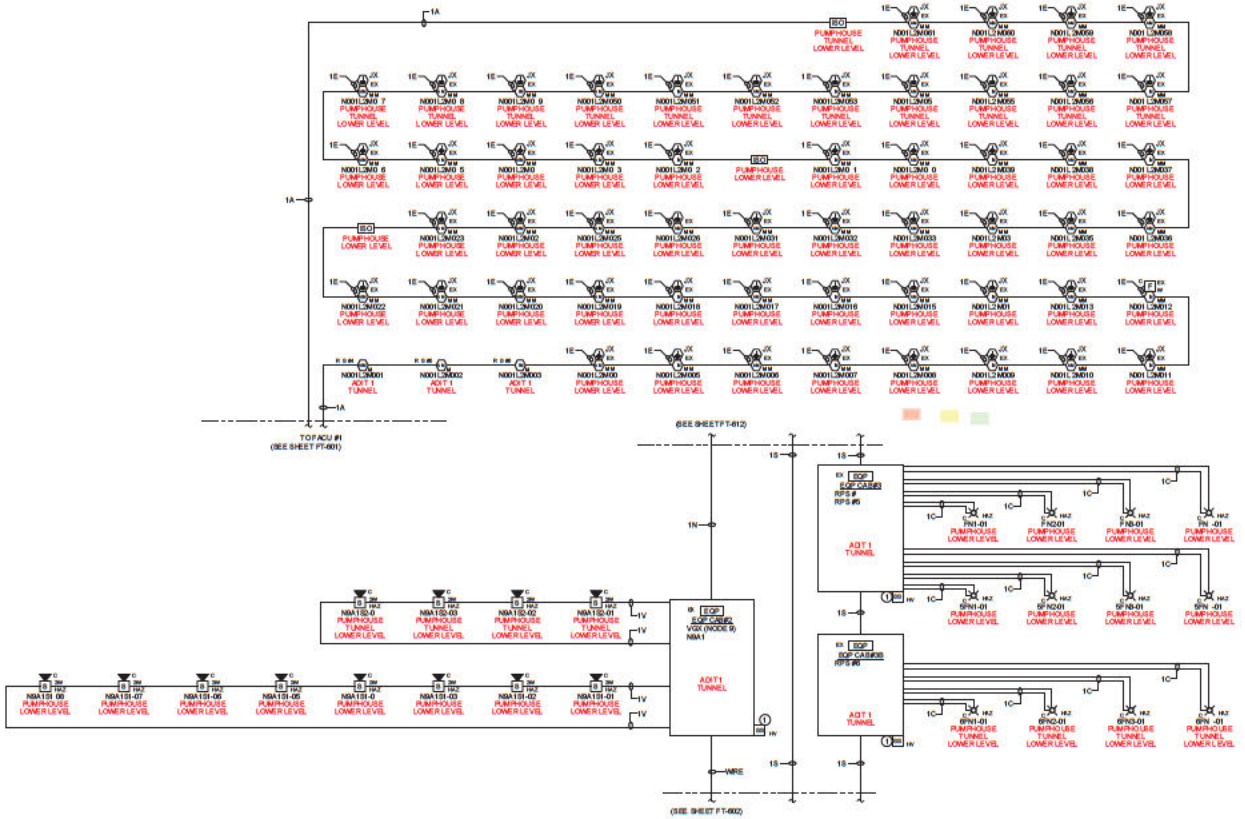
13061 3

FT-602

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 3"
REDUCED PRINT - USE GRAPHIC SCALES

REFERENCE	
ADDRESS LABEL CLARIFICAT ON	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3
EQ P CAB #2	SEE SHEET FT-161
EQ P CAB #2	SEE SHEET FT-606.1
EQ P CAB #2	SEE SHEET FT-620
EQ P CAB #3	SEE SHEET FT-161
EQ P CAB #3	SEE SHEET FT-60
EQ P CAB #38	SEE SHEET FT-161
EQ P CAB #38	SEE SHEET FT-606



Honeywell FSG

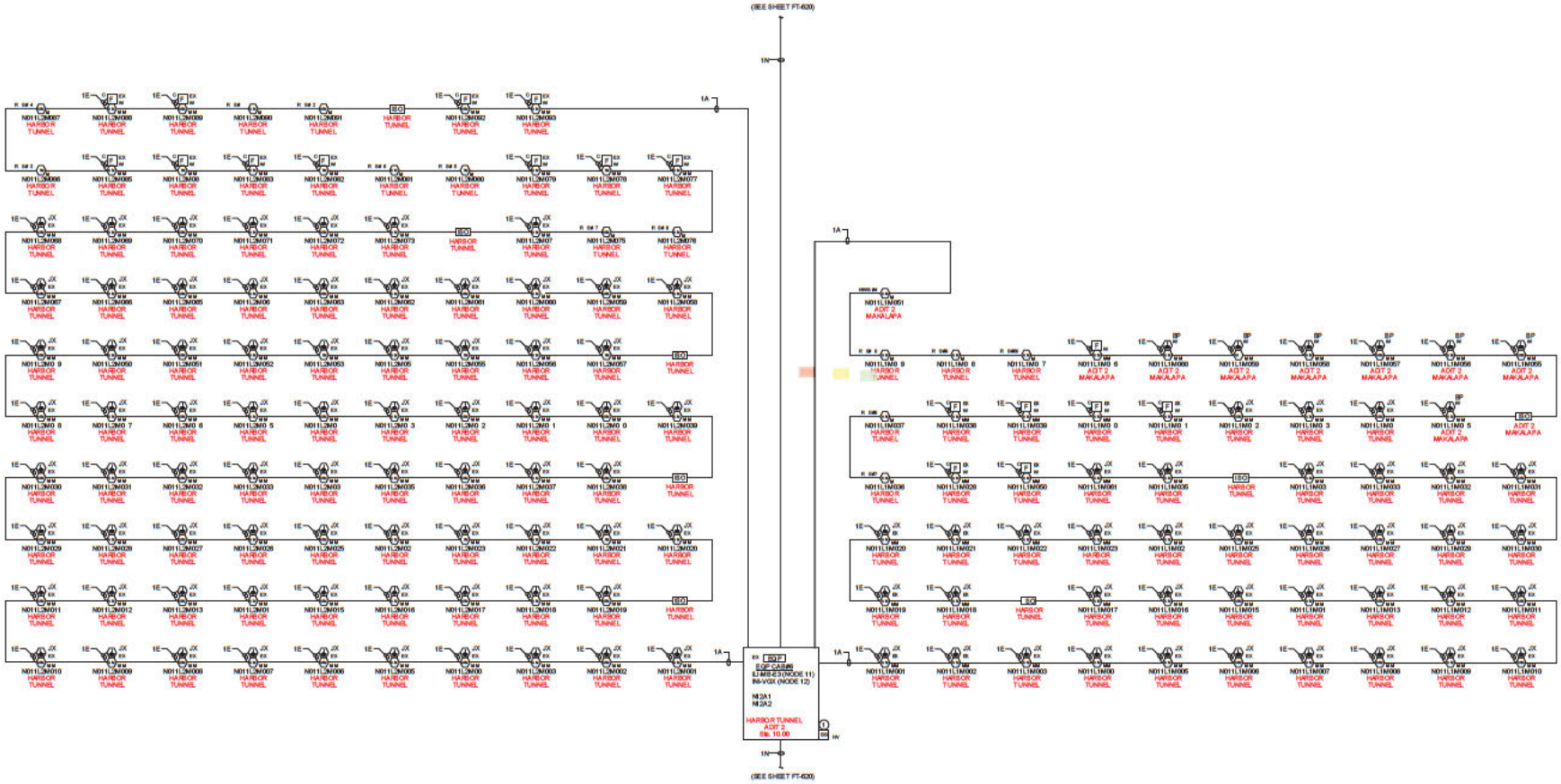
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FIRE ALARM RISER DIAGRAM - SLC - UPPER PUMP HOUSE

13001 3

FT-603

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VAR OUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITH IN THE AVAILABLE SPACE.

F SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES



REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3
EQP CAB #5	SEE SHEET FT-103
EQP CAB #6	SEE SHEET FT-606.2
EQP CAB #9	SEE SHEET FT-612
EQP CAB #8	SEE SHEET FT-620

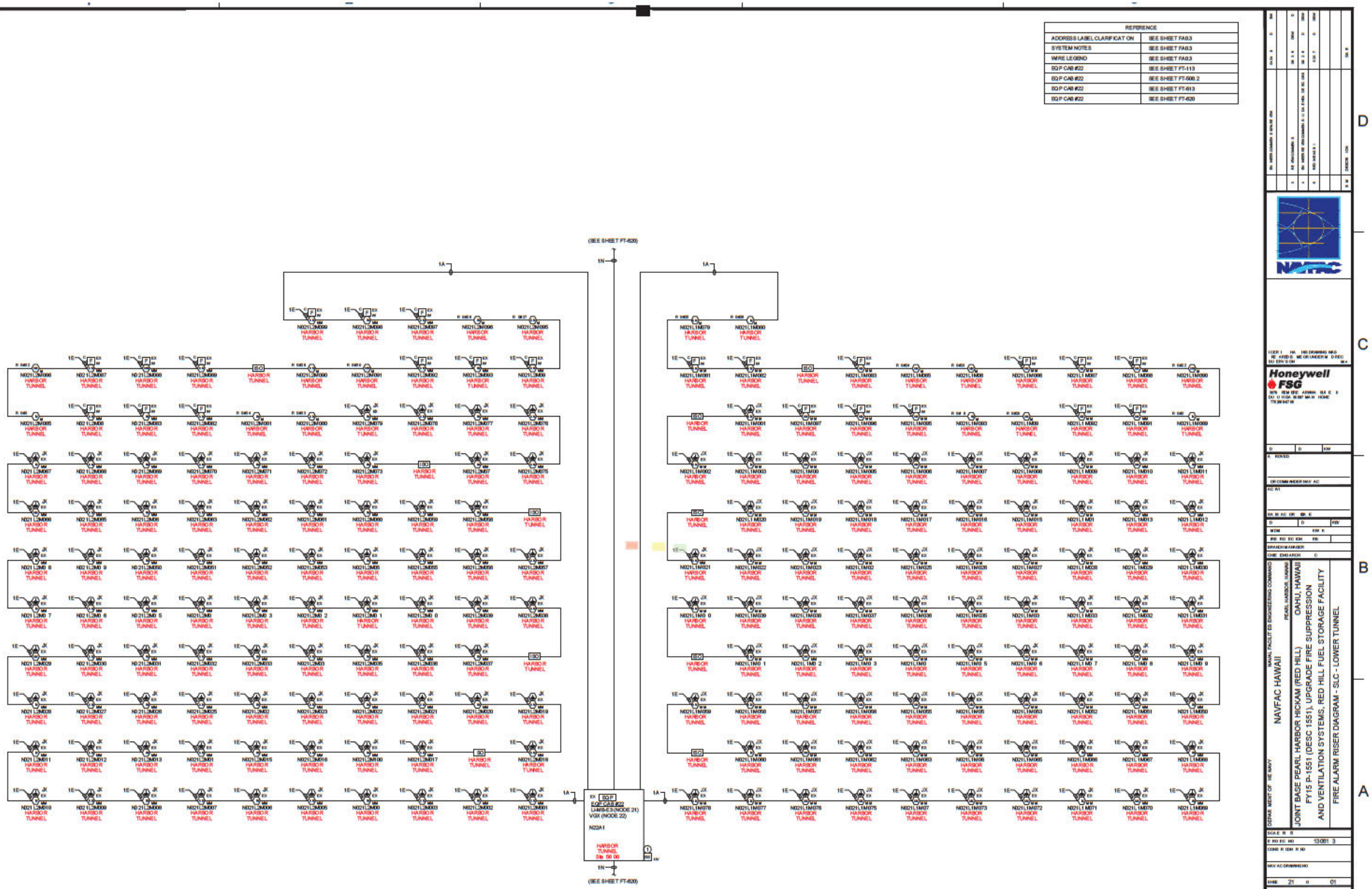
NAVFAC HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551) UPGRADE FIRE SUPPRESSION
AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FIRE ALARM RISER DIAGRAM - SLC - LOWER TUNNEL

