PUBLIC WORKS UTILITIES CRITERIA (PWUC)

For Design & Construction:
Electric, Sewer & Water

NAVFAC MARIANAS (NAVFACMAR) PWUC
Revision 2: 15 November 2018

This PWUC supersedes: PWUC dated 14July2011; Revision 1 dated 02April2015

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PUBLIC WORKS UTILITIES CRITERIA DESIGN AND CONSTRUCTION: ELECTRICAL, SEWER, and WATER

Record of Revisions / Changes		
Revision #	Date	Description of Changes
1	02 April 2015	Chapter 1, Section 1.2 & 1.4 added sentence to include AAFB Chapter 2, Added new Section 2.1.1 – 2.1.1.2 Government Services; Updated Section 2.3.4 – 2.3.4.1 Metering; Added SCADA Section 2.3.7 – 2.3.7.2.3 Chapter 3, Updated Section 3.3.12 Meters; Added SCADA Section 3.3.15 – 3.3.15.2.3 Chapter 4, Updated Section 4.4.1 Water Meters; Added SCADA Section 4.5.8 – 4.5.8.2.3 Chapter 5, Replaced with New Chapter 5, Smart Grid Section 5.1 – 5.2
2	15 November 2018	PWUC - Re-format the whole document, Significant re-write. Chapter 1, Updated Section 1.1 – added "Designers", changed "encouraged" to "required"; Updated Section 1.2 to indicate "NAFACMAR Public Works Utilities on Guam."; Updated Section 1.3 - changed "and" to "but it"; Updated Section 1.4 – clarified that electrical distribution is medium voltage (not high) and added reference to GUARNG Barrigada Complex; Updated Section 1.5 – Changed "Utilities" to "UEM"; Updated Section 1.6 – Complete re-write (incorporated requirement of previous sections 1.7 & 1.8); Added/Revised Section 1.7 – Utilities Connections; Added/Revised Section 1.8 – Meter Installation & Removal; Added Section 1.9 – Government Services; Added Section 1.10 – BOSC Services; Added Section 1.11 – Utility Outages; Added Section 1.12 – Availability of Utilities for Contractors; Revised previous section 1.9 – now Section 1.13 references. Chapter 2 – Updated Section 2.1 – Changed "Utilities" to "UEM", significant re-write – removed section 2.1.1 (requirement is now in Chapter 1); Updated Sections 2.3.1.7, 2.3.1.9, 2.3.2.2, 2.3.2.8, 2.3.3, 2.3.4, 2.3.5.2, 2.3.5.3; Added 2.3.5.4 - "Sectionalizing Termination Cabinet (STC)"; Updated Section 2.3.7, 2.3.8, 2.3.8.1 and 2.3.8.3; Updated

		Section 2.3.9.4 - Changed “170 MPH” to “180 MPH”; Updated Section 2.3.10; Updated Section 2.4 – now “Equipment, Spare Parts & Special Tools”, remove previous section 2.4.1 related to “utilities for contractors”; Updated previous Section 2.4.1.3 & 2.4.1.4 – now section 2.4.1.1 & 2.4.1.2; Updated Section 2.4.4 and added new Section 2.4.4.1.e; Updated Section 2.4.13.; Removed section 2.8. Chapter 3 – Updated Section 3.1.9; Removed Section 3.1.10 (requirement included in Chapter 1); Updated Section 3.2.1, 3.2.2, 3.2.13, 3.3.12, 3.3.15, 3.3.17, 3.3.19, & 3.5.2; Removed Section 3.7. Chapter 4 - Updated Section 4.2.1; Updated Section 4.2.7.2 – Changed “…class 200 (DR 14).” to “….class 235 (DR 18)”; Updated Section 4.2.8; Updated Section 4.4.1 – complete rewrite; Updated Section 4.11 – removed “References”, now “Construction Notes”. Chapter 5 – Renamed from “SMARTGRID” to “COMMUNICATIONS & CYBERSECURITY”; Significant rewrite Appendices - Added Appendix 1-7

FOREWORD

This is a living document that will be periodically reviewed, updated, and made available to users as part of the Naval Facilities Engineering Command, Marianas (NAVFACMAR) responsibility for providing technical criteria for design and construction projects in Guam. Defense agencies should contact NAVFACMAR for document interpretation and improvements.

Deviation from these criteria cannot be made without prior written approval of the NAVFACMAR, Utilities and Energy Management Product Line Coordinator (UEM PLC).

This document is effective upon issuance.

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TABLE OF CONTENTS

APPENDICES:

CHAPTER 1 - INTRODUCTION

1.1 GENERAL INFORMATION

Engineers, Designers and Contractors are required to consult with NAVFACMAR Public Works Department (PWD) on design and construction for projects on Public Works Utilities Systems. Recommended changes and/or deviations to these criteria with supporting rationale shall be sent to Utilities and Energy Management Product Line Coordinator (UEM PLC) for review and consideration.

1.2 OBJECTIVE

The purpose of this document is to provide common technical guidance and to ensure quality and consistency in design and construction for the NAVFACMAR Public Works Utilities Systems on Guam.

1.3 PURPOSE AND SCOPE

This document prescribes design and construction standards necessary to support NAVFACMAR Public Works Utilities. It has been developed from previous “lesson-learned” projects and it is intended for use by experienced engineers and contractors.

This document does not negate other referenced technical standards and common industry practices but is provided as additional criteria specifically for NAVFACMAR Public Works Utilities projects.

This document does not constitute a detailed technical design, construction, maintenance or operation manual, but it is issued as a requirement for all NAVFACMAR Public Works Utilities projects.

