**6. ENGINEERING SYSTEMS REQUIREMENTS**

**H50 WATERFRONT UTILITIES**

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SYSTEMS REQUIREMENTS
WATERFRONT UTILITIES TEMPLATE 02/18

Instructions for using this template: There are template files for each UNIFORMAT Level 2 Group Elements. This template is for Group Element H50-WATERFRONT UTILITIES. Text such as this is hidden text that will not print when the hidden text box in "Print/Options" is un-checked.

Edit this template for the requirements of the project and wherever brackets [ ] appear. Use UFC 4-150-02, *Dockside Utilities for Ship Services*, UFC 3-201-01, *Civil Engineering*, UFC 3-401-01, *Mechanical Engineering*, UFC 3-501-01, *Electrical Engineering*, and UFC 3-600-10N, *Fire Protection Engineering*when determining Waterfront Utilities system requirements.

The SYSTEMS REQUIREMENTS are intended to define items that are required throughout the facility or on a system wide basis that are common to waterfront facilities. Waterfront Utilities-specific requirements are defined in GENERAL SYSTEM REQUIREMENTS paragraph of Section H50. Coordinate with the lead programmer for interface requirement with other elements of the program. Editing is required where brackets [ ] appear. Delete all Waterfront Utilities elements that are not required for the project. If additional elements or sub-elements are required for the projects that do not appear in the template, consult with the Capital Improvements section at NAVFAC Atlantic for additional element numbers and description. Coordinate with the PERFORMANCE TECHNICAL SPECIFICATION SECTION H50 to ensure that performance requirements are provided for all of the Waterfront Facility Elements listed here and that paragraph numbering matches.

There may be rare occasions when prescriptive specifications may either be edited and included in Part 5 of the RFP or required in PTS Section H50 to be edited by the Contractor's Designer of Record. In both cases, the Engineering Systems Requirements (ESR) must include references to these documents.
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**SYSTEM DESCRIPTION**
The Waterfront Utility System consists of civil/mechanical utilities, electrical utilities, and fire protection to be installed on [new] [modified] [extended] [wharf,] [pier,] [breasting dolphin,] [mooring dolphin,] [access trestle,] [and] [ \_\_\_\_\_\_\_ ].

Provide civil/mechanical utilities consisting of piping and utility connection stations for [potable water,] [salt water,] [sanitary sewer,] [bilge and oily waste,] [high pressure compressed air,] [low pressure compressed air,] [steam,] [and] [ \_\_\_\_\_\_\_ ] systems and other specialty piping and fittings. This section covers piping and utility service station installations within the area [from 5 feet (1.5 meters) landward from the landside edge of the [wharf,] [pier,] [breasting dolphin,] [mooring dolphin,] [and] [ \_\_\_\_\_ ] deck and the waterfront] [between the utility manholes at the landside edge of the [wharf,] [pier,] [breasting dolphin,] [ [mooring dolphin,] [and] [ \_\_\_\_\_\_ ] deck and the waterfront] [ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ].

Provide an Electrical Utilities system including [[primary] [and] [secondary] electrical power,] [telecommunication,] [lighting,] [lightning protection and grounding] [and] [ \_\_\_\_\_\_\_\_ ] [and all accessories and devices] as necessary and required for a complete and usable system. This section covers electrical ducts/conduits, electrical service stations and electrical power outlet assemblies installations within the area [from 5 feet (1.5 meters) landward from the landside edge of the [wharf,] [pier,] [breasting dolphin,] [mooring dolphin,] [and] [ \_\_\_\_\_ ] deck and the waterfront] [between the electrical manholes at the landside edge of the [wharf,] [pier,] [breasting dolphin,] [mooring dolphin,] [and] [ \_\_\_\_\_\_ ] deck and the waterfront] [\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_].

Provide [an integrated fire alarm system,] [and] [an adequate fire protection] system (see "Fire Protection Water Distribution" paragraph in ESR and PTS Sections G30, *Site Civil/Mechanical Utilities*).