FT-604

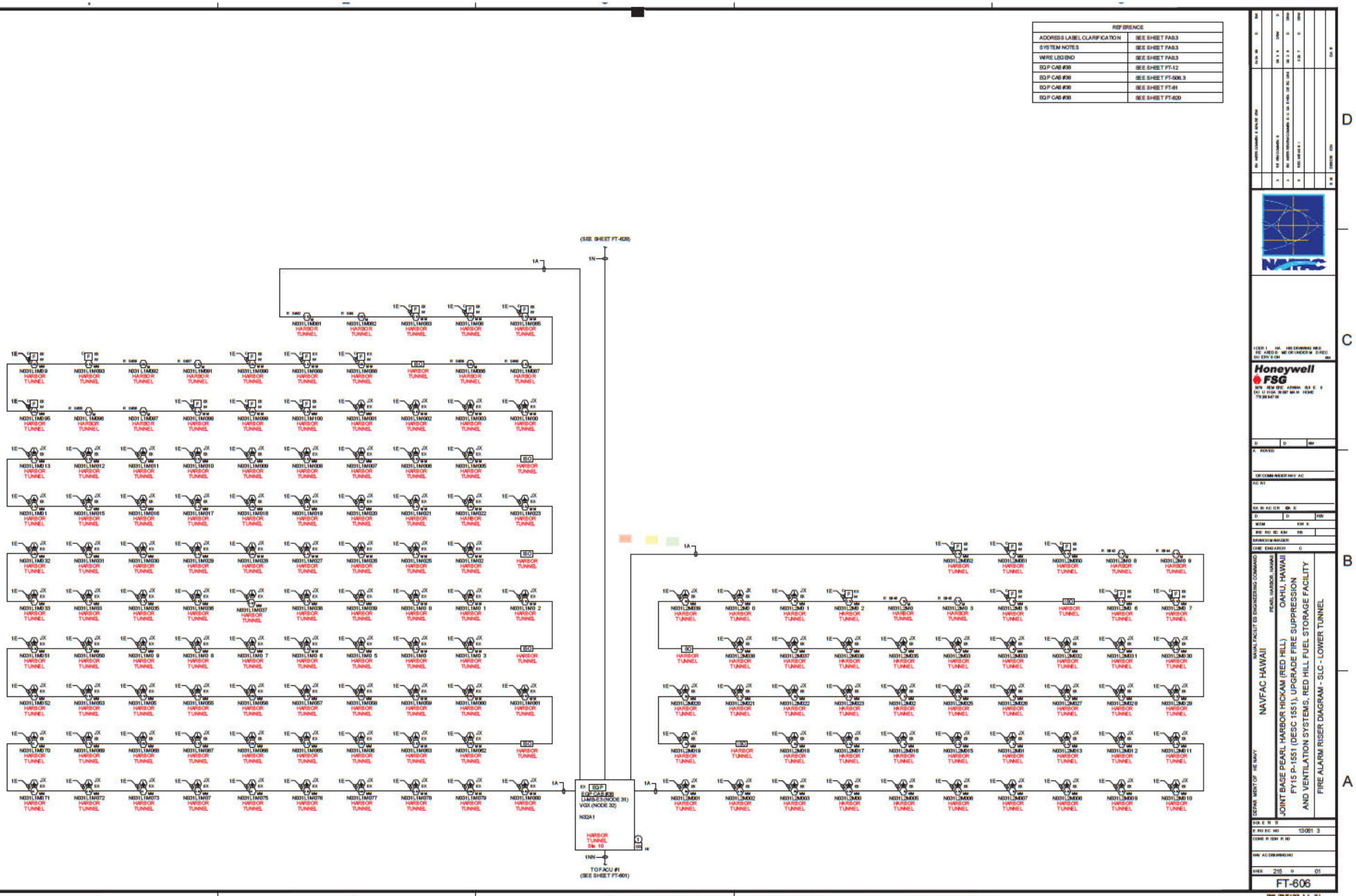
THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22" X 3"
REDUCED PRINT - USE GRAPHIC SCALES



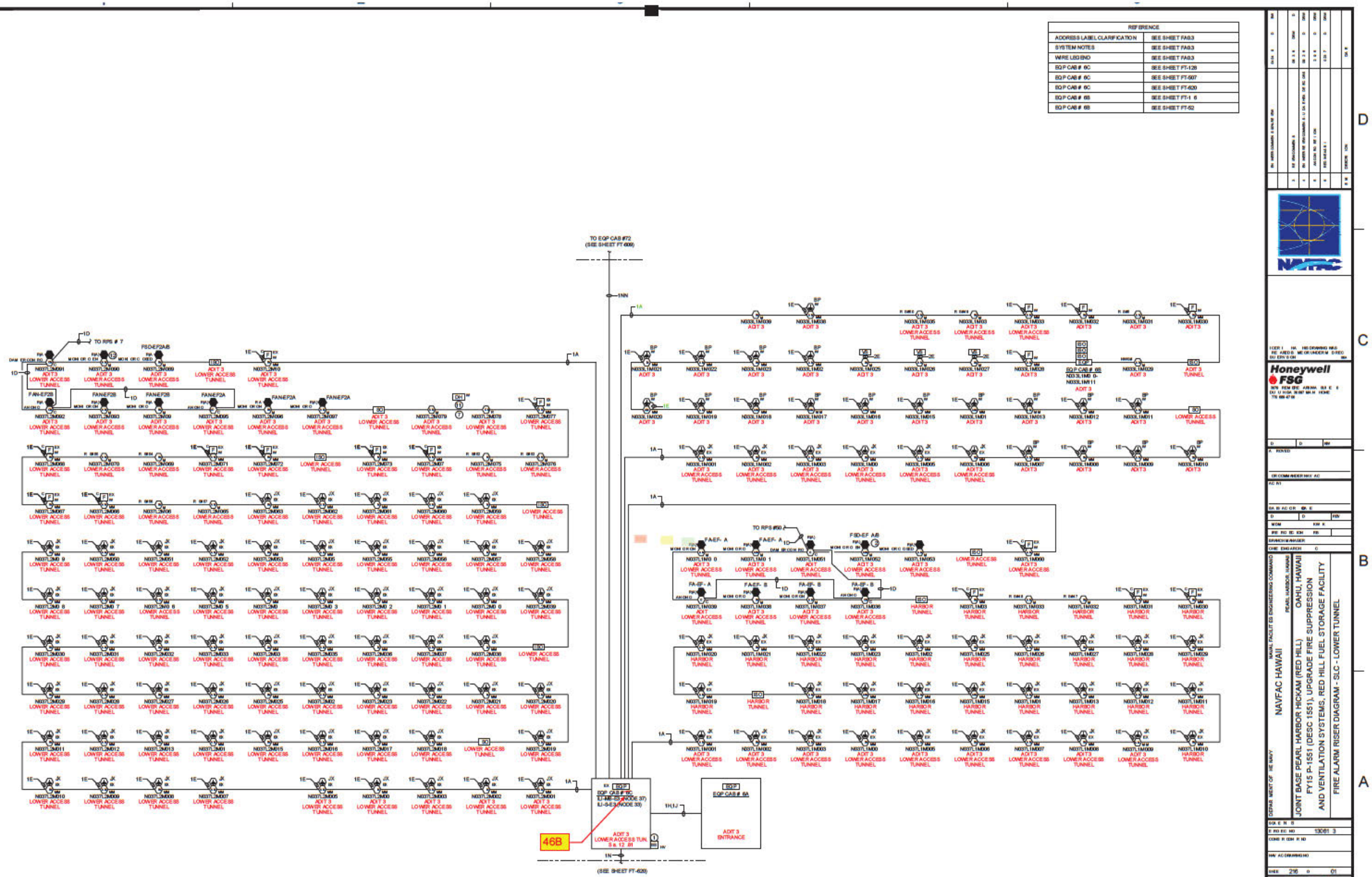
THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

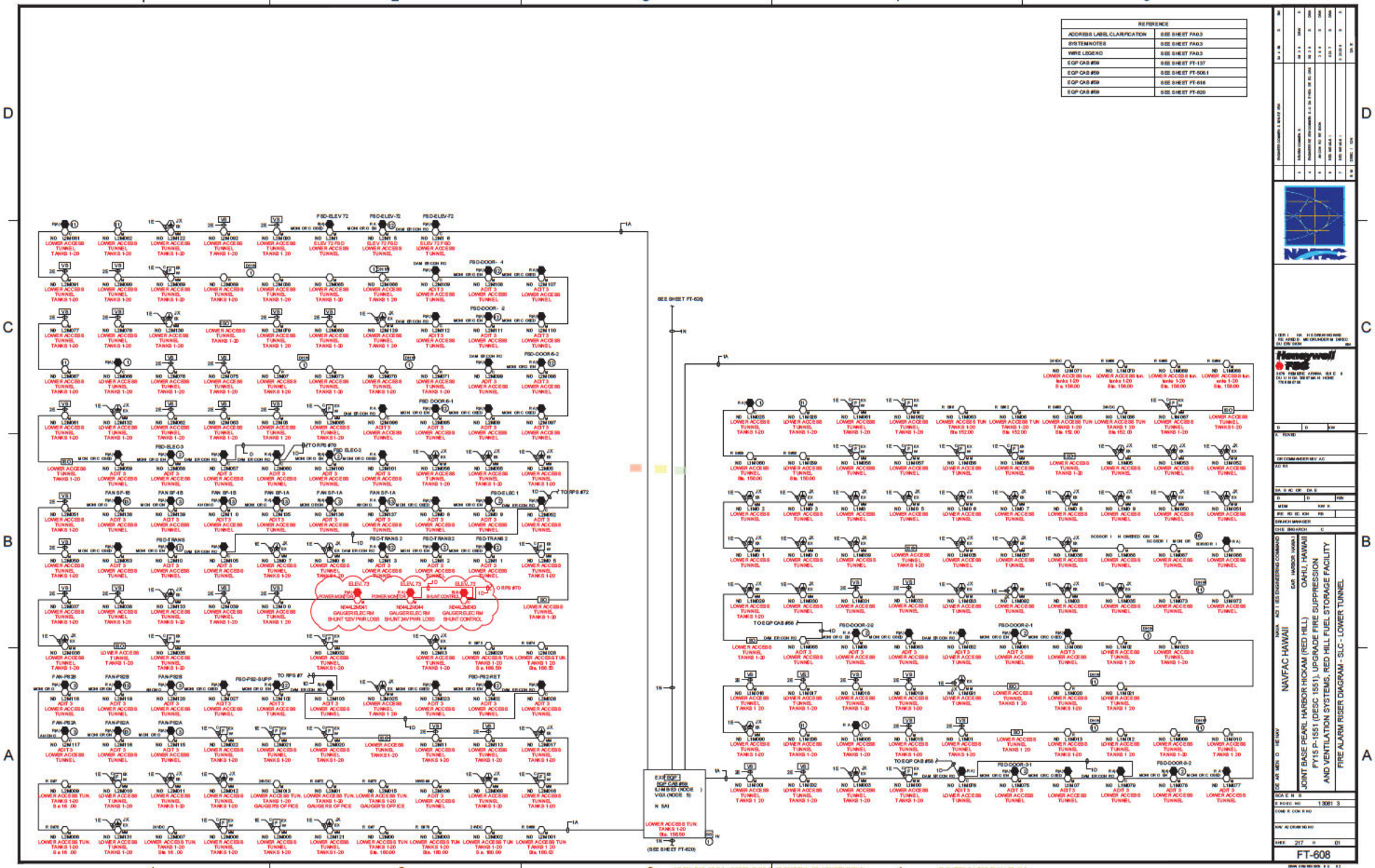
F SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES

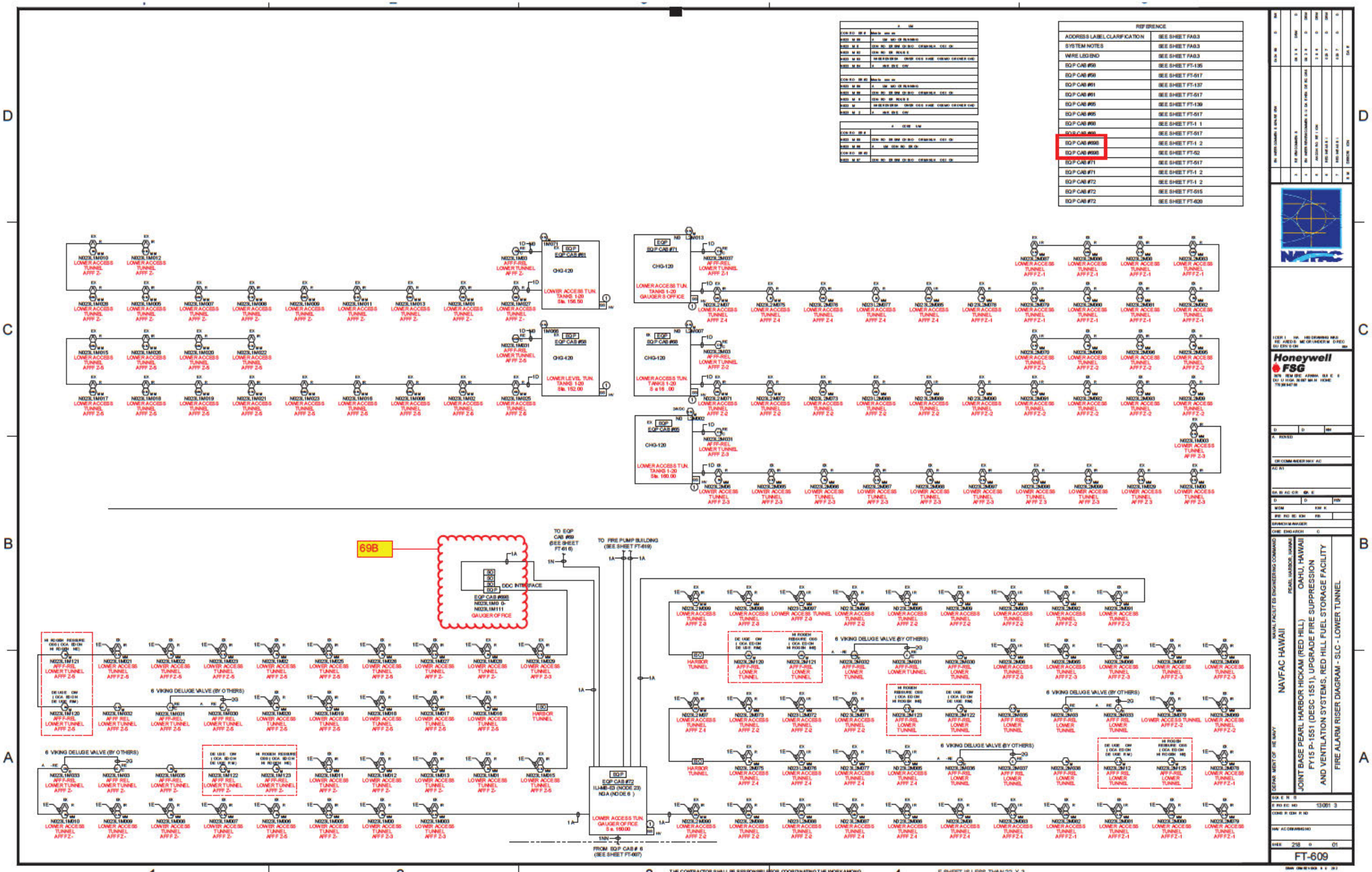


THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

F SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES


REFERENCE
ADDRESS LABEL CLARIFICATION | SEE SHEET FA0.3
SYSTEM NOTES | SEE SHEET FA0.3
WIRE LEGEND | SEE SHEET FA0.3
EQP CAB # 6C | SEE SHEET FT-128
EQP CAB # 6C | SEE SHEET FT-607
EQP CAB # 6C | SEE SHEET FT-620
EQP CAB # 6B | SEE SHEET FT-1 6
EQP CAB # 6B | SEE SHEET FT-62
TO EQP CAB #72 (SEE SHEET FT-609)
TO RPS # 7
TO RPS #50
FSDEF2AB
FANEF2B
FANEF2A
FAN-EF2B
FA-EF- A
FA-EF- B
FSD-EF AB
EQP CAB # 6C
EQP CAB # 6A
ADIT 3 LOWER ACCESS TUN S & TJ R1
ADIT 3 ENTRANCE
46B
(SEE SHEET FT-620)
Honeywell
FSG
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FIRE ALARM RISER DIAGRAM - SLC - LOWER TUNNEL
FT-607
THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VAR OUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITH IN THE AVAILABLE SPACE.
F SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES


REFERENCE
ADDRESS LABEL CLARIFICATION
SYSTEM NOTES
WIRE LEGEND
EQP CAB #59
EQP CAB #59
EQP CAB #59
EQP CAB #59
SEE SHEET FA0.3
SEE SHEET FA0.3
SEE SHEET FA0.3
SEE SHEET FT-137
SEE SHEET FT-506.1
SEE SHEET FT-616
SEE SHEET FT-620
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION
AND VENTILATION SYSTEMS; RED HILL FUEL STORAGE FACILITY
FIRE ALARM RISER DIAGRAM - SLC - LOWER TUNNEL
FT-608
SEE SHEET FT-620
(SEE SHEET FT-620)
IF SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES



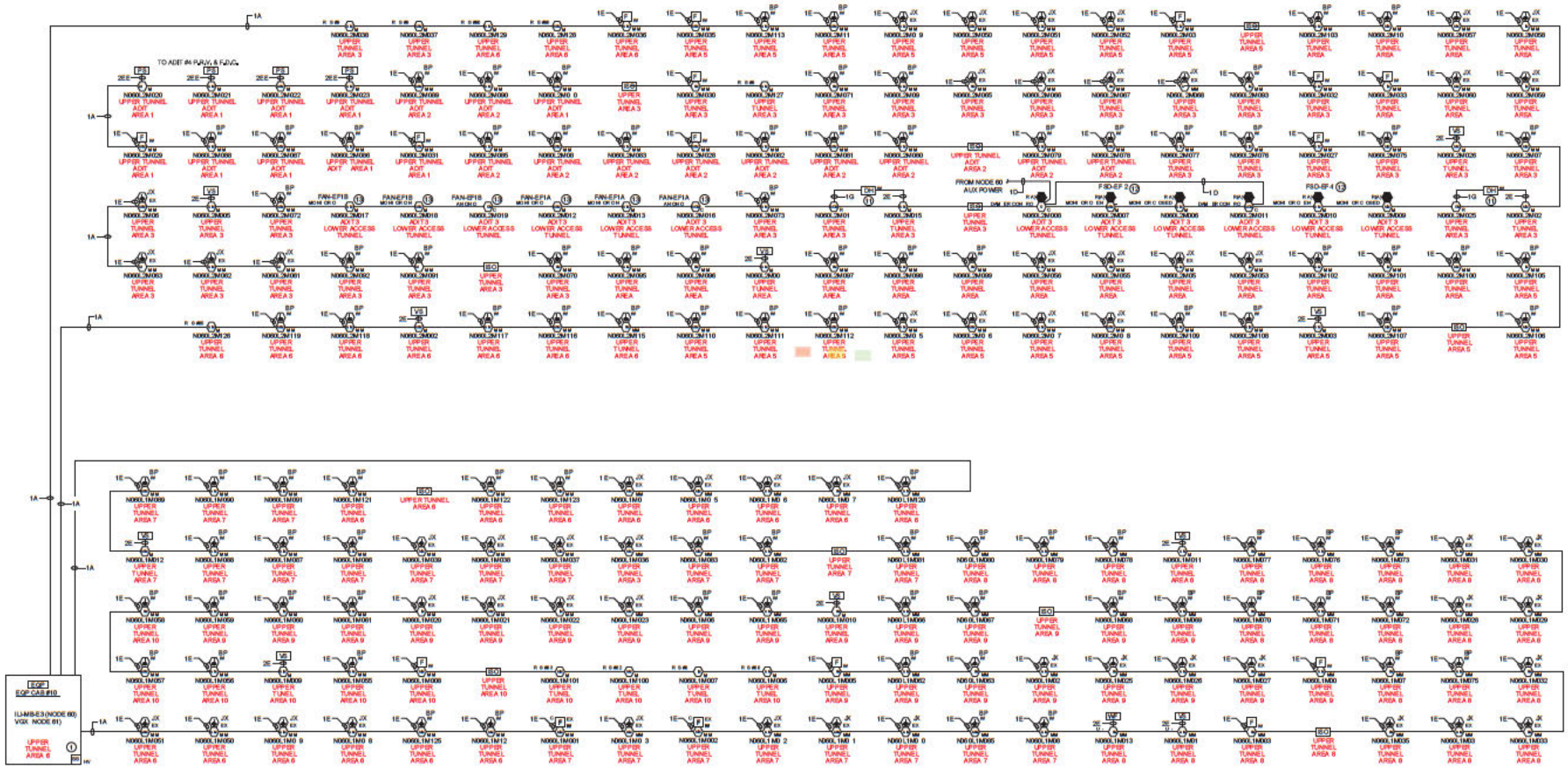
REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3
EQ P CAB #59	SEE SHEET FT-135
EQ P CAB #59	SEE SHEET FT-617
EQ P CAB #59	SEE SHEET FT-137
EQ P CAB #61	SEE SHEET FT-617
EQ P CAB #65	SEE SHEET FT-139
EQ P CAB #65	SEE SHEET FT-617
EQ P CAB #69	SEE SHEET FT-1 1
EQ P CAB #69	SEE SHEET FT-617
EQ P CAB #696	SEE SHEET FT-1 2
EQ P CAB #696	SEE SHEET FT-52
EQ P CAB #71	SEE SHEET FT-617
EQ P CAB #71	SEE SHEET FT-1 2
EQ P CAB #72	SEE SHEET FT-1 2
EQ P CAB #72	SEE SHEET FT-615
EQ P CAB #72	SEE SHEET FT-620

NAVFAC HAWAII
PEARL HARBOR, HAWAII
OAHU, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FIRE ALARM RISER DIAGRAM - SLC - LOWER TUNNEL
13091 3
FT-609

Honeywell FSG

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES



REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3
EQ P CAB #10	SEE SHEET FT-151 1
EQ P CAB #10	SEE SHEET FT-511
EQ P CAB #10	SEE SHEET FT-611
EQ P CAB #10	SEE SHEET FT-618
EQ P CAB #10	SEE SHEET FT-620

