Petersen Engineering

Memorandum

Job Name: 23006 – Portsmouth DPW Expansion
Date: December 6th, 2023
To: Cory Belden – Altus Engineering (AE)
Prepared By: Jonah Israelit, Mark Prendable. Adrienne Harris - Petersen Engineering Inc (PEI)
Cc: Kate Haddock (PEI)
Subject: MEP/FP Conceptual and Schematic Design Narrative

The following narrative outlines recommended scope of work for the building additions planned for the Portsmouth Department of Public Works (DPW). This is based on our understanding of program requirements, our site visit to review existing conditions, existing drawings from the Maguire Group Inc dated 1999, and proposed drawings prepared by Placework and dated 7/24/2023.

This Mechanical, Electrical, Plumbing and Fire Protection (MEP/FP) narrative is conceptual and schematic and is intended to document the owner's basic requirements for the project. The Design/Build Contractor shall develop the complete Construction Documents, shall provide the services of an Engineer of Record for the project, and shall provide stamped MEP/FP drawings and specifications.

The General Contractor and Subcontractor shall field verify existing conditions to include costs to modify or relocated existing MEP/FP systems to accommodate the construction of the new additions.

Maintenance Vehicle Garage

Mechanical

1. General Exhaust
    a. Provide a high flow fan that shall only run on high level gas detection alarm – 0.75 CFM/SF and 3,200 CFM (min).
    b. Provide a low flow fan to run 24/7 - .05 CFM/F and 220 CFM (min).
    c. Provide a complete gas detection system including CO and NO2 sensors, controller, fans and interconnecting wiring.
    d. Provide wall mounted exhaust fans and motorized dampers. Provide (2) dedicated intake louver with motorized dampers.
    e. Provide high and low transfer ducts in wall between garage bay and wash bay, sized to transfer all the general exhaust air at 200 feet per minute.
    f. The louvers shall provide a means of makeup air for the exhaust fans. The motorized dampers shall open upon high fan alarm and shall be positioned to allow air to sweep the room and quickly dilute contaminants.
    g. Provide an extension of the existing "reliable" brand control system to control and monitor operation of the exhaust system. The existing control panel control panel located in the mechanical room in the first floor of the existing building.
2. Vehicle Exhaust Extraction
    a. Provide a complete vehicle exhaust extraction system, designed and manufactured by Plymovent, or approved equal.
        i. System shall include (4) 6" exhaust drop for each garage bay. Each exhaust drop shall include a hose reel, heavy duty flexible hose and nozzle adapter. Coordinate the locations, length and type of hose and type of adapter with the owner.

ii. Exhaust drops shall be connected to a common duct system and routed to a central exhaust fan. Duct system shall be designed for up to 750 CFM from each exhaust drop. Coordinate the final CFM at each location required with owner.
iii. Provide a high pressure exhaust central exhaust fan sized for 3,000 CFM. Fan shall be wall mounted on exterior building. Provide misc. support steel as required and match similar installation in existing truck maintenance area.
iv. Extend outlet of fan up above roofline and terminate in a "no-loss" stack.
v. Provide a central control panel with start/stop control.
vi. Exhaust system shall be fully commissioned and adjusted by a third-party air balancing contractor. Air balancer shall carry NEBB certification or approved equal. commissioned to provide required airflow