**GENERAL SYSTEM REQUIREMENTS**
Provide a Waterfront Utilities System complete in place, tested and approved, as specified throughout this RFP, as needed for a complete, usable and proper installation. Install all material in accordance with this ESR and PTS Section H50. Where the word "should" is used in the manufacturer's recommendations, substitute the word "must".

[Locations and capacities of waterfront utility stations are as specified in this ESR H50[ and shown on the RFP drawings provided in Part 6].] [Locations, and capacities of waterfront utility stations are to be determined by the Contractor based on criteria and information provided in this ESR H50 and the RFP drawings, [and] [ \_\_\_\_\_\_\_\_\_ ] provided in Part 6.] [\_\_\_\_Specify criteria and provide information for Contractor to determine location and capacity of each waterfront utility\_\_\_\_\_\_]

**Government Furnished Equipment**
Rough-in and provide connections for Government-furnished equipment such that equipment will operate as intended, including providing miscellaneous items such as [plugs,] [receptacles,] [wire,] [cable,] [conduit,] [flexible conduit,] [outlet boxes or fittings] [and] [ \_\_\_\_\_\_\_\_ ]. [Pick up equipment at location(s) designated by Contracting Officer [within [5 miles] [\_\_\_\_\_] of project site] and transfer to project site for storage until ready for installation. Testing requirements of Government-furnished equipment are the responsibility of the Contractor and must follow the same guidelines as though the Contractor had provided the equipment. The following items will be furnished by the Government and must be installed and tested by the Contractor:

• [Electrical power cables]

• [ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ]

 **H5010 CIVIL/MECHANICAL UTILITIES**

Provide [new] [and] [modified existing] civil/mechanical utility riser stations for ship services along the waterfront in accordance with UFC 4-150-02, *Dockside Utilities for Ship Service*. [New] [and] [modified existing] utility riser stations include:

• [Potable water,]

• [Salt water,]

• [Sanitary sewer,]

• [Bilge and oily waste,]

• [ [High pressure] [and] [low pressure] compressed air,]

• [Steam,] [and]

• [ \_\_\_\_\_\_\_\_ ]

Locate the [new] [and] [modified existing] [potable water,] [salt water,] [sanitary sewer,] [bilge and oily waste,] [[high pressure] [and] [low pressure] compressed air,] [steam,] [and] [ \_\_\_\_\_\_\_\_ ] risers to avoid [new] [and] [existing] [cleats,] [bitts,] [bollards,] [other utilities risers,] [electrical power outlet assemblies,] [electrical power booms,] [other above-deck features] [and] [ \_\_\_\_\_\_\_\_ ]. Also avoid traffic areas and other areas for temporary features, such as [personnel brows,] [cable brows,] [electrical cable lay-down areas,] [platforms and access stairs to ships,] [guard shacks,] [mobile crane staging and parking areas,] [and] [\_\_\_\_\_\_\_\_]. [Desired locations of the utility riser stations are shown on the RFP drawings provided in Part 6. Locate these utility stations within \_\_\_\_ ft ( \_\_\_ m ) of the locations shown.] Detailed requirements of Civil/Mechanical utilities are provided in Paragraph H5010 in PTS Section H50 of Part 4.

 **H501001 POTABLE WATER**

[Not used]

[Provide [new] [and] [modified existing] potable water utility connections (risers) along the waterfront face of the [wharf,] [pier] [and] [\_\_\_\_\_\_\_\_]. Connect the new risers to the [new,] [modified existing,] [and] [extended] potable water line being provided as part of this project. Potable water risers must include outlets for [ship service connection] [and] [fire protection] use].

[The design conditions are as shown on the RFP drawings provided in Part 6.] [The design conditions are as follows:

• [ Flow rate - \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ]

• [ Flow pressure - \_\_\_\_\_\_\_\_\_\_\_ ]

• [ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ] ]

[Incoming water pressure must be reduced to [\_\_\_\_\_\_] using pressure regulator as required.]