1.4 APPLICABILITY

This document applies to all designers and contractors preparing design or performing construction projects involving NAVFACMAR Public Works Utilities Systems on Guam projects including assets that are under NAVFACMAR PWD Utilities & Energy Management (UEM) at Navy Base Guam (NBG), Andersen Air Force Base (AAFB) & Marine Corp Base Guam (MCBG) (i.e., medium voltage electrical distribution, water distribution and sanitary sewer systems) and at Guam Army National Guard (GUARNG) Barrigada Complex (i.e., water distribution and sanitary systems). Include this document as reference to RFPs. Designers/Contractor should address any questions to the UEM PLC regarding applicability for their project.

1.5 WAIVER

Where a valid need exists and an alternate solution involving sound engineering and construction is available, designers and/or contractors can submit request for a criteria waiver to NAVFACMAR PWD UEM. Requests for waiver should include justification, criteria used, and other pertinent data.

1.6 PROJECT SUBMITTALS

Provide a minimum of three sets (hard/paper & electronic copies on optical disc [CD-R or DVD-R]) of design plans (with applicable Basis of Design, Calculations, Specifications, Response to Comments & correspondence), Shop Drawings, As-Built plans and Electronic Operations & Maintenance Systems Information (eOMSI) for review, comment, acceptance and for record purposes to NAVFACMAR PWD UEM via Contracting Officer.

Provide As-Built plans & eOMSI submittal to NAVFACMAR Base Operations Support Contractor (BOSC) technical library & respective Installation technical library.

Electronic submittals shall include native file formats (Word, Excel, GIS, AutoCAD, etc.) & pfd.

1.7 UTILITIES CONNECTIONS

The Customer/Customer Representative, Project Manager or Engineer-In-Charge must contact the UEM as early as in the planning process to verify the availability of utility services.

Forward the utility connection permit application package (see Appendix 1 & 2 for reference) to the Installation PWD UEM for review & approval.

1.8 METER INSTALLATION & REMOVAL

NAVFACMAR PWD UEM shall be informed of any meter (electric, water & sewer) installation and removal. Forward the meter change form (see Appendix 3 for reference) to the Installation PWD UEM for review, approval & acceptance.

NAVFACMAR UEM Billing & Allocations group shall be informed of the installation or removal.

1.9 GOVERNMENT SERVICES

Project (MILCON, SRM, Special projects) submittal reviews, facilities escort, site visits, utility service connections, shall be cost reimbursable

using project funding, as applicable. Project Manager / Contracting Officer to coordinate with NAVFACMAR UEM & Financial Management (FM) with regards to providing funding document & setting up a Job Order Number (JON).

Escort Services: On occasion, facilities engineering studies/investigations commissioned by other Navy Activities require others (A-E, outside consultants or other Navy Personnel) to access secured NAVFACMAR UEM operational areas (e.g. substation, booster pump facilities, sewer lift stations, etc.) where qualified NAVFACMAR PWD UEM escorts will be required. In such instances, the Navy facility sponsor (Project Manager / Contracting Officer) shall establish a Job Order account with the NAVFACMAR FM & UEM to reimburse the affected NAVFACMAR PWD UEM Work Center for escort by qualified maintenance personnel at the prevailing/established Work Center hourly labor rate. Such escort services will need to be arranged in advance with the supervisor of the affected NAVFACMAR PWD UEM Work Center.

The resources of NAVFACMAR PWD UEM or the NAVFACMAR BOSC shall not be committed to any Project team/Contractor's work plan without proper coordination.

1.10 BASE OPERATING SERVICES CONTRACTOR (BOSC) SERVICES

Facilities escort & site visits shall be coordinated with the respective Utility Annex Contracting Officer Representative (COR) & BOSC Annex Manager. Project Manager / Contracting Officer to coordinate with NAVFACMAR UEM & Financial Management (FM) with regards to providing funding document & setting up a Job Order Number (JON).

1.11 UTILITY OUTAGES

Contractor shall follow provisions in the contract related to utility outage request.

NBG Utility (Electric, Water & Sewer) outages, De-energization, or Energization support shall be coordinated with the NAVFACMAR BOSC Service Support Center. Cost related to Utility service outages / connections, shall be paid by Contractor to BOSC.

AAFB Utility (Electric) outages, De-energization, or Energization support shall be coordinated with the NAVFACMAR BOSC Service Support Center. Cost related to Utility service outages / connections, shall be paid by Contractor to BOSC.

AAFB Utility (Water & Sewer) outages support shall be coordinated with 36 CES Customer Service / Operations Support. Cost related to Utility service outages / connections, shall be paid by Contractor by providing Job Order Number to Work Center Supervisor when requesting support.

1.12 AVAILABILITY OF UTILITIES FOR CONTRACTORS

Reasonable amount of utilities (normally electricity & potable water) will be made available to the Contractor at the prevailing rates at the time of use.

Requests for installation of Contractor field offices utility services shall be forwarded to the Contracting Officer in accordance with the contract specifications. Request shall include the following information:

a. Site Plan, showing location of Contractor field offices, source/point of connection of electrical power or water, & proposed route of service conductors/water line. Plans proposing to route cables in the Navy's underground distribution system shall indicate the duct(s) to be used.
b. Electric One-Line Diagram, including load (kVA) and voltage requirements. Meter shall be provided by the contractor.
c. Water One-Line Diagram, including water flow & pressure requirement, and pipe size. Back flow preventer (BFP) & meter shall be provided by the contractor.
d. Meter (Electric or Water) & BFP to be used shall be calibrated. Provide calibration certificate to NAVFACMAR UEM representative. Calibration certificate shall be effective during the contract duration.

1.12.1 Paying for Utilities

For all construction projects where Government utilities are required for the Contractor’s use, typically for office trailers, the Navy contractually requires that the Contractor pay for Government utility service used (potable water, electricity, sewer, etc.). The Contractor shall also be responsible for, and pay for, associated costs of connecting, disconnecting, conveying utilities to the work site, meters, transformers, backflow preventers, etc. as necessary. Utility billing accounts shall be established with NAVFACMAR UEM. Coordinate with the Contracting Officer.