3. Welding Exhaust
    a. Provide a complete fume extraction system, designed and manufactured by Plyovent or approved equal. System shall include:
        i. Adjustable extraction arm, Plyovent MultiSmart Arm-200, or equal.
        ii. Extension crane to increase the reach of the adjustable arm.
        iii. Duct system designed to carry the fumes and discharge outdoors, above the roofline.
        iv. Provide a dedicated exhaust fan, sized for up to 1200 CFM. Coordinate final requirements with owner.
4. Exhaust from flammable cabinets
    a. Provide a dedicated exhaust system for each chemical storage cabinet, in accordance with NFPA 30.
    b. At a minimum each exhaust system shall include dedicated intake ductwork, exhaust ductwork, a dedicated exhaust fan and (2) flame arrestors, per cabinet.
5. Heating Only
    a. Provide a gas-fired infrared tube heater for each garage bay, manufactured by SpaceRay or approved equal.
    b. System shall consist of infrared tube, hanging chain, reflectors, burner, and intake/vent termination.
    c. Provide intake and exhaust vent ductwork to side-wall penetrations. Coordinate layout of heaters and mounting height with owner.
    d. System shall be designed to maintain 68F setpoint during heating season.
    e. Provide a column-mounted thermostats for control of each heater.
6. New Restroom
    a. Provide new ceiling exhaust fan and speed control.
    b. Provide electric resistance wall heater with self-contained thermostat.
    c. Heater shall include tamper-proof thermostat control.
7. New Office
    a. Provide a dedicated heat pump, Mitsubishi Hyper Heat or equal.
    b. Provide wall mounted outdoor unit, up to 1-ton nominal capacity.
    c. Provide ceiling cassette style indoor unit.
    d. Provide interconnecting refrigerant piping.
    e. Provide condensate piping and control wiring.
    f. Provide hard-wired wall mounted thermostat, 7-day programmable feature.

<u>Plumbing / Fire Protection</u>

1. Provide a catch basin or long trench drain in a single bay with piping routed to a new interior oil separator, for current or future use as a wash bay. All equipment and access panels at floor level shall have the capacity to withstand anticipated vehicle loads.

2. Extend the existing 2” domestic cold water line to serve all new plumbing fixtures. Provide an additional backflow preventer for vehicle washdown.
3. Provide domestic cold water piping with dedicated shutoff valves to new interior and exterior hose bibbs.
4. Provide a dedicated tank type, ceiling mounted, electric water heater to serve the addition’s new restroom and eyewash station – 50 gallons @ 10kW. Additionally provide a thermostatic mixing valve, expansion tank, and drain pan routed to the nearest available drain.
5. Extend the existing building’s sanitary system to the new restroom and eyewash locations and coordinate piping inverts.
6. The new building’s roof drainage shall include qty. 3 6” primary and overflow roof drains, which will be located on the flat roof area of the addition. These drains will be routed through the building using a series of leaders connecting to the site storm drainage system, via a 10” main, which will be further coordinated with the civil engineer.
7. Extend the piping from the existing building’s sprinkler system to serve the addition and new bays.
8. Provide a fully automatic, wet sprinkler system compliant with an Ordinary Hazard (Group 2) sprinkler classification which adheres to all NFPA 13 requirements. Contractor to provide hydraulic calculations to verify required pipe sizes.

Electrical

1. General
   a. All devices and equipment shall be listed for their location.
   b. All branch circuit wiring shall be type XHHW/XHHW-2 copper conductors.
   c. Branch circuit wiring throughout the Maintenance Vehicle Garage and other exposed locations shall be installed EMT conduit. Provide liquid tight fitting for conduits near garage doors and car wash bays.
   d. Branch circuit wiring concealed in walls or above ceilings shall be type MC cable.
   e. Minimum conduit sizes shall be 3/4" for electrical branch circuits and 1-1/2” for telecom cabling.
   f. General purpose 120 volt, 20 amp receptacles shall be industrial grade receptacles.
   g. Where equipment in the Maintenance Vehicle Garage are located in an open space near no wall or column to mount power connections, provide SO Cord drop from ceilings with ceiling outlet drop or wired connection to the unit. SO cord cable be supported from ceiling with metal channel and threaded rod support, retention wire and strain relief spring. Strain relief grip shall be provided at the outlet connected at the end of the cord.
   h. The following electrical information identifies the minimum requirements. Additional receptacles, branch circuits, lighting, etc. shall be provided per final coordination with the DPW and architectural space planning requirements.
   i. The design of Low Voltage Systems (telecommunications, security, access controls, etc.) are not within the contracted scope of this narrative. The design-built contractor shall coordinate with the owner, verify their low voltage system standards and requirements for the building, and provide complete and operational systems.