 **H501002 SALTWATER**

[Not used]

[ [Provide [new] [and] [modified existing] saltwater utility connections (risers) along the waterfront face of the [wharf,] [pier,] [and] [ \_\_\_\_\_\_\_\_ ]. Connect the new risers to the [new,] [modified existing,] [and] [extended] salt water line being provided as part of this project. Salt water risers must include outlets for [ship service connection] [and] [fire protection] use].

[The design conditions are as shown on the RFP drawings provided in Part 6.] [The design conditions are as follows:

• [ Flow rate - \_\_\_\_\_\_\_\_\_\_\_\_\_\_ ]

• [ Flow pressure -\_\_\_\_\_\_\_\_\_\_\_ ]

• [ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ] ]

[Incoming water pressure must be reduced to [\_\_\_\_\_\_] using pressure regulator as required.]

 **H501003 SANITARY SEWER**

[Not used]

[Provide [new] [and] [modified existing] sanitary sewer connections (risers) along the waterfront face of the [wharf,] [pier,] [and] [\_\_\_\_\_\_\_\_]. Connect the new risers to the [new,] [modified existing,] [and] [extended] sanitary sewer piping being provided as part of this project. Provide drainable spill containment concrete pad and curbing with drain pipe and valve for the risers. Construct spill containment pad and curb to contain spills and drips occurring during hose disconnection. Drain pipe and valve are for manual removal of rainwater.]

[The design conditions are as shown on the RFP drawings provided in Part 6.] [The design conditions are as follows:

• [ Flow rate - \_\_\_\_\_\_\_\_\_\_\_\_\_\_ ]

• [ Flow pressure -\_\_\_\_\_\_\_\_\_\_\_ ]

• [ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ] ]

 **H501004 BILGE AND OILY WASTE**

[Not used]

[Provide [new] [and] [modified existing] bilge and oily waste connections (risers) along the waterfront face of the [wharf,] [pier,] [and] [\_\_\_\_\_\_\_\_]. Connect the new risers to the [new,] [modified existing] [and] [extended] bilge and oily waste piping being provided as part of this project. Provide drainable spill containment concrete pad and curbing with drain pipe and valve for the riser. Construct spill containment pad and curb to contain spills and drips occurring during hose disconnection. Drain pipe and valve are for manual removal of rainwater.]

[The design conditions are as shown on the RFP drawings provided in Part 6.] [The design conditions are as follows:

• [ Flow rate - \_\_\_\_\_\_\_\_\_\_\_\_\_\_ ]

• [ Flow pressure -\_\_\_\_\_\_\_\_\_\_\_ ]

• [ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ] ]

 **H501005 STEAM**

[Not used]

[Provide [new] [and] [modified existing] steam utility connections (risers) along the waterfront face of the [wharf,] [pier,] [and] [\_\_\_\_\_\_\_\_]. Connect the new risers to the [new,] [modified existing,] [and] [extended] steam line being provided as part of this project. Steam risers must include outlets for [ship service connection] [and] [\_\_\_\_\_].]

[The design conditions are as shown on the RFP drawings provided in Part 6.] [The design conditions are as follows:

• [ Flow rate - \_\_\_\_\_\_\_\_\_\_\_\_\_\_ ]

• [ Flow pressure -\_\_\_\_\_\_\_\_\_\_\_ ]

• [ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ] ]

 **H501006 COMPRESSED AIR**

[Not used]

[Provide [new] [and] [modified existing] [[high pressure] [and] [low pressure] compressed air utility connections (risers) along the waterfront face of the [wharf,] [pier,] [and] [\_\_\_\_\_\_\_\_]. Connect the new risers to the [new,] [modified existing,] [and] [extended] [high pressure] [and] [low pressure] compressed air lines being provided as part of this project. Compressed air risers must include outlets for [ship service connection] [and] [\_\_\_\_\_\_\_\_].]