1.12.2 Contractor Account / Job Order Numbers

Contractors performing work shall establish separate job order numbers with the NAVFACMAR UEM & Financial Management (FM) for the use of any Navy-supplied electrical, potable water and wastewater provisions and services to be provided during the construction phase. Such accounts are usually established through the facilities project / Contract

administrator. Establish a separate NAVFACMAR Contractor account (Job Order Number) for required support by Government forces, to reimburse the affected NAVFACMAR Work Centers for pre-arranged services, materials and utility consumption. For projects located at the AAFB, Contractors shall provide Job Order Number to work center supervisor when requesting support.

Because the primary mission of NAVFACMAR UEM is to ensure reliable utility services to its customers, Emergency response efforts by government personnel (including NAVFACMAR BOSC) required to mitigate a utility emergency situation (i.e. electrical system damage, sanitary sewage overflows, broken waterlines, etc.) resulting from construction operations may also be charged to such Contractor accounts.

The resources of NAVFACMAR PWD UEM or the NAVFACMAR BOSC shall not be committed to any Contractor's work plan.

1.13 REFERENCES

The "Facilities Criteria (FC)", "Unified Facilities Criteria (UFC), and "Unified Facilities Guide Specifications (UFGS)" have valuable information and requirements relating to subjects that are addressed by these criteria.

Contractor shall comply with the applicable Facilities Criteria (FC), Unified Facilities Criteria (UFC) and Unified Facilities Guide Specifications (UFGS) located at http://www.wbdg.org.

If there is a conflict between these criteria and/or other NAVFAC publications and Government of Guam Standards, the engineer or contractor shall contact the Contracting Officer or Project Design Engineer. Where perceived conflicts may exist, the more stringent requirement will apply. The Contracting Officer or Project Design Engineer shall contact NAVFACMAR PWD UEM for further guidance.

CHAPTER 2 – ELECTRIC

2.1 GENERAL INFORMATION

This section covers electrical materials, equipment, and installation techniques used in general construction for electrical systems to be maintained by NAVFACMAR PWD UEM.

2.2 PRIMARY DISTRIBUTION SYSTEM CHARACTERISTICS

2.2.1 System Voltages

2.2.1.1 Primary distribution system voltage

Primary distribution system voltage is predominantly and preferred 13.8kV, 3 phase, 3 wire, except in few existing areas with 13.8/7.97kV and 4.16/2.4kV.

2.2.2 System Configuration

2.2.2.1 Radial Feed - Systems are generally radial in configuration from the main substations switchgears.

2.2.2.2 Loop Feed - Switches or other means of loop feed capability are required for new distribution transformers for back feed capabilities.

2.2.2.3 Double Dead Ended with Secondary Tie for Shore Power Stations

2.2.2.4 System Tie Feeders shall not be used to directly supply loads.

2.2.2.5 Dedicated shore power feeders shall not be used to supply non-shore power loads. Exception: Industrial loads associated with the pier. Dedicated underground electrical feeders shall provide Shore-to-Ship power only to ships/vessels. Provide a separate pad mounted transformer as a source feeder to industrial power at the wharf.

Figure 2-1 shows details for a 60 A industrial receptacle. Figure 2-2 typical details for a 200 A industrial receptacle.