2. Maintenance Vehicle Garage
   a. Provide a 225 amp, 120/208V, 3-phase, 4-wire surface mounted electrical panel with a 225 amp, 4-wire feeder in EMT conduit to a new 225A-3P circuit breaker in the existing electrical

panel "MDP" located in the Vehicle Storage (Truck Barn) space. Panel to serve all lighting and power within the Maintenance Vehicle Garage space.

b. Provide one 120 volt, 20 amp, GFCI duplex receptacle and one data outlet at each truck bay's kiosk location. Provide one 120 volt, 20 amp branch circuit for every three kiosk receptacles.
c. Provide 120 volt, 20 amp, GFCI duplex receptacles spaced every 20' around the perimeter of the space. Receptacles near garage doors shall be installed with weatherproof covers. Provide one 120 volt, 20 amp branch circuit for every four receptacles.
d. Provide one 120 volt, 20 amp, GFCI duplex receptacle on each column. Each receptacle shall be on a dedicated 120 volt, 20 amp branch circuit.
e. Provide 250V, special purpose twist lock receptacle at each end of the space and one located in the middle. Receptacle NEMA configuration and amperage rating shall be confirmed with the DPW.
f. Provide dedicated circuits to the following equipment.
    i. Heavy equipment welding tables
    ii. Vertical rise lifts
    iii. Two post 20,000 LB rotary lift
    iv. High compact rotary screw air compressor
    v. Overhead crane/gantrys
    vi. Steam cleaners
    vii. Tig welders
    viii. Motorized garage doors.
g. Provide Wifi coverage throughout the space.
h. Provided suspended mounted linear LED light fixtures to achieve minimum of 70 foot-candles. Light fixtures shall be Energy Star listed and be provided with lens.
i. Provide lighting controls in accordance with the 2018 International Energy Conservation Code (IECC).
j. Selected light fixtures shall be connected to the existing emergency panel to provide a minimum of 1 FC during emergency operation.
k. Provide cold weather rated exit signs at egress doors. Exit signs shall be connected to the existing emergency panel.
l. Provide circuit breaker and feeder from existing panel "MDP" to serve 20 horsepower fan.

<u>Fire Alarm System</u>

1. General
    a. The existing fire alarm control panel shall be replaced with a new analog addressable fire alarm system. Existing fire alarm devices and wiring shall be connected to the new fire alarm system. Contractor shall field verify and coordinate with the existing fire alarms system's maintenance contractor for connection points. Contractor shall provide 120 volt circuits, power supplies, modules, wiring, connections, etc. as required to accommodate the installation.
    b. Provide new SLC and NAC loop wiring to serve the areas. Wiring shall be Class A, Level 1.
    c. Where installed in exposed locations, fire alarm wiring shall be installed in EMT conduit.

d. When concealed in walls or above ceilings, fire alarm wiring shall be type MC cable or be installed in a flexible metal cable.

2. Devices Layouts
    a. Provide new fire alarm pull stations with protective covers at each egress door.
    b. Provide new fire alarm horn/strobe devices throughout the garage and corridor to meet the coverage requirements of NFPA 72.
    c. Provide strobe only device in the new toilet room.

New Second Floor Offices

Mechanical

1. Heating and Cooling
    a. Provide a complete high efficiency Air Source Heat Pump (ASHP) system, Mitsubishi PURY-EP series or equal. System shall include:
        i. Outdoor unit shall be mounted on grade on 24" stand.
        ii. Provide a branch controller located above the drop ceiling. VRF system shall be capable of simultaneous heating and cooling.
        iii. Provide (1) ceiling cassette style indoor unit per individual room.
        iv. Provide up to (4) ceiling cassette style indoor units for the open work area.
        v. Each room shall have a dedicated hard-wired thermostat.
        vi. Provide all refrigerant piping, condensate piping and control wiring.
        vii. System shall include a central controller for programming, troubleshooting and global occupancy schedule.
    b. Preliminary pricing shall be based on a 12-ton system. Contractor is responsible for providing heating and cooling load calculations and final "right sizing" of system.
    c. System shall be designed to maintain 70F setpoint in heating, 72F setpoint in cooling.
    d. Installer shall be certified from manufacturer and 10-year warranty shall be included.