Honeywell
FSG

NAVFAC HAWAII
NAVAL FACILITY ENGINEERING COMMAND
PEARL HARBOR, HAWAII

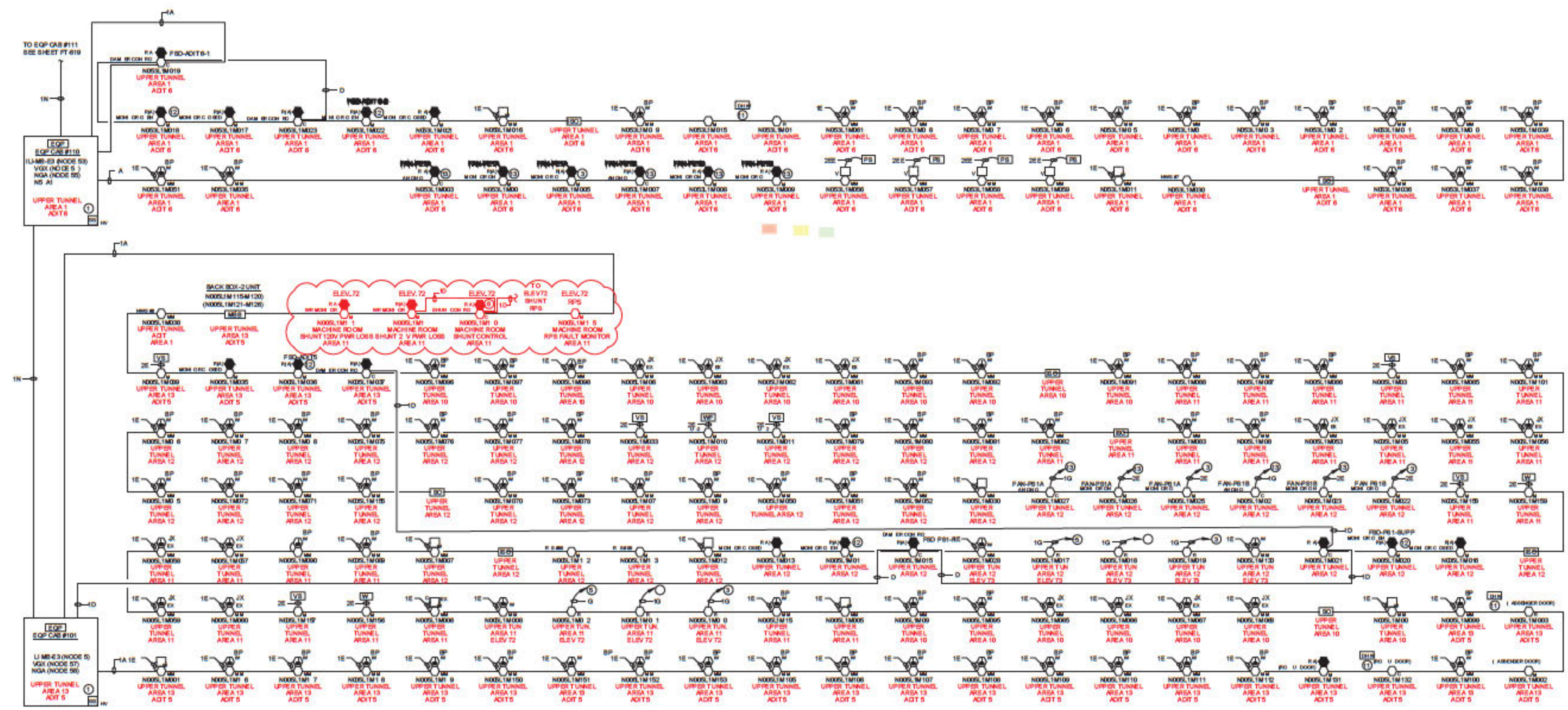
OAHU, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION
AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FIRE ALARM RISER DIAGRAM - SLC - UPPER TUNNEL

FT-610

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

F SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES

REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3
EQP CAB #101	SEE SHEET FT-158
EQP CAB #101	SEE SHEET FT-510
EQP CAB #101	SEE SHEET FT-620
EQP CAB #101	SEE SHEET FT-618
EQP CAB #110	SEE SHEET FT-159
EQP CAB #110	SEE SHEET FT-509
EQP CAB #110	SEE SHEET FT-618
EQP CAB #110	SEE SHEET FT-620



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REDUCED PRINT - USE GRAPHIC SCALES

DEPARTMENT OF HE NAVY
NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC HAWAII
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION
AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
WD.85;FIRE ALARM RISER DIAGRAM - SLC - UPPER TUNNEL

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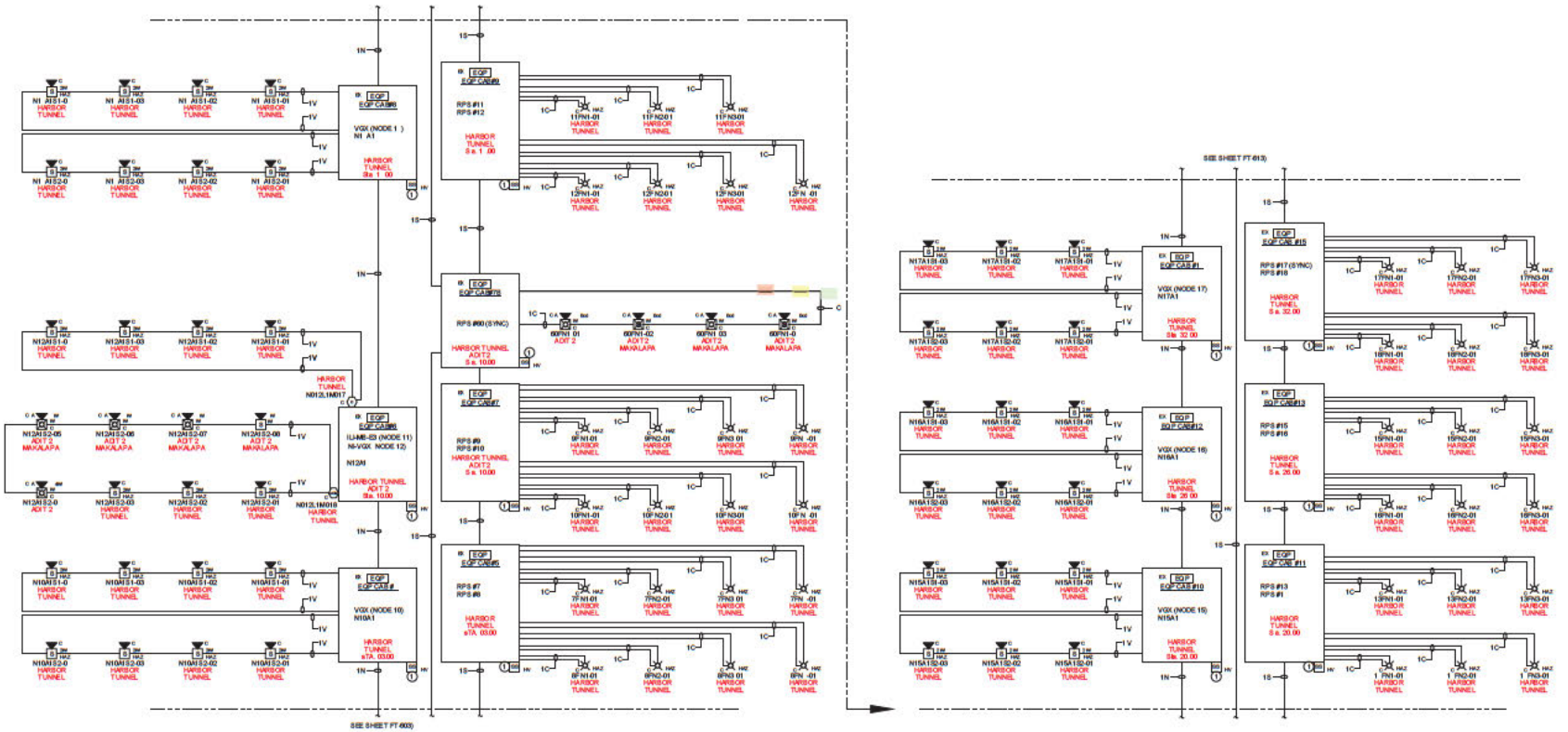
SHEE 220 o 01

FT-611



REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA03
SYSTEM NOTES	SEE SHEET FA03
WIRE LEGEND	SEE SHEET FA03
EQP CAB #	SEE SHEET FT-401
EQP CAB #	SEE SHEET FT-606.1
EQP CAB #	SEE SHEET FT-620
EQP CAB #5	SEE SHEET FT-401
EQP CAB #5	SEE SHEET FT-60
EQP CAB #6	SEE SHEET FT-403
EQP CAB #6	SEE SHEET FT-606
EQP CAB #6	SEE SHEET FT-60
EQP CAB #6	SEE SHEET FT-620
EQP CAB #7	SEE SHEET FT-403
EQP CAB #7	SEE SHEET FT-60
EQP CAB #8	SEE SHEET FT-40
EQP CAB #8	SEE SHEET FT-606.1
EQP CAB #8	SEE SHEET FT-620
EQP CAB #9	SEE SHEET FT-40
EQP CAB #9	SEE SHEET FT-60

REFERENCE	
EQP CAB #10	SEE SHEET FT-105
EQP CAB #10	SEE SHEET FT-606.1
EQP CAB #10	SEE SHEET FT-620
EQP CAB #11	SEE SHEET FT-105
EQP CAB #11	SEE SHEET FT-60
EQP CAB #12	SEE SHEET FT-107
EQP CAB #12	SEE SHEET FT-606.1
EQP CAB #12	SEE SHEET FT-620
EQP CAB #13	SEE SHEET FT-107
EQP CAB #13	SEE SHEET FT-60
EQP CAB #1	SEE SHEET FT-108
EQP CAB #1	SEE SHEET FT-606.1
EQP CAB #1	SEE SHEET FT-620
EQP CAB #15	SEE SHEET FT-109
EQP CAB #15	SEE SHEET FT-60

NAVFAC HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551) UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FIRE ALARM RISER DIAGRAM - NAC - LOWER TUNNEL

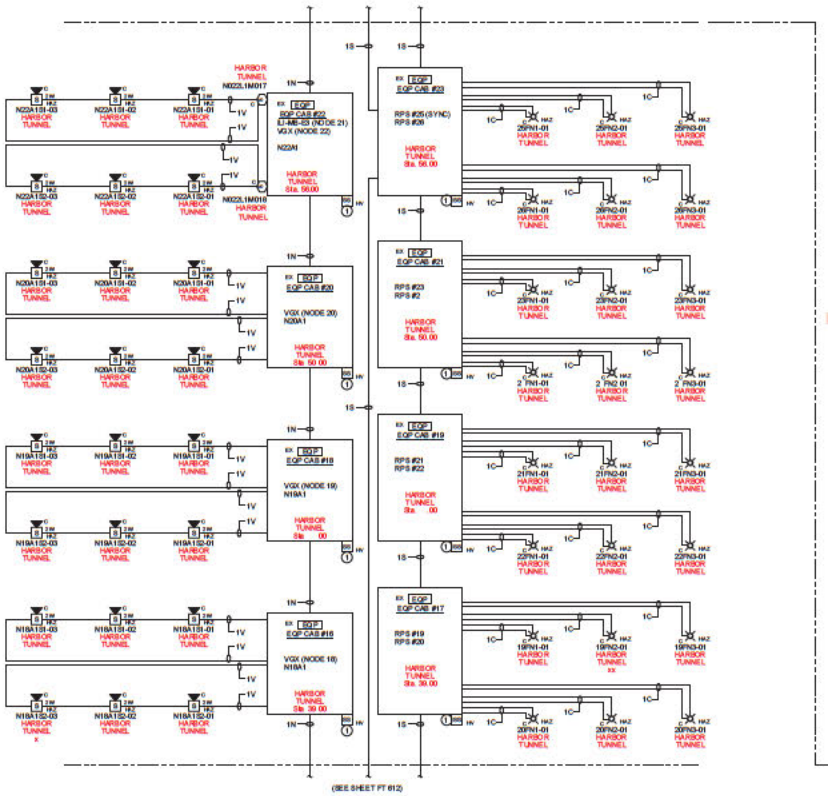
FT-612

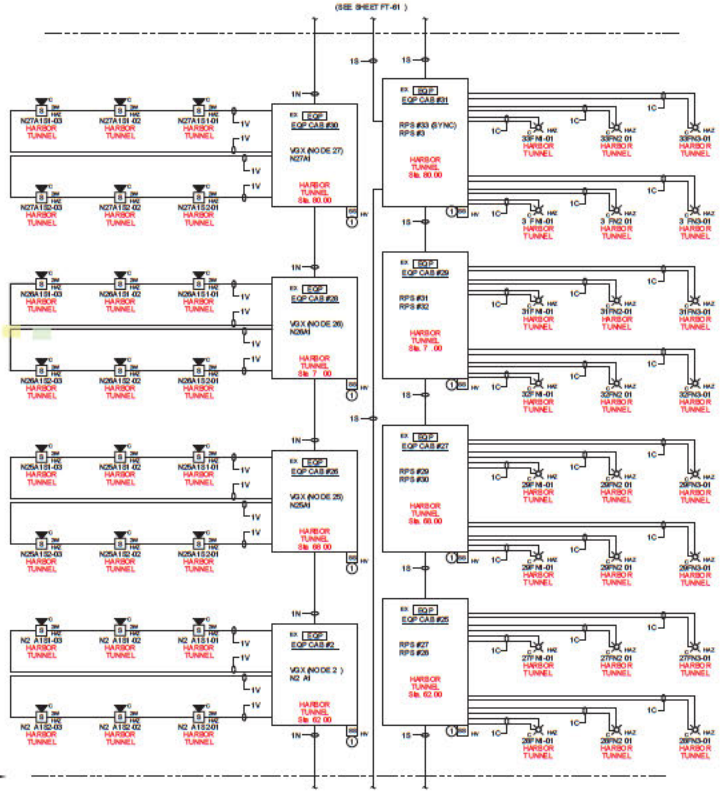
THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES

REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA03
SYSTEM NOTES	SEE SHEET FA03
WIRE LEGEND	SEE SHEET FA03
EQP CAB #16	SEE SHEET FT-410
EQP CAB #16	SEE SHEET FT-606.1
EQP CAB #16	SEE SHEET FT-620
EQP CAB #17	SEE SHEET FT-410
EQP CAB #17	SEE SHEET FT-60
EQP CAB #18	SEE SHEET FT-411
EQP CAB #18	SEE SHEET FT-606.1
EQP CAB #18	SEE SHEET FT-620
EQP CAB #19	SEE SHEET FT-411
EQP CAB #19	SEE SHEET FT-60
EQP CAB #20	SEE SHEET FT-412
EQP CAB #20	SEE SHEET FT-606.1
EQP CAB #20	SEE SHEET FT-620
EQP CAB #21	SEE SHEET FT-412
EQP CAB #21	SEE SHEET FT-60
EQP CAB #22	SEE SHEET FT-413
EQP CAB #22	SEE SHEET FT-606.2
EQP CAB #22	SEE SHEET FT-605
EQP CAB #22	SEE SHEET FT-620
EQP CAB #23	SEE SHEET FT-413
EQP CAB #23	SEE SHEET FT-60

REFERENCE	
EQP CAB #2	SEE SHEET FT-115
EQP CAB #2	SEE SHEET FT-606.1
EQP CAB #2	SEE SHEET FT-620
EQP CAB #25	SEE SHEET FT-115
EQP CAB #25	SEE SHEET FT-60
EQP CAB #26	SEE SHEET FT-116
EQP CAB #26	SEE SHEET FT-606.1
EQP CAB #26	SEE SHEET FT-620
EQP CAB #27	SEE SHEET FT-116
EQP CAB #27	SEE SHEET FT-60
EQP CAB #28	SEE SHEET FT-117
EQP CAB #28	SEE SHEET FT-606.1
EQP CAB #28	SEE SHEET FT-620
EQP CAB #29	SEE SHEET FT-117
EQP CAB #29	SEE SHEET FT-60
EQP CAB #30	SEE SHEET FT-118
EQP CAB #30	SEE SHEET FT-606.1
EQP CAB #30	SEE SHEET FT-620
EQP CAB #31	SEE SHEET FT-118
EQP CAB #31	SEE SHEET FT-60





THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

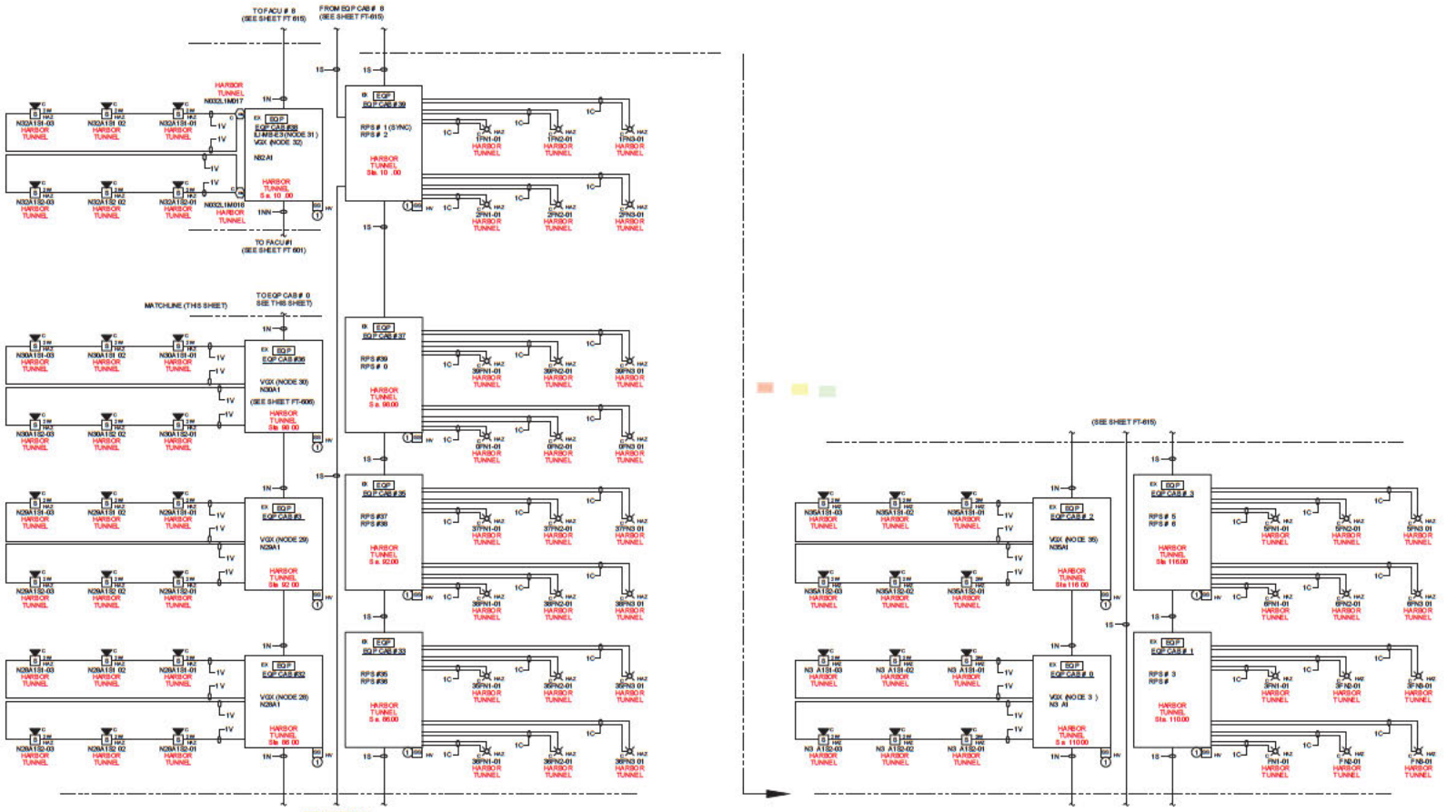
F SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES

NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 15551) UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FIRE ALARM RISER DIAGRAM - NAC - LOWER TUNNEL

FT-613

REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3
EQP CAB #32	SEE SHEET FT-420
EQP CAB #32	SEE SHEET FT-606.1
EQP CAB #32	SEE SHEET FT-620
EQP CAB #33	SEE SHEET FT-420
EQP CAB #33	SEE SHEET FT-60
EQP CAB #3	SEE SHEET FT-421
EQP CAB #3	SEE SHEET FT-606.1
EQP CAB #3	SEE SHEET FT-620
EQP CAB #35	SEE SHEET FT-421
EQP CAB #35	SEE SHEET FT-60
EQP CAB #36	SEE SHEET FT-422
EQP CAB #36	SEE SHEET FT-606.1
EQP CAB #36	SEE SHEET FT-620
EQP CAB #37	SEE SHEET FT-422
EQP CAB #37	SEE SHEET FT-60

REFERENCE	
EQP CAB #38	SEE SHEET FT-12
EQP CAB #38	SEE SHEET FT-606.3
EQP CAB #38	SEE SHEET FT-606
EQP CAB #38	SEE SHEET FT-620
EQP CAB #39	SEE SHEET FT-12
EQP CAB #39	SEE SHEET FT-60
EQP CAB # 0	SEE SHEET FT-125
EQP CAB # 0	SEE SHEET FT-606.1
EQP CAB # 0	SEE SHEET FT-620
EQP CAB # 1	SEE SHEET FT-125
EQP CAB # 1	SEE SHEET FT-60
EQP CAB # 2	SEE SHEET FT-126
EQP CAB # 2	SEE SHEET FT-606.1
EQP CAB # 2	SEE SHEET FT-620
EQP CAB # 3	SEE SHEET FT-126
EQP CAB # 3	SEE SHEET FT-60



THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

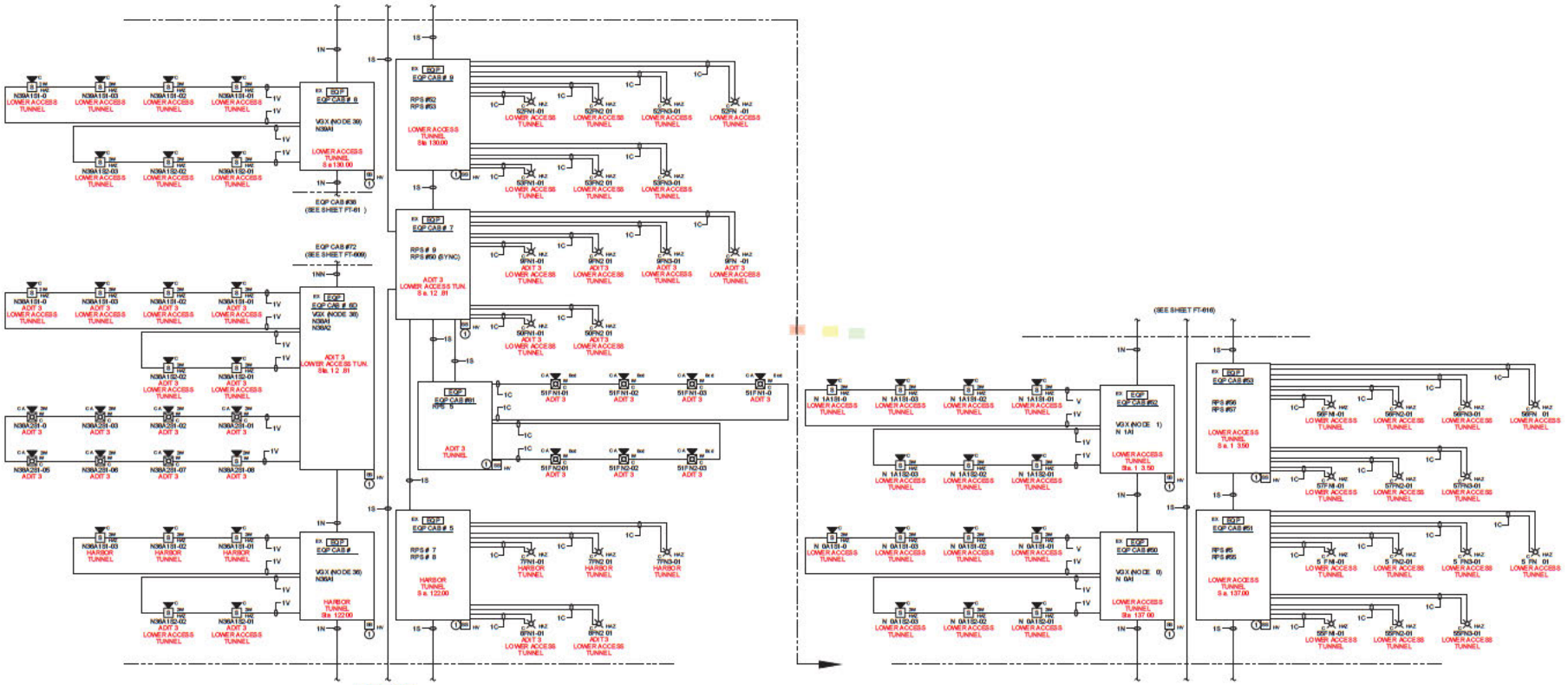
F SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES

NAVFAC HAWAII
NAVAL FACILITIES ENGINEERING COMMAND
PEARL HARBOR, HAWAII
DEPARTMENT OF THE NAVY

JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FIRE ALARM RISER DIAGRAM - NAC - LOWER TUNNEL

13091 3

FT-614



REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA03
SYSTEM NOTES	SEE SHEET FA03
WIRE LEGEND	SEE SHEET FA03
EQP CAB #	SEE SHEET FT-427
EQP CAB #	SEE SHEET FT-606.1
EQP CAB #	SEE SHEET FT-620
EQP CAB # 5	SEE SHEET FT-427
EQP CAB # 5	SEE SHEET FT-60
EQP CAB # 6D	SEE SHEET FT-428
EQP CAB # 6D	SEE SHEET FT-607.2
EQP CAB # 6D	SEE SHEET FT-620
EQP CAB # 7	SEE SHEET FT-428
EQP CAB # 7	SEE SHEET FT-60
EQP CAB # 8	SEE SHEET FT-429
EQP CAB # 8	SEE SHEET FT-606.1
EQP CAB # 8	SEE SHEET FT-620