Figure 2-1: Typical 60 A Industrial Receptacle

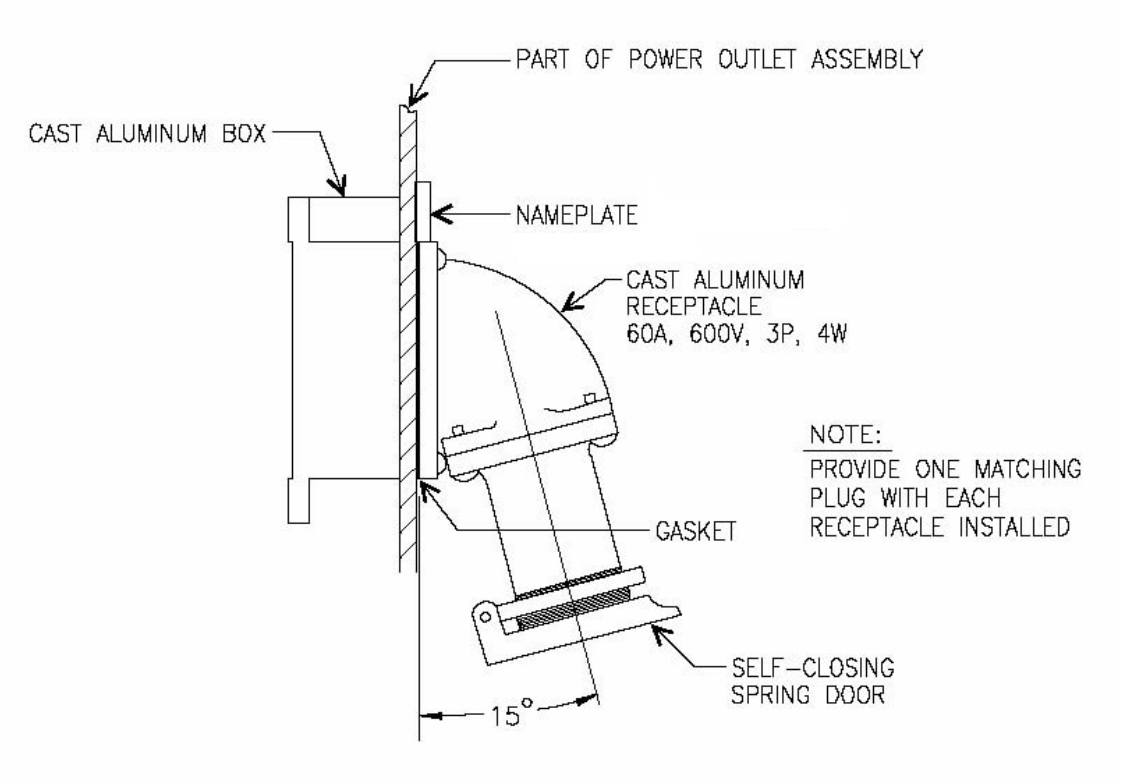
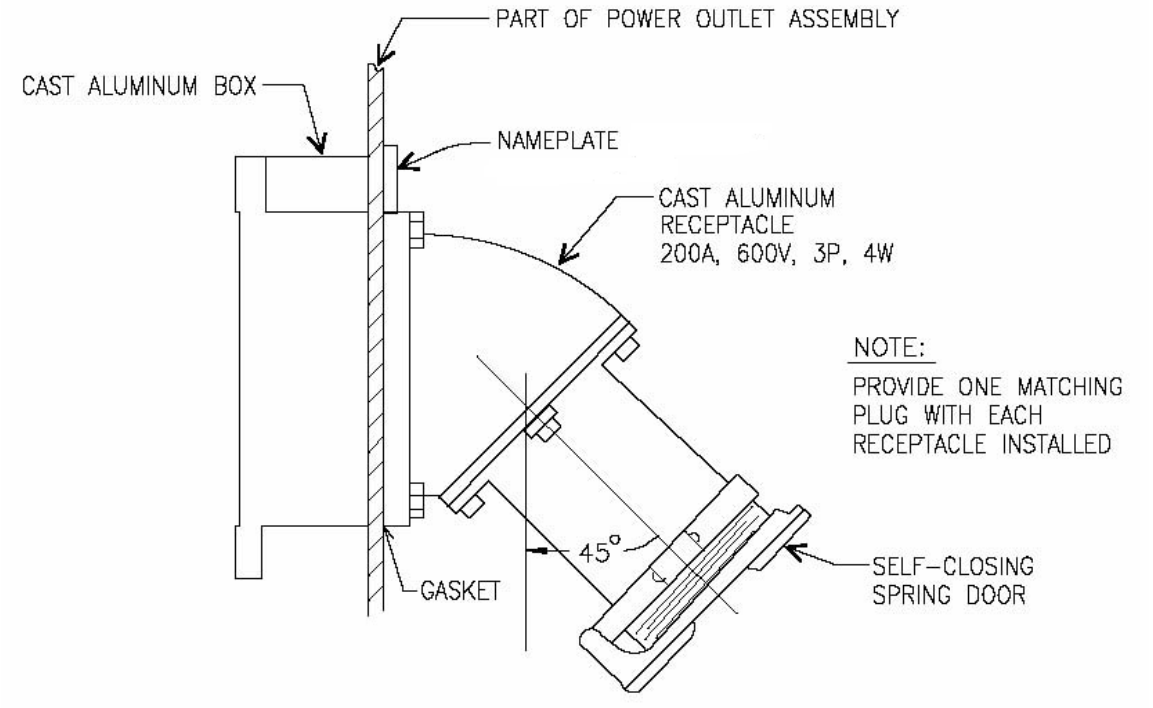


Figure 2-2: Typical 200 A Industrial Receptacle



2.3 EQUIPMENT

2.3.1 Transformers

2.3.1.1 Size – Distribution transformer size shall be limited to limit the short circuit current to within economical standard rating of the designed panelboard size associated with the electrical load. The size limit shall depend upon the secondary voltage of the transformer. Electrical designs shall include design analysis and transformer size calculations to be included in the basis of design and summary of electrical load calculations. Station Class Power transformers shall be provided with transformer monitor with SCADA features.

2.3.1.2 Protection

2.3.1.2.1 Primary Protection - All transformers shall be provided with appropriate primary protective devices, such as fuses, circuit breakers, interrupter switches, and/or relays, applicable and designed according to the transformer size.

2.3.1.2.2 Secondary Protection – should not be more than (1.25) X Secondary FLC or as required by the NEC.

2.3.1.3 Transformer Taps (see section 2.2.1 System Voltages above) - Provide four 2-1/2 % full capacity primary taps; two above and two below rated primary voltage.

2.3.1.4 Pad mounted transformer windings shall be made out of copper. Station class transformer windings shall be made out of copper or aluminum.

2.3.1.5 Transformers shall be insulated with non-PCB mineral oil or other approved environmentally friendly insulating oil due to recycling and disposal issues.

2.3.1.6 Submittal Requirements – Designers/Contractors shall submit the required complete transformer specifications to the NAVFACMAR PWD Utilities and the Project Design Engineer for review and acceptance prior to procurement. Transformer data shall include, but not limited to the following: winding and core materials and design, test data on insulation, conductors, resistance, dielectric strength, and losses.

2.3.1.7 Pad Mounted Transformers

a. Maximum size – 1000kVA. Transformers rated above 1,000kVA, serving 480/277 volt loads and above 2,500 kVA serving 480/277 volt loads must be in a secondary unit substation configuration. On

upstream of a transformer larger than 1,000kVA, provide pad mounted VFI switchgear with Tri-phase control devices and complete with features such as overload, ground and instantaneous fault protection. The pad mounted VFI switchgear shall be selectively coordinated with all supply side overcurrent protective devices.

b. Do not use dead front transformers if the available fault current exceeds 10,000 amperes symmetrical.
c. Constructed of stainless steel.
d. Provide liquid (oil) level indicator.
e. For loop feed systems, provide 3 each two-position load break primary switches with one set of primary fuses.
f. For loop feed systems supplying single phase transformers, provide three phase primary switches.
g. For loop feed systems and cable risers, provide auto-resetting, directional fault indicators for each phase.
h. For loop feed systems, provide cable fault indicator for each phase. The indicator shall be installed in the out-going side of the loop elbow.
i. Provide test point for the load break elbows.
j. Provide standard fuses instead of current limiting fuses. Exception: For pad mounted transformers connected directly to 13.8kV radial feeders, current limiting fuses will be allowed to reduce the available fault current. Expulsion and Current Limiting Fuse ratings shall be indicated in the Design Plans and As-Built Drawings.
k. Provide temperature gauge. On transformers over 500KVA, provide temperature sensor and all communications infrastructure and integration to the SCADA front end.
l. Provide spare set of fuses.
m. All kWh metering shall be installed on the pad mounted transformer's concrete enclosure and not on the transformer's metal enclosure.
n. Provide bushing mounted elbow type arresters at the end of all radials and in normally open locations in loops. Provide arresters for all voltage levels above 5kV.