[The design conditions are as shown on the RFP drawings provided in Part 6.] [The design conditions are as follows:

• [ High pressure system flow rate - \_\_\_\_\_\_\_\_\_\_\_\_\_\_ ]

• [ High pressure system flow pressure -\_\_\_\_\_\_\_\_\_\_\_ ]

• [ Low pressure system flow rate -\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ]

• [ Low pressure system flow pressure - \_\_\_\_\_\_\_\_\_\_\_ ]

• [ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ] ]

 **H501007 OTHER CIVIL/MECHANICAL UTILITIES**

[Not used ]

 **H501008 MISCELLANEOUS MATERIAL**

• [Pipe guardrails - Provide protective pipe guardrails for [all] [ \_\_\_\_describe locations\_\_\_\_ ] [new] [and] [modified existing] utility riser stations. Design and construct guardrails to prevent snagging of mooring lines, hoses and electrical cables and shall protect the risers from vehicle contact and damage. [Guardrails must be of stainless steel construction.]]

• [Pipe hangers and supports [– Pipe hangers and supports must be of stainless steel construction.]]

• [Hardware]

• [Miscellaneous metal]

• [ \_\_\_\_\_\_\_\_\_ ]

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NOTE: If the project involves the modification of existing piping and riser stations to accommodate the current project requirements, provide more details to describe the interface between the existing and new/modified systems. In addition, describe the conditions of the existing systems and what the Contractor is expected to do with the existing systems. If the existing distribution system is to be upgraded, make reference to the respective Paragraphs of ESR and PTS Sections G30, *Site Civil/Mechanical Utilities*.
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 **H5020 ELECTRICAL UTILITIES**

Provide [new] [and] [upgraded existing] electrical utilities for ship services along the waterfront. [Desirable locations of the electrical utility stations are shown on the RFP drawings provided in Part 6. Locate these utility stations within \_\_\_\_ ft ( \_\_\_ m ) of the locations shown.] [New] [and] [upgraded existing] electrical utilities include:

• [Electrical power distribution system,]

• [Telecommunication system,]

• [Lighting,]

• [Lightning protection,]

• [Electrical power boom,] [and]

• [ \_\_\_\_\_\_\_\_ ]

 **H502001 ELECTRICAL POWER DISTRIBUTION**

Design and construct Waterfront Electrical Power Distribution System as described herein[ and as shown on the RFP drawings provided in Part 6].

• Design and construct the electrical power distribution system to comply with UFC 4-150-02, *Dockside Utilities for Ship Service*, NFPA 70 and the requirements of the "Electrical Power Distribution System" paragraph in PTS Section H50 of Part 4.

• [Provide [ \_\_specify number\_\_\_ ] new electrical power outlet assemblies along the waterfront face of the [wharf,] [pier,] [and] [ \_\_\_\_\_\_\_\_ ]. [Provide new conduits, wiring, controls, receptacles, and [ \_\_\_\_\_\_\_\_ ] as part of the new electrical power outlet assemblies.] [The electrical power outlet assemblies must include:

• Ship power receptacles for [multiple three phase, three wire] for [480 volts, \_\_\_\_ Amperes,] [4,160 volts, \_\_\_\_ amperes,] [13.8 kV, \_\_\_\_ amperes] [and] [ \_\_\_\_\_\_\_\_ ] services.

• Industrial power receptacles for [three phase four wire 277/480 volts, \_\_\_\_ amperes,] [three wire 120/240 volts \_\_\_\_ amperes,] [115 volts] [and] [ \_\_\_\_\_\_ ] services.]