2. Ventilation
    a. Provide a 250 CFM Energy Recovery Ventilator (ERV), Renewaire EV Premium LH, or equal.
    b. Provide a duct mounted electric resistance heater to temper air on the coldest days – 2KW.
    c. Exhaust shall be ducted from pantry and toilet areas. Provide aluminum ceiling mounted grilles.
    d. Outdoor air shall ducted into open work area. Provide aluminum ceiling mounted diffusers.
    e. Provide side wall terminations for outdoor air and exhaust ductwork. Unit shall be mounted above ceiling and no more than 15 ft from outdoor terminations.
    f. All ductwork shall be insulated with 1.5-inch fiberglass blanket with FSK jacket.
    g. Outdoor air ductwork shall be insulated with 3" blanket for R-8 insulating value.
    h. Provide a wall mounted time clock for on/off control, mounted in the IT closet.

3. IT Closet
    a. Provide a ceiling mounted exhaust fan sized for 500 CFM.
    b. Fan shall be ducted to open work area, and terminate in a ceiling mounted grille.

c. Provide a transfer "jumper duct" from the open area to the IT closet, to provide a path of transfer air and facilitate operation of the exhaust fan.
d. Provide a wall mounted thermostat to start the fan on temperature rise.
e. Coordinate cooling requirements with the Owner's IT Vendor.

Plumbing / Fire Protection

1. Extend the existing building's domestic cold water line to serve the addition.
2. Utilize the new first floor electric water heater, already serving the water department garage restroom, to serve the office addition's new restroom and kitchen/break room.
3. Extend the piping from the existing building's sprinkler system to serve the new addition. Provide light hazard occupancy sprinkler coverage which adheres to all NFPA 13 requirements. Contractor to provide hydraulic calculations to verify required pipe size and to confirm that the existing piping is adequate for reuse.
4. Extend the existing building's sanitary system to the new restroom and kitchen/break room locations and coordinate piping inverts.

Electrical

1. General
   a. All devices and equipment shall be listed for their location.
   b. All branch circuit wiring shall be type XHHW/XHHW-2 copper conductors.
   c. Branch circuit wiring in exposed locations shall be installed EMT conduit.
   d. Branch circuit wiring concealed in walls or above ceilings shall be type MC cable.
   e. Minimum conduit sizes shall be 3/4" for electrical branch circuits and 1-1/2" for telecom cabling.
   f. General purpose 120 volt, 20 amp receptacles shall be industrial grade receptacles.
   g. The design of Low Voltage Systems (telecommunications, security, access controls, etc.) are not within the contracted scope of this narrative. The design-built contractor shall coordinate with the owner, verify their low voltage system standards and requirements for the building, and provide complete and operational systems.
   h. The following electrical information identifies the minimum requirements. Additional receptacles, branch circuits, lighting, etc. shall be provided per final coordination with the DPW and architectural space planning requirements.

2. Office Space
   a. Provide a 225 amp, 120/208V, 3-phase, 4-wire double tub surface mounted electrical panel with a 150 amp, 4-wire feeder in EMT conduit to a new 150A-3P circuit breaker in the existing electrical panel "MDP" located in the Vehicle Storage (Truck Barn) space. Panel to serve all lighting and power within the Maintenance Vehicle Garage space.
   b. Provide a minimum of one tel/data outlet and five 120 volt, 20 amp duplex receptacles for each office. Each office shall be provided with a dedicated 120 volt, 20 amp branch circuit to serve receptacles.
   c. Provide a minimum of one tel/data outlet and one 120 volt, 20 amp quad receptacle at each workstation in the Shared Office. One 120 volt, 20 amp branch circuit shall be provided for every three quad outlets.