2.3.1.8 Pole Top Transformers

a. Maximum number of transformers on a single pole shall be three. Limit pole-mounted transformer sized as follows:
   - Three phase installations – limited to three 25kVA transformers or smaller.
   - Single phase installations – limited to one 75 kVA transformer or smaller.
b. Transformer kVA size shall be labeled on the tank; labels with a minimum of 4" high lettering.
c. Covers shall be constructed of stainless steel.
d. Provide external tap changer.

2.3.1.9 Provide transformer identification number on transformer enclosure. Stencil in 4 inch high white lettering. Transformer ID label shall include the facility or building number it is feeding, the transformer's kVA and voltage rating (e.g. 13.8 kV 480/277VAC)

2.3.1.10 For loop feed systems supplying single phase transformers, identify transformer phase assignment (i.e. AB, BC, CA) and balance single phase loads. Provide cable tags identifying phase inside of primary compartment.

2.3.2 Switchgears

2.3.2.1 Breaker Control Voltages

a. Switching Station: 125VDC trip and close
b. Remote or End-of-Line Station (small sizes on isolated areas): use 48VDC or 120VAC trip and close

2.3.2.2 Breaker Indication Lights and Controls

a. Provide the following indication light colors for primary and secondary power breakers:
   1. Green – Normally Open
   2. Yellow – Open (Tripped)
   3. Red – Normally Closed

b. Indication lights shall be "push-to-test," transformer, resistor on diode type.

c. Controls for breakers shall be compatible with existing SCADA controls and shall be integrated into the SCADA front end. Follow section 5.

d. Provide each draw out breaker with three position operation. The connected position and the test/disconnect position shall be clearly identified by an indicator on the circuit breaker front panel.

e. Provide a portable lifter rated for lifting and lowering circuit breakers from two-high cubicles. Portable lifter shall have swivel casters in front for ease of movement.

2.3.2.3 Lightning Arrestors – shall be metal oxide varistor (MOV) type.

2.3.2.4 Busing - Primary and secondary bus shall be copper, fully insulated.

2.3.2.5 Insulators

a. Primary switchgears installed outdoors shall have insulators made of

porcelain due to Guam environment.

b. Primary switchgears installed indoors shall have insulators made of porcelain or approved polymer material.

2.3.2.6 Provide bus bar connection from primary switchgear bus to any required Potential Transformers instead of cable connection due to higher probability of failure for cable connections.

2.3.2.7 Cable entry into switchgear shall be sealed to prevent rodent entry. All spare conduit entry into switchgear shall be capped. All entry into switchgear from manholes shall be sealed in the manhole, including ducts with cables.

2.3.2.8 Primary Pad Mounted Switches:

a. Provide vacuum bottle technology with appropriate vacuum fault protection switch. Fault protection relay shall be SCADA ready. Air-insulated switch is prohibited for corrosive or coastal environment. The number of switch-ways will be in accordance with the appropriate design application (depending on the intended system configuration, a 3-way, 4-way, 5-way or at times 6-way switch may be required.
b. Provide key interlock for dual feed system.
c. Require cable fault indicators at switch. The indicators shall be installed in the out-going side of the loop elbow.
d. Provide type 304L or 316 factory-painted stainless steel enclosure.
e. Provide temporary grounding sets.
f. Switch shall be installed on concrete pad. Seal around opening between bottom of the switch and concrete pad with sealant or caulking to resist water, sunlight, and oils.
g. Provide VFI protection device equipped with programmable tri-phase with ground-trip electronic control logic, relay action indicator or detector, and port for laptop connection. The device shall be capable of storing fault events log data. Provide applicable software.
h. Provide high fire point liquid insulation and vacuum bottle interruption, dead front with stainless steel tanks and operator full size viewing windows for each way, three position (On/Off/Ground).
i. Provide NEMA ground pad (welded to tank).

2.3.3 Relaying

Provide relaying protections in accordance with the specified guidelines, standards, and specifications.

2.3.3.1 CT Type - Provide separate CT's for metering (metering accuracy) and relaying (relaying accuracy).

2.3.3.2 Installation

a. Meters and relays shall be mounted no lower than 2'-0" from the bottom of device to floor and no higher than 6'-0" from the top of device to floor.
b. Meters shall follow section 2.3.4 Metering.

2.3.3.3 Relays shall be microprocessor-based multi-function, programmable type, capable of communicating directly with the SCADA system, unless otherwise specified by NAVFACMAR PWD Utilities. If relays being provided do not already exist in the NFM PWD System, maintenance instruction/documentation, programmable software, and test instrument shall be furnished and included as part of the project. Coordinate with NFM UEM concerning any additional microprocessor-based relay features or functions available to the device that shall be enabled or activated.

2.3.4 Metering

For each facility or structure that is connected to the NAVFAC Marianas electrical distribution system, provide a kilowatt-hour and demand meter. Meters are owned and maintained as a functional part of the electrical distribution system, as well as the enclosures, switches, cabling, and other accessories that are critical to meter operation. Low voltage secondary cables and pathways are owned and maintained as an inherent part of the facility.