• [Upgrade [ \_\_\_specify number \_\_ ] existing electrical power outlet assemblies along the waterfront face of the [wharf,] [pier,] [and] [ \_\_\_\_\_\_\_\_ ]. [Provide new conduits, wiring, controls, receptacles and [\_\_\_\_\_\_\_] to effect the upgrade.] [Remove cables that are disconnected as part of the upgrade work.] [The upgraded electrical power outlet assemblies must include:

• Ship power receptacles for [multiple three phase, three wire] for [480 volts, \_\_\_\_ Amperes,] [4,160 volts, \_\_\_\_ amperes,] [13.8 kV, \_\_\_\_ amperes] [and] [ \_\_\_\_\_\_\_\_ ] services.

• Industrial power receptacles for [three phase four wire 277/480 volts, \_\_\_\_ amperes,] [three wire 120/240 volts \_\_\_\_ amperes,] [115 volts] [and] [ \_\_\_\_\_\_ ] services.]

• [Provide new [duct,] [manholes,] [hand-holes,] [equipment pads,] [and] [electrical power [and] [control] wiring] to the location of the [new] [upgraded] electrical power mounds.]

• [Test the electrical power outlet assemblies under load to demonstrate proper operation and to prove the integrity of all receptacles, cables, splices, [and] [ \_\_\_\_\_\_\_ ]. Specify and perform a test that proves all equipment operates satisfactorily under continuous full load conditions. Test all [ \_\_describe components to be tested \_\_\_\_ ]]

• [ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ]

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NOTE: If substation or transformer is to be located on the wharf/pier, add requirements here or make reference to ESR G40 and PTS G40.
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 **H502002 TELECOMMUNICATION**

Provide Waterfront Telecommunications System as described herein[ and as shown on the drawings provided in Part 6].

• [Provide [\_\_\_specify number\_\_] new telecommunication terminals along the waterfront face of the [wharf,] [pier,] [and] [\_\_\_\_\_\_\_\_]. The telecommunication terminals must include [ \_\_specify number of telephone or fiber optic cables\_\_.] [The telecommunication terminals must be integrated into the enclosures for electrical power outlet assemblies and housed in a separate compartment with separate access.] [Provide stand-alone telecommunication terminals consisting of equipment pad, cabinet, protective posts and railing.] ]

• [Upgrade [\_\_\_specify number\_\_] existing telecommunication terminals along the waterfront face of the [wharf,] [pier,] [and] [\_\_\_\_\_\_\_\_.] The upgraded telecommunication terminals must include [ \_\_specify changes in number of telephone or fiber optic cable \_\_ .] [The upgraded telecommunication terminals must be integrated into the existing electrical power outlet assembly enclosures and housed in a separate compartment with separate access.] [The upgrade must be done in existing stand-alone telecommunication terminals.] ]

• [Provide [ducts,] [manholes,] [hand-holes] [and] [equipment pad] as required.]

• [ \_\_describe who is to install the cables\_\_ ]

• [Coordinate the design with and incorporate the requirements of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ]

• [ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ]

 **H502003 LIGHTING**

Provide the Waterfront Lighting System as described herein.

Provide illumination on the waterfront between [ \_\_describe the landside limits where waterfront lighting is required\_\_\_ ] and the edge of [wharf,] [pier,] [and] [ \_\_\_\_\_\_\_\_ ]. [The waterfront lighting system must be integrated with the lightning protection system; the poles must support both the catenary wire and floodlights.] Desirable locations of the light poles are shown on the RFP drawings provided in Part 6. Locate these light poles within \_\_\_\_ ft ( \_\_\_ m ) of the locations shown. Floodlight fixtures must be listed for marine service. [Provide internal fixed louver shield and hood to minimize stray light and glare.] Illumination design criteria for the wharf lighting are:

• [ \_\_describe the required lighting level for operation\_\_\_\_\_]

• [ \_\_describe the required lighting level for security\_\_\_\_\_\_]

• [ \_\_describe the required lighting level over water\_\_\_\_\_\_]

• [ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_]

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NOTE: Following are a sample program requirement for emergency generator for waterfront lighting system.
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[Provide electrical powered wharf lighting system from an emergency electrical power system consisting of a diesel-electric generator set located at the new generator building. Wharf lighting controls must include photo control switches that automatically turn on the lighting during hours of darkness. Include provision for testing of the fixtures during daylight hours.]