d. Coordinate Open Work Area and Conf/Training workstation and equipment locations with the DPW and provided required data and receptacles.
e. The quantity of receptacles within the Meeting and Conf/Training receptacles shall meet the minimum requirements of electrical code article 210.65.
f. Kitchen break room shall be provided with the following:
    i. 30A-2P branch circuit and special purpose receptacle to serve wall oven. Provide ground fault protection in accordance with local electrical codes.
    ii. 30A-2P branch circuit and special purpose receptacle to serve cook top. Provide ground fault protection in accordance with local electrical codes.
    iii. 20A-1P branch circuit to serve dishwasher GFCI receptacle. Receptacle shall be mounted in cabinet below kitchen sink.
    iv. 20A-1P branch circuit to serve garbage disposal GFCI receptacle. Receptacle shall be mounted in cabinet below kitchen sink and be controlled via wall switch mounted above the counter.
    v. Four 20A-1P branch circuits to serve countertop GFCI receptacles. Countertop receptacles shall service counter mounted Microwave and Coffee Maker
    vi. Provide feeder from new electrical panel to 10 ton heat pump unit serving the office space. Provide circuit breaker and wiring in accordance with equipment's MOCP and MCA ratings.
g. Provided recessed LED light fixtures to achieve minimum of 30 foot-candles. Light fixtures shall be Energy Star listed.
h. Provide lighting controls and occupancy sensors in accordance with the 2018 International Energy Conservation Code (IECC).
i. Selected light fixtures shall be connected to the existing emergency panel to provide a minimum of 1 FC during emergency operation.
j. Provide thermoplastic exit signs at egress doors. Exit signs shall be connected to the existing emergency panel.
k. Telecommunication closet:
    i. Coordinate the full extend of the telecommunication closet scope of work with the owner.
    ii. Provide (2) 2-1/2"C empty EMT conduits with pull string from the building's demarc location to the new office space telecom closet.
    iii. Provide 8'-0" high x 3/4" thick plywood backboard on all walls of the telecom closet.
    iv. Provide (4) double duplex receptacles in the room, each on it's on 20A-1P dedicated branch circuit.
    v. Coordinate room's exhaust fan power and control requirements with the General Contractor and Mechanical Contractor. Provide power and control wiring as required.

Fire Alarm System

1. General
    a. The existing fire alarm control panel shall be replaced with a new analog addressable fire alarm system. Existing fire alarm devices and wiring shall be connected to the new fire alarm system. Contractor shall field verify and coordinate with the existing fire alarms system's maintenance contractor for connection points. Contractor shall provide 120 volt circuits, power supplies, modules, wiring, connections, etc. as required to accommodate the installation.
    b. Provide new SLC and NAC loop wiring to serve the areas. Wiring shall be Class A, Level 1.
    c. Where installed in exposed locations, fire alarm wiring shall be installed in EMT conduit.
    d. When concealed in walls or above ceilings, fire alarm wiring shall be type MC cable or be installed in a flexible metal cable.
    e. New fire alarm strobe devices shall be synchronized with existing.
3. Devices Layouts
    a. Provide new fire alarm pull stations with protective covers at each egress door.
    b. Provide new fire alarm horn/strobe devices throughout the Open Work Area to meet the coverage requirements of NFPA 72.
    c. Provide strobe only devices in the following rooms:
        i. Shared Office
        ii. Kitchen/Break
        iii. Copy Room
        iv. Conf/Training
        v. Storage
        vi. Restroom
        vii. Other areas required by NFPA 72 and local AHJ.