2.3.4.1 The NAVFAC Marianas Advanced Metering Infrastructure (AMI) system is the required system for utility revenue meters to connect to. The AMI system uses Modbus/TCP over Cat6 Ethernet and single mode fiber to network all meters back to centralized servers. New utility revenue meters are required to be AMI meters, and shall be compatible, programmed, and integrated with the AMI system in conformance to the AMI system architecture. All projects that will provide a new AMI meter shall include the following as part of planning, design, and construction:

a. Installation of new or upgraded OSP fiber optic cable infrastructure from the nearest NCTS wire center to the facility or structure that is being metered, as needed, to ensure at least two pairs of single mode fiber are available for use.
b. Installation of new or upgraded fiber optic cable termination panel, network switch, enclosure, intrusion detection relay and lock, and mounting pedestal, at the facility or structure that is being metered, as needed, to ensure conformance to the AMI system architecture.
c. Installation of new or upgraded AMI meter socket and enclosure,

intrusion detection relay and lock, network cabling and drops, and electrical circuit (must homerun to a point upstream of the electrical meter), as needed, to ensure conformance to the AMI system architecture.

d. Installation and commissioning of AMI meter, accessories, and all other AMI equipment, to also include submission of a change request form, cybersecurity commissioning as outlined in Section 5, delivery of AMI system inventory and network diagram documentation updates, and meter changeover documentation required by the NAVFAC Marianas UEM billing group. Provide wiring with ring lugs for all meter connections.

Meters shall be socket-type, ANSI class 0.2 or better, and able to communicate via an optical interface and Modbus/TCP over Ethernet. Meters shall have at least 32MB of non-volatile memory and shall be capable of automatically recording consumption data over time using a configurable time interval (standard setting will be 15-minute interval). Meters shall have Modbus mastering capability, and shall be capable of querying water meter RTUs via the network and storing water consumption and peak flow data over time using a configurable time interval (standard setting will be 1-hour interval). Meters shall be capable of measuring delivered kWh energy (delivered, received, net) and delivered kW demand (instantaneous, cumulative, peak), kVARh/kVAR, kVAh/kVA, PF (min, instantaneous, average), harmonic measurements (%THD voltage and current), voltage quality measurements (sags, swells, imbalances), and shall be capable of detecting and recording events for the conditions of voltage sags and swells, low power factor, high harmonics, high neutral current, hardware/memory failure, low battery, and wiring errors (e.g. reverse rotation on any phase). Meters shall also be equipped with digital input and output capability (e.g. KYZ pulse, relay).

Meter data and programming shall conform to the latest “AMI to MDM Call for Consistency” document and shall be programmed and integrated to be capable of automated remote reading. Submit a request for NAVFAC Marianas UEM to provide Device ID, Meter Point ID, and IP address/subnet mask/default gateway, prior to programming/configuration. Request must include project name, work description, ready-for-construction (RFC) site plan and one-line schematic.

Meter enclosures (and enclosures for associated equipment) shall be located on the facility exterior wherever possible, in a location that will ensure that utility personnel are able to freely access utility meters and their respective enclosures. If a suitable wall is not available for mounting AMI equipment, a reinforced concrete utility pedestal shall be provided to mount all necessary AMI equipment. Provide reinforced concrete bollards to prevent vehicle damage to AMI equipment if it is located such that it is

susceptible to damage caused by vehicle traffic, but do not place bollards in such a way that access to the enclosures and equipment is limited. All enclosures shall be capable of being secured via padlock, and shall be rated NEMA 4X stainless steel grade 316 or better, except that socket enclosures are permitted to be NEMA 3R stainless steel grade 304. Equip enclosures with molybdenum alloy stainless steel padlocks, common keyed to match existing. Provide surge protection devices and grounding as needed to protect AMI devices, accessories, and communications pathways. Provide a door sensor on the interior of each enclosure, to be wired as a digital input for intrusion detection purposes.

Provide test switches (ten-pole blocks) equipped with shorting bars (to prevent “open secondary” for current transformers), to enable technicians to remove the meter from the circuit for testing/maintenance purposes without effecting an outage. Provide wiring and cabling that is color coded in accordance with the latest applicable UFGS for electrical metering (26 27 14.00 20 at the time of this writing). Wiring must also be marked/labeled at both ends, in a way that is easily correlated with project record drawings. All wiring shall be performed in a professional manner with wire bundled and supported.

Coordinate all meter installations with the BOSC. The installer and the BOSC shall ensure that meter changeover information is properly documented at the time of any meters being changed out, using a form to be provided by NAVFAC Marianas UEM. Facility owner/activity must be identified properly on the form to ensure recording for billing purposes. Electrical metering characteristics after the changeover shall be verified to determine if any possible wiring errors or equipment malfunctions have occurred and (if any) shall be resolved at the time of the changeover.

Provide complete manufacturer documentation including installation, maintenance, testing, and user manuals. Manufacturer documentation shall also be provided for all other provided devices, accessories, and software.

If provided meter is not directly supported by the manufacturer for the existing AMI system front-end software (Schneider Electric ION Enterprise), provide software drivers that will enable the AMI system software to remotely interface with the provided meters, and to automatically retrieve meter data. Software drivers shall become property of the Navy, or shall be licensed to the Navy for unlimited utilization within the Navy. Turn over the source code and original files for all scripts, drivers, and/or configuration files that are created for the fulfillment of the project, and the Navy shall retain full ownership and all rights for such documents. AMI system access requirements and restrictions for personnel performing software integration work are given in Section 5.

Requirements for network devices and pathways are given in Section 5.

2.3.4.2 CT Type

a. Provide separate solid core CT's for metering (metering accuracy, +/- 0.3% or better) and relaying (relaying accuracy). Split core CT is not acceptable.

2.3.4.3 Installation

a. Meter base shall be mounted approximately 4’-0” from the floor. Switchboard type meters shall be mounted no lower than 2'-0" from the bottom of device to floor and no higher than 6'-0" from the top of device to floor.

2.3.5 Cables

2.3.5.1 Splicing Method and Material Restrictions

a. For heat-shrinkable joints: Do not use this method in an oil-contaminated manhole.

b. Primary cable splices shall be made only in electrical manhole not handhole.