 **H502004 LIGHTNING PROTECTION**

[Not used]

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NOTE: Following is a sample program requirement for Lightning Protection System for waterfront facilities involved in ammunition handling.
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[Provide a Waterfront Lightning Protection System as follows:

• Design and construct the lightning protection system to comply with UFC 3-575-01, *Lightning and Static Electricity Protection Systems* and NAVSEA OP 5, Chapter titled, "Lightning Protection".

• Provide a catenary wire lightning protection system in accordance with the design requirements[ and as shown on the drawings provided in Part 6].

• Design and provide catenary wire support poles that are self sustaining; do not use guy wires. Catenary wires must be supported at [\_\_specify height\_\_\_] nominal above grade. [\_\_\_specify any pole location/configuration/loading requirements\_\_\_\_ ]

• Install primary and secondary ground conductors between the lightning protection system poles. Install ground rods in grounding wells at the pole bases; provide ground system test points to permit periodic testing of the grounding system as required by NAVSEA OP 5 APPENDIX "E".

• Provide ground connection points along the waterfront for connection of portable electrically electrical powered and metallic equipment used on the [wharf] [pier]. Bronze "ball and cup" fittings and four-hole ground lugs must be embedded at a suitable location of the wharf structure such as the curbing at water’s edge. Ball and cut fitting and four-hole ground lug must be bonded to the secondary ground conductor and embedded in the pier structure at 9.84 feet (3 meters) on center. Alternate the ball and cup and lug fittings.

• Provide a ground test plan showing the entire grounding system, grounding electrodes, test boxes, tabulation of test points and testing procedure that complies with the requirements of NAVSEA OP 5 APPENDIX "E".]

 **H502005 ELECTRICAL POWER BOOMS FOR BERTHING OF SUBMARINES**

[Not used]

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NOTE: Following is a sample program requirement for Electrical power Boom for waterfront facilities for submarine berthing.
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[Provide electrical power booms to bring electrical power cables from electrical power outlet assemblies [\_\_\_\_describe locations of electrical power outlet assemblies\_\_\_\_] to the submarines. [Desirable boom locations [and] [ \_\_describe requirements such as configurationand access limits\_\_ ] are shown on the drawings provided in Part 6.]]

 **H502006 OTHER ELECTRICAL UTILITIES**

[Not used]

 **H5030 FIRE PROTECTION AND SUPPRESSION**

 **H503001 FIRE PROTECTION WATER DISTRIBUTION**

[Fire protection water distribution system must be capable of delivering the following flow:

• [[\_\_describe flow rate and pressure requirements\_\_\_] from the fire hydrants at the [wharf,] [pier,] [and] [\_\_\_\_\_\_\_\_].]

• [[\_\_describe flow rate and pressure requirements\_\_\_] for inboard connections on vessels at berth along [wharf,] [pier,] [and] [\_\_\_\_\_\_\_\_].]

• [For [wharf,] [pier,] [and] [\_\_\_\_\_\_\_\_] involve in ammunition handling, [\_\_describe flow rate and pressure requirements\_\_\_] topside when transferring ammunition to and from the berthed vessel.]

[See "Potable Water" and "Saltwater" paragraphs of this ESR H50 for additional requirements.] ]

 **H503002 FIRE ALARM**

[Provide new manual fire alarm pull stations and notification appliances [at the new light pole locations] [at new mounting pedestals]. [Remove existing manual fire alarm pull stations, notification appliances, and mounting pedestals] [and] [replace with new pull stations]. [Connect the new pull stations to] [\_\_describe connection or interface to existing fire alarm system\_\_] The new fire alarm system must be compatible with the existing system.]

--End of Section--