REFERENCE	
EQP CAB # 9	SEE SHEET FT-129
EQP CAB # 9	SEE SHEET FT-60
EQP CAB #50	SEE SHEET FT-131
EQP CAB #50	SEE SHEET FT-606.1
EQP CAB #50	SEE SHEET FT-620
EQP CAB #51	SEE SHEET FT-131
EQP CAB #51	SEE SHEET FT-60
EQP CAB #52	SEE SHEET FT-132
EQP CAB #52	SEE SHEET FT-606.1
EQP CAB #52	SEE SHEET FT-620
EQP CAB #53	SEE SHEET FT-132
EQP CAB #53	SEE SHEET FT-60
EQP CAB #91	SEE SHEET FT-1 5
EQP CAB #91	SEE SHEET FT-516

NAVFAC HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551) UPGRADE FIRE SUPPRESSION
AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FIRE ALARM RISER DIAGRAM - NAC - LOWER TUNNEL

FT-615

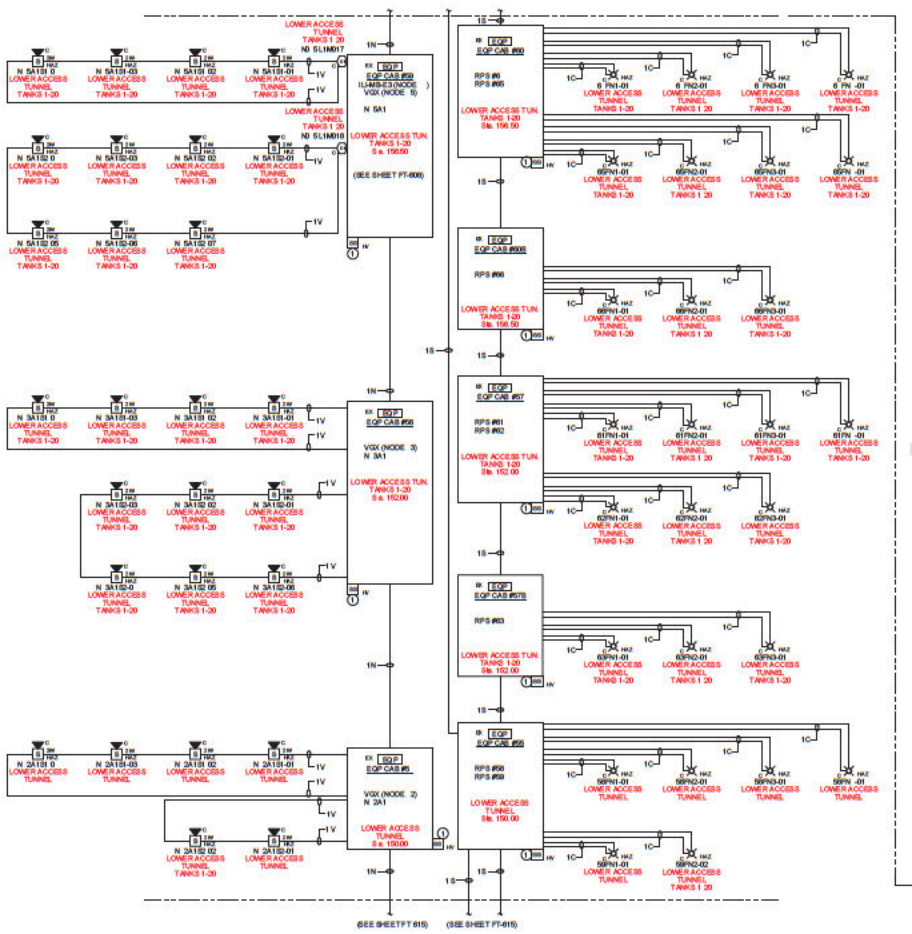
THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

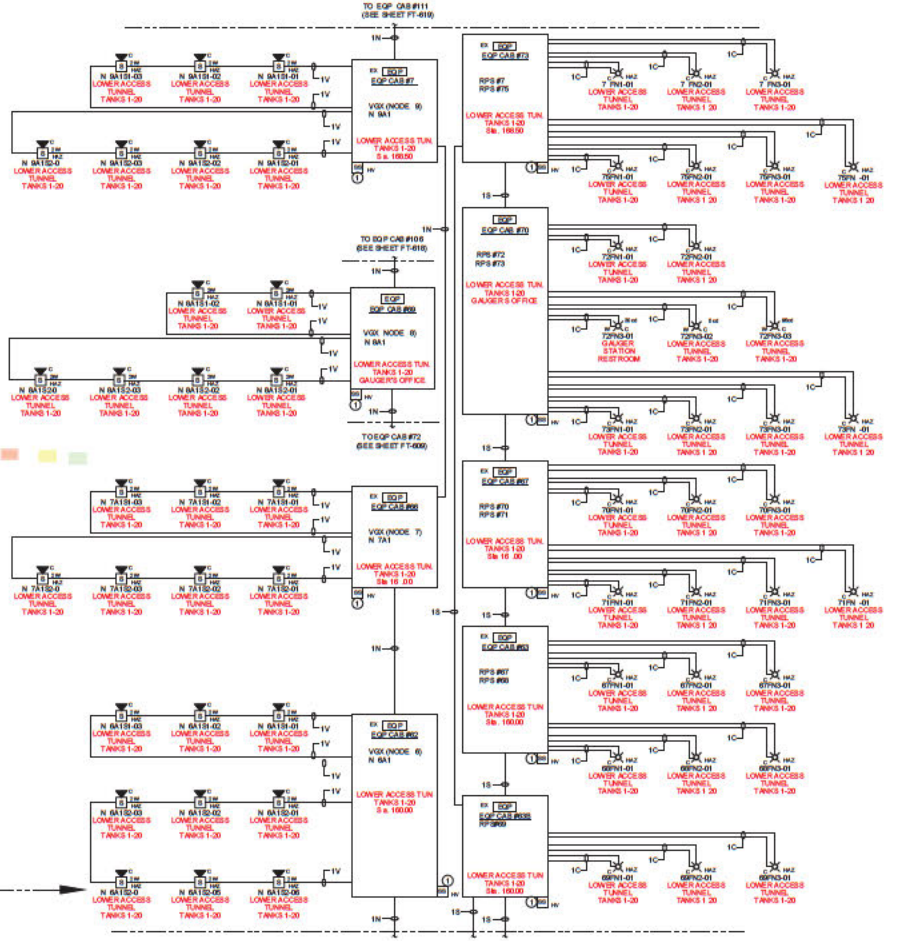
IF SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES

REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FT-NO. 3
SYSTEM NOTES	SEE SHEET FT-NO. 3
WIRE LEGEND	SEE SHEET FT-NO. 3
EQP CAB #5	SEE SHEET FT-13
EQP CAB #5	SEE SHEET FT-506.1
EQP CAB #5	SEE SHEET FT-620
EQP CAB #55	SEE SHEET FT-13
EQP CAB #55	SEE SHEET FT-50
EQP CAB #56	SEE SHEET FT-135
EQP CAB #56	SEE SHEET FT-506.1
EQP CAB #56	SEE SHEET FT-620
EQP CAB #57	SEE SHEET FT-135
EQP CAB #57	SEE SHEET FT-50
EQP CAB #57/8	SEE SHEET FT-135
EQP CAB #57/8	SEE SHEET FT-505

REFERENCE	
EQP CAB #59	SEE SHEET FT-437
EQP CAB #59	SEE SHEET FT-60.1
EQP CAB #59	SEE SHEET FT-60.5
EQP CAB #59	SEE SHEET FT-620
EQP CAB #60	SEE SHEET FT-437
EQP CAB #60	SEE SHEET FT-60
EQP CAB #60/3	SEE SHEET FT-437
EQP CAB #60/3	SEE SHEET FT-60.5
EQP CAB #62	SEE SHEET FT-439
EQP CAB #62	SEE SHEET FT-60.1
EQP CAB #62	SEE SHEET FT-620
EQP CAB #63	SEE SHEET FT-439
EQP CAB #63	SEE SHEET FT-60
EQP CAB #63/8	SEE SHEET FT-439
EQP CAB #63/8	SEE SHEET FT-60.5

REFERENCE	
EQP CAB #66	SEE SHEET FT-1 1
EQP CAB #66	SEE SHEET FT-506.1
EQP CAB #66	SEE SHEET FT-620
EQP CAB #67	SEE SHEET FT-1 1
EQP CAB #67	SEE SHEET FT-60
EQP CAB #69	SEE SHEET FT-1 2
EQP CAB #69	SEE SHEET FT-518
EQP CAB #69	SEE SHEET FT-620
EQP CAB #70	SEE SHEET FT-1 2
EQP CAB #70	SEE SHEET FT-512
EQP CAB #73	SEE SHEET FT-1 3
EQP CAB #73	SEE SHEET FT-50
EQP CAB #7	SEE SHEET FT-1 3
EQP CAB #7	SEE SHEET FT-506.1
EQP CAB #7	SEE SHEET FT-620





THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

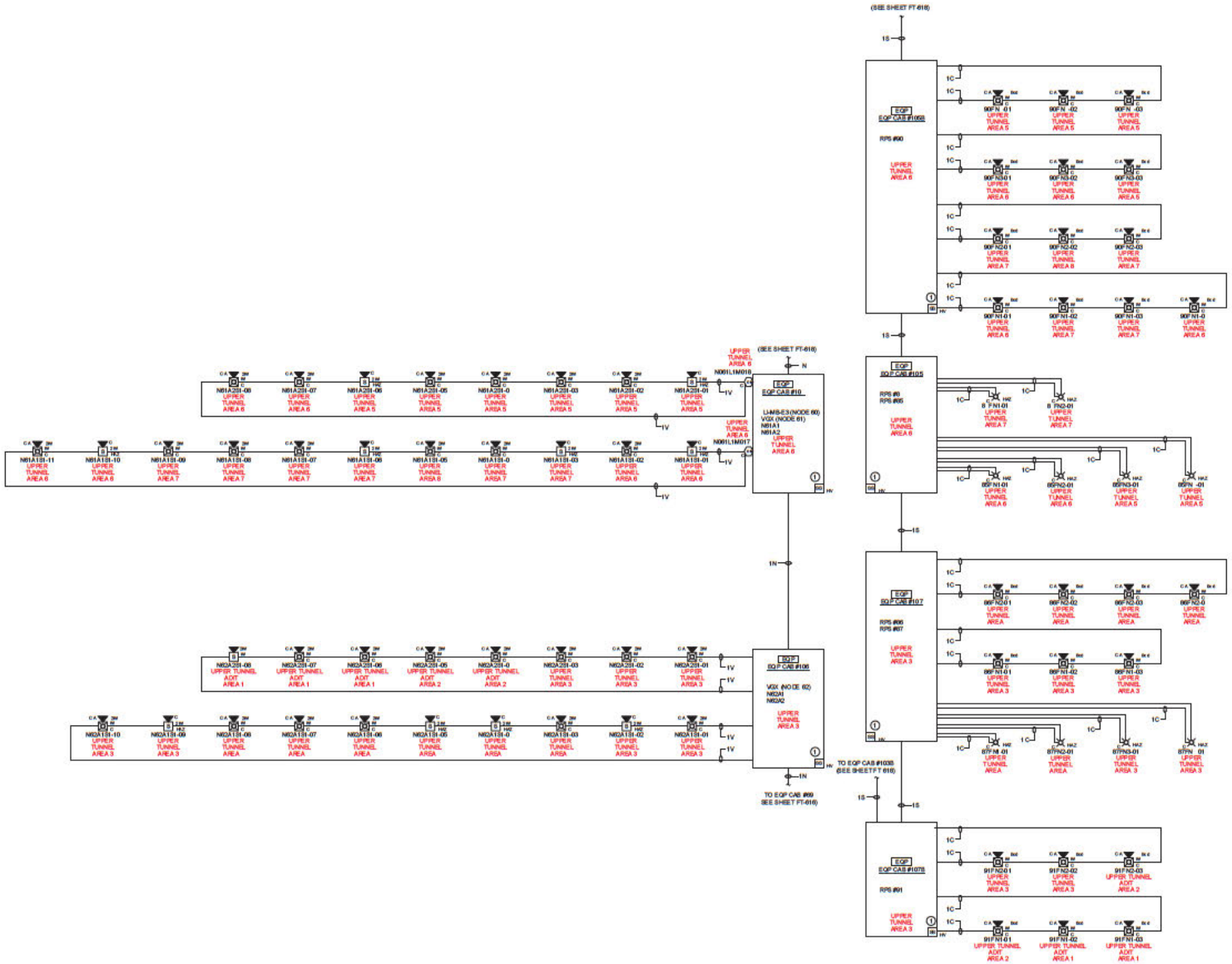
F SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES

Honeywell FSG

NAVFAC HAWAII
PEARL HARBOR, HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551) UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FIRE ALARM RISER DIAGRAM - NAC - LOWER TUNNEL

FT-616



REFERENCE	
ADDRESS LABEL CLARIFICAT ON	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3
EQ P CAB #10	SEE SHEET FT-151.1
EQ P CAB #10	SEE SHEET FT-011
EQ P CAB #10	SEE SHEET FT-010
EQ P CAB #10	SEE SHEET FT-011
EQ P CAB #10	SEE SHEET FT-020
EQ P CAB #105	SEE SHEET FT-151.1
EQ P CAB #105	SEE SHEET FT-012
EQ P CAB #105 B	SEE SHEET FT-151.1
EQ P CAB #105 B	SEE SHEET FT-023
EQ P CAB #106	SEE SHEET FT-1 8.1
EQ P CAB #106	SEE SHEET FT-51
EQ P CAB #106	SEE SHEET FT-020
EQ P CAB #107	SEE SHEET FT-1 8.1
EQ P CAB #107	SEE SHEET FT-012
EQ P CAB #107 B	SEE SHEET FT-1 8.1
EQ P CAB #107 B	SEE SHEET FT-023

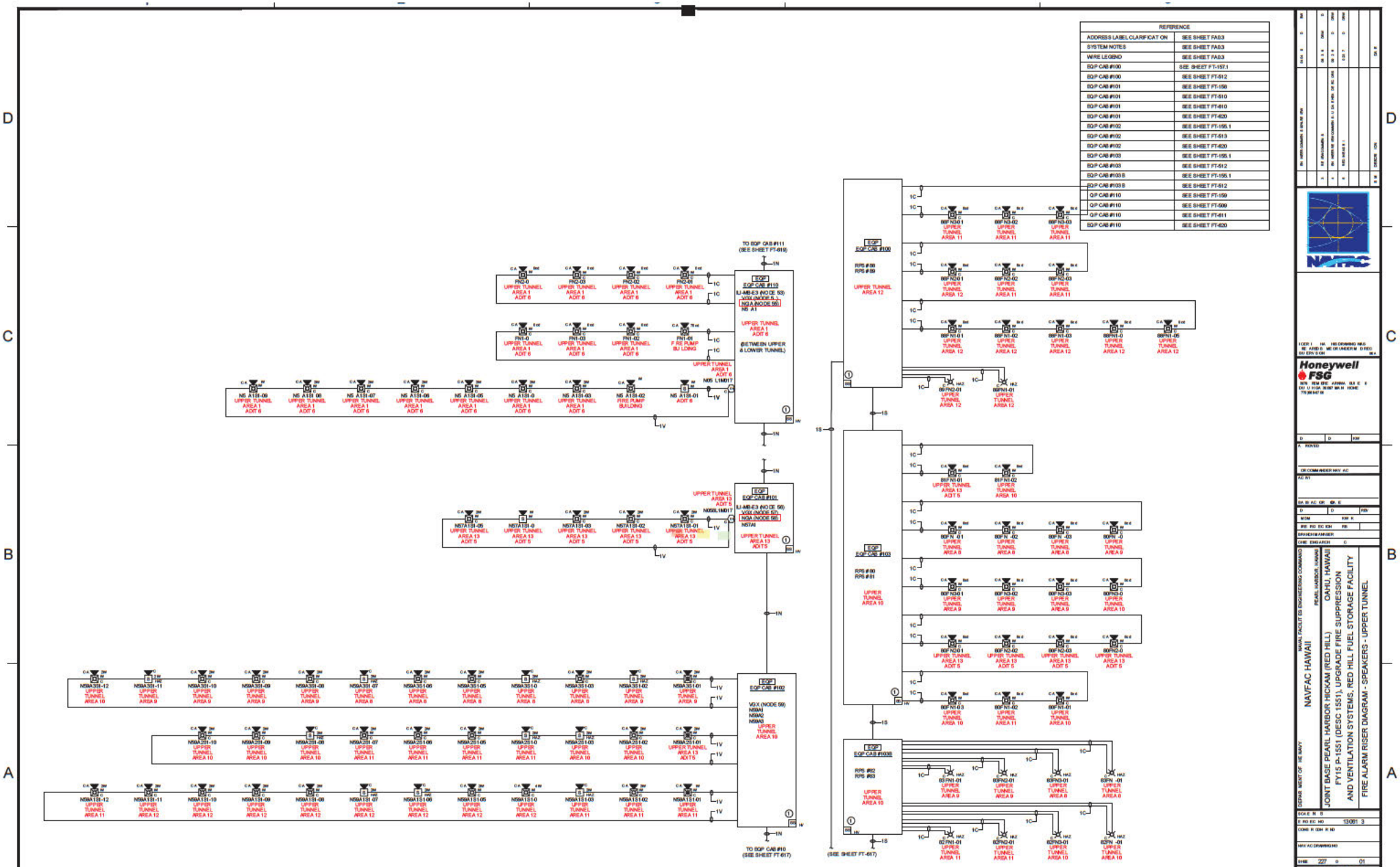
THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VAR OUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITH IN THE AVAILABLE SPACE.

F SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES

NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FIRE ALARM RISER DIAGRAM - STROBES - UPPER TUNNEL

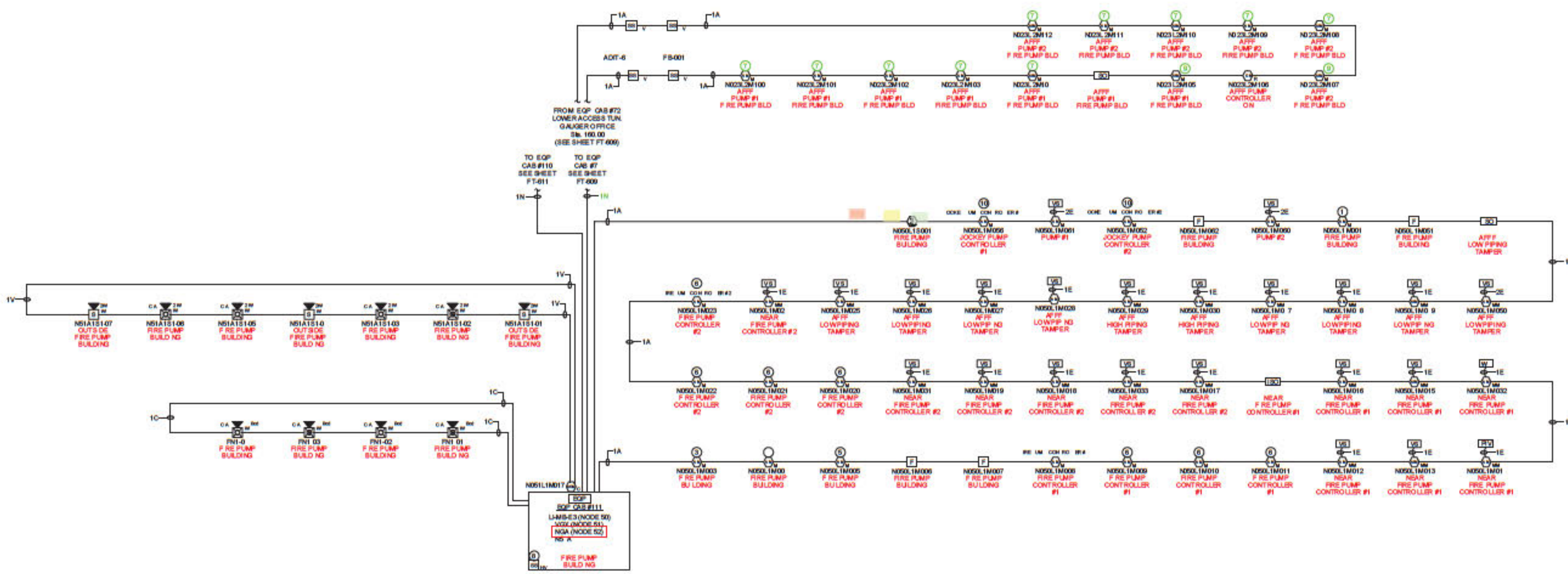
Honeywell FSG

FT-617


REFERENCE
ADDRESS LABEL CLARIFICAT ON | SEE SHEET FA0.3
SYSTEM NOTES | SEE SHEET FA0.3
WIRE LEGEND | SEE SHEET FA0.3
EQP CAB #100 | SEE SHEET FT-157.1
EQP CAB #100 | SEE SHEET FT-512
EQP CAB #101 | SEE SHEET FT-158
EQP CAB #101 | SEE SHEET FT-510
EQP CAB #101 | SEE SHEET FT-610
EQP CAB #101 | SEE SHEET FT-620
EQP CAB #102 | SEE SHEET FT-155.1
EQP CAB #102 | SEE SHEET FT-513
EQP CAB #102 | SEE SHEET FT-620
EQP CAB #103 | SEE SHEET FT-155.1
EQP CAB #103 | SEE SHEET FT-512
EQP CAB #103 B | SEE SHEET FT-155.1
EQP CAB #103 B | SEE SHEET FT-512
Q P CAB #110 | SEE SHEET FT-159
Q P CAB #110 | SEE SHEET FT-509
Q P CAB #110 | SEE SHEET FT-511
EQ P CAB #110 | SEE SHEET FT-620
TO EQP CAB #111 (SEE SHEET FT-619)
EQP CAB #110
EQP CAB #101
EQP CAB #102
EQP CAB #100
EQP CAB #103
EQP CAB #103B
TO EQP CAB #10 (SEE SHEET FT-617)
(SEE SHEET FT-617)
NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FIRE ALARM RISER DIAGRAM - SPEAKERS - UPPER TUNNEL
Honeywell FSG
FT-618
THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.
IF SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES

SHEET NOTES
(1) TO MONITOR LOW AIR PRESSURE SWITCH
(2) TO MONITOR HIGH AIR PRESSURE SWITCH
(3) TO MONITOR GENERATOR PHASE REVERSAL
( ) TO MONITOR GENERATOR RUNNING
(5) TO MONITOR GENERATOR POWER LOSS
(6) TO MONITOR FIRE PUMP FOR RUNNING, LOSS OF PHASE, PHASE REVERSAL, AND CONTROLLER CONNECTED TO ALTERNATE SOURCE
(7) TO MONITOR AFFF PUMP FOR RUNNING, LOSS OF PHASE, PHASE REVERSAL, AND CONTROLLER CONNECTED TO ALTERNATE SOURCE
(8) TO 120VAC DEDICATED BRANCH NOTE: BREAKER REQUIRES A LOCK

REFERENCE	
ADDRESS LABEL CLARIFICATION	SEE SHEET FA0.3
SYSTEM NOTES	SEE SHEET FA0.3
WIRE LEGEND	SEE SHEET FA0.3
EQP CAB #111	SEE SHEET FS-001
EQP CAB #111	SEE SHEET FT-509
EQP CAB #111	SEE SHEET FT-620



THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

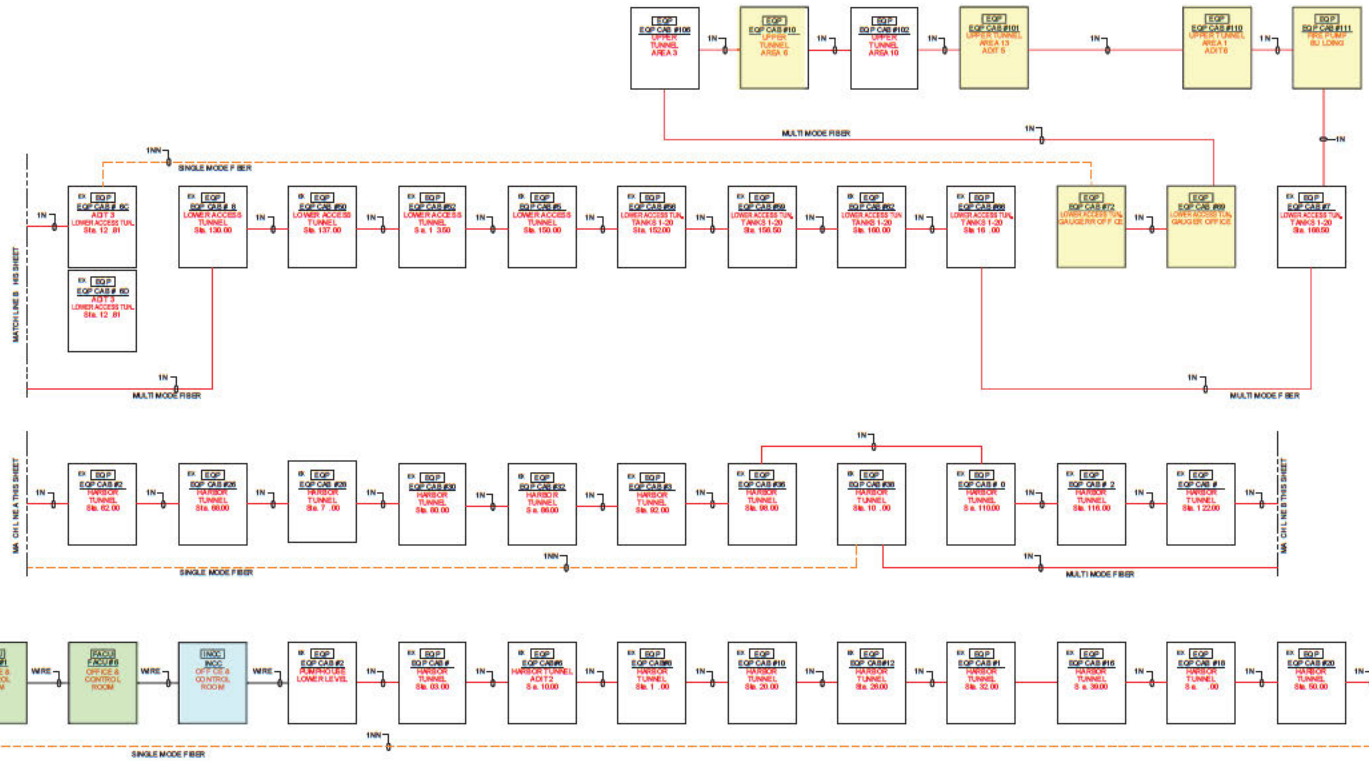
IF SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES

Honeywell FSG

NAVFAC HAWAII
PEARL HARBOR, HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL)
OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION
AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FIRE ALARM RISER DIAGRAM - NAC & SLC - FIRE PUMP BUILDING

13081 3

FT-619



NAVFAC HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY

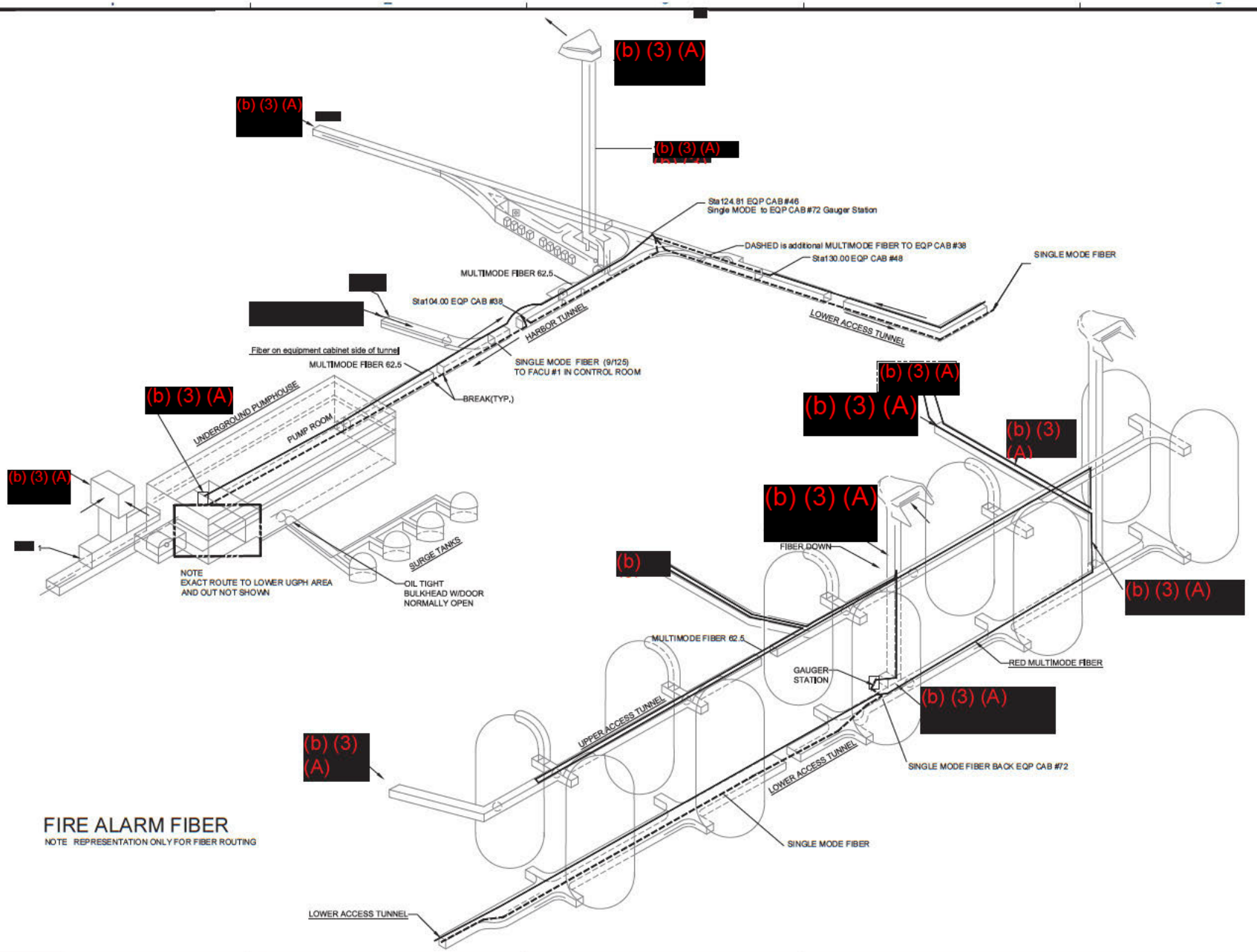
NETWORK RISER DIAGRAM

Honeywell FSG

FT-620

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

F SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES



FIRE ALARM FIBER

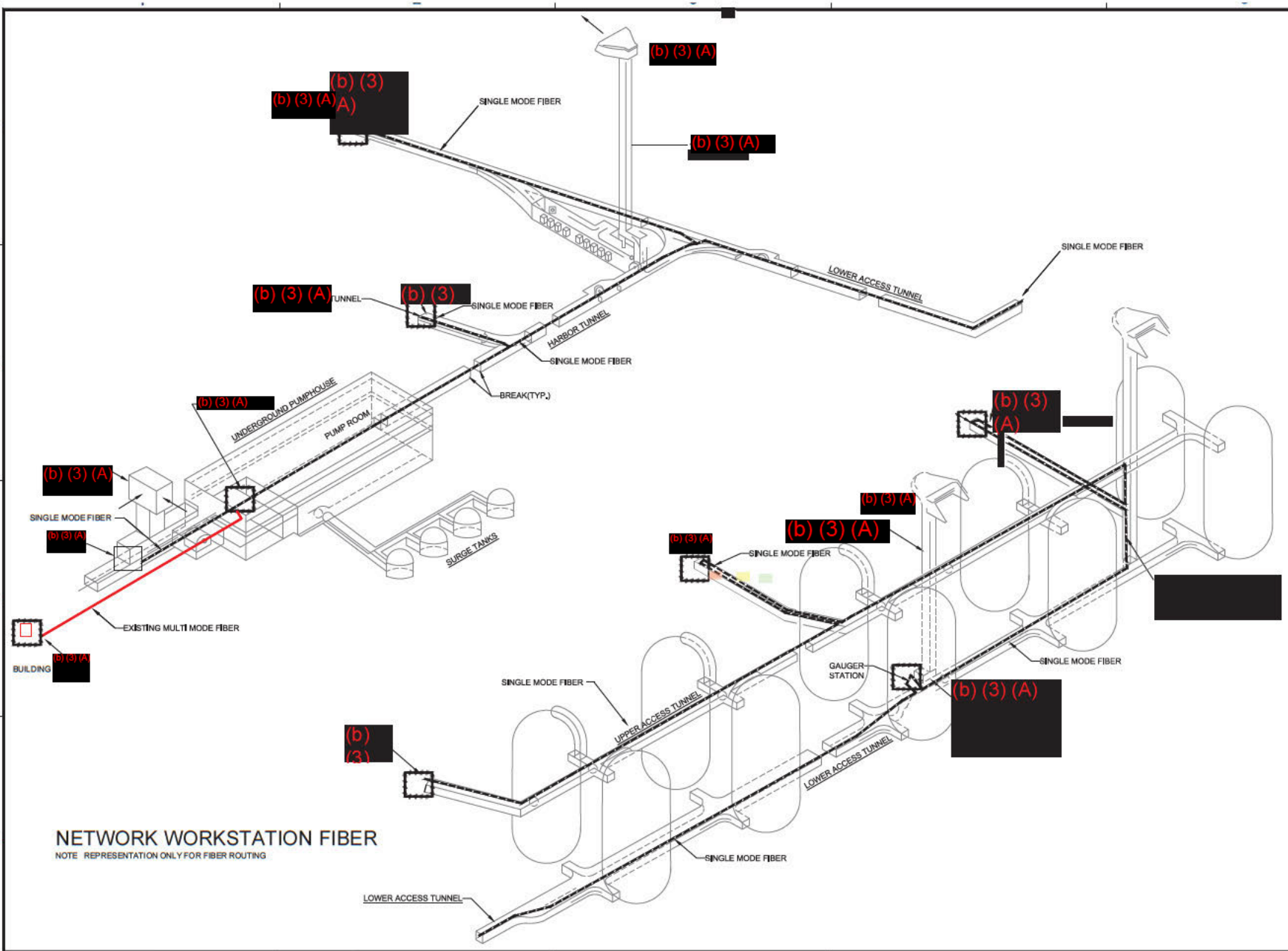
NOTE REPRESENTATION ONLY FOR FIBER ROUTING

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES

NAVFAC HAWAII
JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION
AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
FIRE ALARM FIBER

FT-621



NETWORK WORKSTATION FIBER

NOTE REPRESENTATION ONLY FOR FIBER ROUTING

NAVFAC HAWAII

JOINT BASE PEARL HARBOR HICKAM (RED HILL) OAHU, HAWAII
FY15 P-1551 (DESC 1551), UPGRADE FIRE SUPPRESSION AND VENTILATION SYSTEMS, RED HILL FUEL STORAGE FACILITY
NETWORK WORKSTATION FIBER

FT-622

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE WORK AMONG THE VARIOUS TRADES AS NECESSARY TO AVOID CONFLICTS AND TO INSURE THE INSTALLATION OF ALL WORK WITHIN THE AVAILABLE SPACE.

IF SHEET IS LESS THAN 22 X 3
REDUCED PRINT - USE GRAPHIC SCALES

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