2.3.5.2 Size

a. 500 kcmil copper: Distribution.
b. EPR, 15 kV, 133% UGN application, 5 mil, 25% overlap tape shield.
c. Single conductor
d. Provide counterpoise ground wire with all underground installations.
e. Provide complete grounding system in all underground electrical structure installations.

2.3.5.3 Installation in Manholes

a. Do not install more than 8 primary cables in one manhole.
b. Recommend do not install more than 2 circuits in one manhole.
c. Do not completely loop primary cables in congested manholes. Provide sufficient slack in cables for 1 set of splices.
d. Provide phenolic cable nameplates/tags (1/16” thick) secured by nylon tie wrap for primary and secondary cables. Nameplates shall be engraved with yellow background and black letters (1” high). Cable

tags shall include the circuit ID number, system voltage, phase, cable size, “from” where it originates and “to” where the cable goes.

e. Underground conduits shall be a minimum of 6” along main run between underground structures (for Air Force, conduits may be a minimum of 5”).
f. Ductbanks shall be reinforced for seismic conditions.
g. There shall be no separate splices, Bolted-T connections or load junction in a primary electrical manhole.

2.3.5.4 Sectionalizing Termination Cabinet (STC)

a. Provide STC instead of separable (Y or Bolted-T) splices.
b. Provide pad-mounted, dead-front sectionalizing termination cabinets, 600 Amps, 3 phase, 15kV, 600 Amps dead-break/200 Amps load-break bushings, 95kV BIL in IEEE C57.12.28 compliant stainless steel enclosures. Provide high profile sectionalizing termination cabinets when the conductor size is larger than 4/0 AWG to meet the cable bending radius requirement. Install fault indicators on all outgoing circuit feeds.
c. The STC’s bushing center point shall be at a minimum height of its concrete pad finished grade. Low profile STC is not recommended.
d. Provide cable fault locator to each phase of the outgoing (lateral) cables.
e. New fault indicators shall be intended for underground application trip level selection with auto adjusting, fault sensing range from 50 to 1200A, and minimum operating current of 3A. Provide battery powered fault indicator for lines with less than 3A load current. Self-powered fault indicators shall be provided for all main feeders and battery powered fault indicators shall be provided for branch lines to transformers.
f. Provide tags for all underground cables in all accessible locations such as in manholes, transformers, switchgear and sectionalizing termination cabinet.

2.3.6 Substations (End-of-Line).

Provide complete grounding system in all underground electrical structure installations.

2.3.6.1 For new stations, provide 2 incoming primary circuits with individual overcurrent protection.

2.3.6.2 Always provide CLF's for fused primary switches.

2.3.6.3 New Substation Buildings

a. At a minimum, provide 4" C to nearest MH for future telephone, SCADA requirements, unless otherwise specified in the project specifications. Provide communications pathway to the SCADA front end. New substation control systems shall follow section 5.
b. Provide door hasp for substation security; NAVFACMAR PWD Utilities will furnish its own padlock.
c. Provide double doors for all entry points.
d. Provide primary and secondary power cable trench from point of substation entry and between primary switchgear, transformer and secondary switchgear. This will allow installation and replacement of cables with less effort. Cables in trench shall be fireproofed and supported.

2.3.6.4 For outdoor substations with separate primary switchgear install a cable (instead of bus) connection between the transformer and primary switchgear.

2.3.6.5 Secondary Main Breaker Section:

a. Require an individual breaker section, separate from secondary switchboard, to be provided. The purpose of the section is to establish a demarcation point to identify the ownership between NAVFACMAR PWD Utilities and customer.
b. Require a draw out type breaker with solid-state trip device.

2.3.7 SCADA

2.3.7.1 When adding new SCADA components, the new components shall be compatible with and integrated for operation under the existing Navy Electrical System SCADA system. New remote SCADA components shall connect and be integrated to the central control station front end. The communication medium shall be fiber unless a waiver is received from Utilities. Communications and requirements for cybersecurity shall follow section 5. At a minimum, monitoring points shall include frequency, voltage, current, power, power factor, intrusion detection, and breaker status. Logging of these point's values shall occur at a minimum of 15 minute intervals. Control shall allow operation to open and close breakers remotely from the front end.

Contractor integrating new remote with existing master shall have the following (or equal) qualifications:

a. Certified by master station software vendors as "qualified" via attendance in formal training classes, etc.

b. Minimum 3 years of experience integrating specific remote equipment (RTU, Automation Controller, etc.) with existing master.

It is not acceptable for the Contractor to claim a status of “qualified” by taking master station software training classes after contract award.

The project shall include the following general requirements:

a. On-site training for Engineers and O&M personnel.
b. Factory training if necessary.
c. Site specific documentation (schematics, wiring diagrams, training documentation, user & troubleshooting manuals, etc.).
d. Configuration of master to remotely monitor/control new remote points and historize as necessary.
e. Creation of new remote station one-line diagrams and reports in master station HMI as necessary.
f. Site Acceptance Testing (SAT) and Factory Acceptance Testing (FAT), if deemed necessary.
g. New remote equipment (RTU, Automation Controller, etc.) shall have at least 50% expansion capability fir additional points.
h. New equipment spare parts.

When providing and integrating Intelligent Electronic devices (IEDs), include the following:

a. Logic diagrams with accompanying narratives.
b. IEDs configuration files.
c. IEDs Front Panel Faceplate display in master station HMI for each IED. This IED HMI faceplate shall display the correct status (ON/OFF) of each IED Target LED.

2.3.8 Manholes/Handholes

2.3.8.1 For new manholes/handholes:

a. Provide a manhole cover with the word “ELECTRIC” stamped in the center. Bond manhole cover with a minimum 6 AWG conductor to the manhole ground loop.
b. Prevent surface water entry by elevating entry opening above surrounding terrain except in sidewalks. Manholes/handholes are not allowed in roadway areas. Underground electrical lines shall not be designed within the roadway areas unless the electrical line’s crossing is required for tie-in and/or completing the design for the service area.
c. Coat exterior walls to prevent infiltration of liquids such as water and oil.
d. Provide closed sump if located below sea level or in liquid (water, oil, etc.) saturated soil. Otherwise, provide open sump.

e. Seal all ducts entering manhole/handhole.