Water Department Garage

Mechanical

1. Relocate existing air-cooled condensing units serving existing building. Extend the piping and electrical as required to maintain operation.
2. General Exhaust
    a. Provide a high flow fan that shall only run on high level gas detection alarm – 0.75 CFM/SF or 3,000 CFM (min).
    b. Provide a low flow fan to run 24/7 - .05 CFM/SF and 200 CFM (min).
    c. Provide a complete gas detection system including CO and NO2 sensors, controller, fans and interconnecting wiring for complete coverage of indoor parking areas.
    d. Provide wall mounted exhaust fans and motorized dampers. Provide a dedicated intake louver with motorized damper. Intake louver shall open upon high fan alarm.

   e. Provide an extension of the existing "reliable" brand control system to control and monitor operation of the exhaust system. Expand the control panel located in the mechanical room in the first floor of the existing building.
3. CCTV Parking Bay Exhaust
   a. Provide a dedicated low flow exhaust fan to run 24/7 at 0.05 CFM/SF and 30 CFM (min)
   b. Provide high and low transfer ducts to allow air circulation between the garage areas, sized for the full high airflow at 200 feet per minute.
   c. Position intake louver(s), exhaust fans and transfer grilles so that all parking areas are adequately exhausted upon high fan operation.
   d. Provide a dedicated set of CO and NO2 sensors for CCTV Parking Bay.
4. Heating Only
   a. Provide a gas-fired infrared tube heater for each garage bay, manufactured by SpaceRay or approved equal.
   b. System shall consist of infrared tube, hanging chain, reflectors, burner, and intake/vent termination.
   c. Provide intake and exhaust vent ductwork to side-wall penetrations. Coordinate layout of heaters and mounting height with owner.
   d. System shall be designed to maintain 68F setpoint during heating season.
   e. Provide a column-mounted thermostats for control of each heater.
5. New Restroom
   a. Provide new ceiling exhaust fan and speed control.
   b. Provide electric resistance wall heater with self-contained thermostat.
6. New Stair
   a. Provide electric cabinet heater on lowest level
   b. Heater shall maintain 45F min temperature for freeze protection of sprinkler system.
   c. Heater shall include tamper-proof thermostat control.

<u>Plumbing / Fire Protection</u>

1. Provide a catch basin (large floor drain) in one bay with piping to a new interior oil separator, for current or future use as a wash bay.
2. Extend the existing building's domestic cold water line to serve the addition.
3. Provide a dedicated tank type electric water heater in the ceiling of the first floor restroom, to serve both new restrooms and the new kitchen/break room – 15 gallons @ 4.0kW. Additionally provide a thermostatic mixing valve, expansion tank, and drain pan routed to the nearest available drain.
4. The new building's roof drainage shall include primary and overflow roof drains which will be routed through the building using a series of leaders and connecting to the site storm drainage system which will be further coordinated with the civil engineer.
5. Extend the piping from the existing building's sprinkler system to serve the new addition. Provide Ordinary Hazard (Group 2) occupancy sprinkler coverage which adheres to all NFPA 13 requirements. Contractor to provide hydraulic calculations to verify required pipe size and to confirm that the existing piping is adequate for reuse.

Electrical

1. General
   a. All devices and equipment shall be listed for their location.
   b. All branch circuit wiring shall be type XHHW/XHHW-2 copper conductors.
   c. Branch circuit wiring throughout the Water Department Garage and other exposed locations shall be installed EMT conduit. Provide liquid tight fitting for conduits near garage doors.
   d. Branch circuit wiring concealed in walls or above ceilings shall be type MC cable.
   e. Minimum conduit sizes shall be 3/4" for electrical branch circuits and 1-1/2” for telecom cabling.
   f. General purpose 120 volt, 20 amp receptacles shall be industrial grade receptacles.
   g. The design of Low Voltage Systems (telecommunications, security, access controls, etc.) are not within the contracted scope of this narrative. The design-built contractor shall coordinate with the owner, verify their low voltage system standards and requirements for the building, and provide complete and operational systems.
   h. The following electrical information identifies the minimum requirements. Additional receptacles, branch circuits, lighting, etc. shall be provided per final coordination with the DPW and architectural space planning requirements.

2. Water Department Garage
   a. Provide a 225 amp, 120/208V, 3-phase, 4-wire surface mounted electrical panel with a 225 amp, 4-wire feeder in EMT conduit to the new 225A-3P circuit breaker in the existing electrical panel “MDP” located in the Vehicle Storage (Truck Barn) space. Panel to serve all lighting and power within the Water Department Garage.
   b. Provide 120 volt 20 amp, GFCI duplex receptacles spaced every 20’ around the perimeter of the space. Receptacles near garage doors shall be installed with weatherproof covers. Provide one 120 volt, 20 amp branch circuit for every four receptacles.
   c. Provide one data outlet and three 120 volt, 20 amp quad GFCI receptacle outlets at the CCTV truck equipment location. Provide a dedicated 120 volt, 20 amp branch circuit for each quad outlet.
   d. Provide Wifi coverage throughout the space.
   e. Provide three ChargePoint+ wall mounted Level 2 EV car charges with dual ports charges. Each car charge shall be fed with two 40A-2P branch circuits.
   f. Provided suspended mounted linear LED light fixtures to achieve minimum of 10 foot-candles. Light fixtures shall be Energy Star listed and be provided with lens.
   g. Provide lighting controls in accordance with the 2018 International Energy Conservation Code (IECC).
   h. Selected light fixtures shall be connected to the existing emergency panel to provide a minimum of 1 FC during emergency operation.
   i. Provide cold weather rated exit signs at egress doors. Exit signs shall be connected to the existing emergency panel.
   j. Provide circuit breaker and feeder to serve 7.5 horsepower fan.
   k. Scope of work shall include making the

Fire Alarm System

1. General
    a. The existing fire alarm control panel shall be replaced with a new analog addressable fire alarm system. Existing fire alarm devices and wiring shall be connected to the new fire alarm system. Contractor shall field verify and coordinate with the existing fire alarms system's maintenance contractor for connection points. Contractor shall provide 120 volt circuits, power supplies, modules, wiring, connections, etc. as required to accommodate the installation.
    b. Provide new SLC and NAC loop wiring to serve the areas. Wiring shall be Class A, Level 1.
    c. Where installed in exposed locations, fire alarm wiring shall be installed in EMT conduit.
    d. When concealed in walls or above ceilings, fire alarm wiring shall be type MC cable or be installed in a flexible metal cable.
    e. New fire alarm strobe devices shall be synchronized with existing.

2. Device Layouts
    a. Provide new fire alarm pull stations with protective covers at each egress door.
    b. Provide new fire alarm horn/strobe devices throughout parking and work area per the coverage requirements of NFPA 72.
    c. Provide strobe only devices in the following rooms:
        i. Restroom
        ii. Other areas required by NFPA 72 and local AHJ.

Solar PV Ready Roof

Electrical

1. Coordinate the location of the future exterior solar PV utility disconnect with local AHJ and electrical utility requirements.
2. Coordinate with the design-built general contractor to provide designated space on the roof the Water Department addition for future solar PV inverters. Designated space shall be provided with a 8' high x 4' wide weatherproof plywood backboard with 5' of clearance in front.
3. Provide a minimum of (2) 2-1/2" empty EMT conduits from existing panel "MDP" located in the Vehicle Storage (Truck Barn) to the outdoor location of the future solar PV utility disconnect switch. Conduits shall be capped, sealed, and be made weather tight.
4. Provide a minimum of (2) 2-1/2" empty EMT conduits from the location of the future solar PV utility disconnect switch to the designated solar PV inverter space on roof of the new Water Department addition. Conduits shall be capped, sealed and be made weather tight.
5. Provide an exterior weatherproof LED jelly jar and weatherproof GFCI receptacle located at the designated space for the future solar PV inverters. The new light shall be controlled via a weatherproof switch with timeclock override. Include a dedicated 20A-1P branch circuit to serve the light and switch.