2.3.8.2 For new manholes/handholes, provide:

a. An identification number embedded on the manhole rim on at least four different locations.
b. Manholes, sized accordingly to provide adequate space for personnel, cables and future requirements. Minimum size of manhole shall be in accordance with applicable UFC standards, unless otherwise specified in the contract specifications or by NAVFACMAR PWD Utilities.

2.3.8.3 For new handholes, provide concrete covers to prevent unauthorized access. For medium voltage handholes with concrete cover, provide ID labels engraved onto the concrete frame or concrete cover. Minimum size of handhole shall be of 4' x 4' x 6'; unless otherwise specified by NAVFACMAR PWD Utilities.

2.3.9 Overhead Distribution Systems

2.3.9.1 Fuse cutouts shall be load break cutouts and made of porcelain material.

2.3.9.2 Do not connect to existing primary overhead lines using a mid-span tap and slack span for the following reasons:

a. Lower strength of connection, especially during poor weather conditions.
b. Our shops normally do not stock the connectors for mid-span taps.
c. A higher probability that the primary line must be de-energized for maintenance and repair due to the slack span.

2.3.9.3 Minimum size of new primary lines shall be #2 (solid).

2.3.9.4 Poles shall withstand the 180 MPH wind speed and loading criteria.

2.3.9.5 Minimum diameter for pole ground rod shall be 3/4" diameter X 10' length and made of copper clad steel.

2.3.10 Miscellaneous Equipment

2.3.10.1 Heaters

a. Heater for primary and secondary switchgear is required.
b. Heaters must be operational after the switchgear is installed, before and during commissioning. Heaters shall have thermostatic control and shall have automatic control features.

2.3.10.2 When retrofitting existing equipment, the design shall provide the nameplate data.

2.3.10.3 Installation of Equipment Not Owned by NAVFACMAR PWD Utilities.

Equipment not owned by NAVFACMAR PWD Utilities shall not be located in, attached to or consuming electrical power from NAVFACMAR PWD Utilities electrical facilities (substations, switching stations, etc.). If this is not possible the owner of the equipment shall submit a written request to NAVFACMAR PWD Utilities explaining why alternative equipment location is not possible. If the request is approved:

a. The equipment shall be tagged clearly identifying the owner.
b. NAVFACMAR PWD Utilities reserves the right to remove or relocate the equipment
c. We may require the installation of a kWh meter for electrical billing purposes.
d. If electrical service is supplied from a panel board in the facility, the equipment owner will have to depend on NAVFACMAR PWD Utilities forces to allow access into the facility for resetting the panel board circuit breaker, etc.

2.4 SPECIFICATIONS

2.4.1 Equipment, Spare Parts & Special Tools

2.4.1.1 All equipment containing dielectric fluid shall be accompanied by the manufacturer's certification that the equipment contains no detectable PCB's or that the PCB level is less than 1 PPM, IAW OPNAVINST 5090.1A (Environmental Natural Resources Program Manual) dtd 2 Oct 90.

2.4.1.2 Provide spare parts and special tools for equipment to be provided under contract - fuses, circuit breaker test set, tools, protection relay test kit, etc.

2.4.2 Relays

2.4.2.1 Testing

a. Relay Wiring Testing: Testing and verification of CT ratio and polarity and relay operation shall be done by primary current injection.
b. Differential protective relaying circuits shall be tested under load in addition to the primary current injection testing.

2.4.2.2 Time-Current Curves: Submit original manufacturer's published time-current curves of transformer fuses, secondary breakers, relays, etc. for application of relay settings.

2.4.3 Switching

Only the BOSC Utilities Electrical Power Distribution personnel are authorized to perform switching. Do not use the term "de-energize".

2.4.4 High Voltage Cables

2.4.4.1 Hi-Pot Testing

a. Conduct the tests in three phases: 1) For the existing conductors, 2) For the new conductors after installation, splices and terminators/connectors and before terminating to equipment or splicing to existing conductors, 3) For any of the combined new and existing conductors or new terminators/connectors and existing conductors.
b. New Cables: Perform field acceptance tests on new cables in accordance with ANSI/NETA ATS and IEEE 400.2. Tests must be shield continuity test, insulation resistance test and very low frequency (VLF) alternating voltage withstand test/Hi-Pot for a duration of 60 minutes using a sinusoidal waveform.
c. Existing Cables/Existing cables connected to new connector, terminator and or new cables: Perform field maintenance tests on combined existing cables, new connector, terminator and or new cables in accordance with ANSI/NETA MTS and IEEE 400.2. Tests must be insulation resistance test and very low frequency (VLF) alternating voltage withstand test/Hi-Pot for a duration of 30 minutes using a sinusoidal waveform.
d. Furnish a copy of Hi pot test report certified and signed by the Contractor and DOR to NAVFACMAR PWD Utilities for review and comments upon completion of testing.
e. Label all medium voltage cables – Tags or labels shall include the voltage rating, phase size of cable, circuit identification, and “to” and “from” information. Cable tags shall be in conformance with UFC and UFGS criteria.

2.4.5 Outages

2.4.5.1 Electrical outages shall be requested in writing in accordance with the contract requirements.

2.4.5.2 Electric Power Generator support for scheduled electrical outages on critical facilities (including housing) due to construction contract work shall be provided by the Contractor.

2.4.6 Pier (Shore) Power Outlet Assemblies and Cables

2.4.6.1 Insulation resistance readings for 600 volt class shore power cables shall not be less than 100 mega ohms.

2.4.6.2 Single conductor, 600A pier receptacles shall meet standard configuration.

2.4.6.3 Each pier receptacle shall be 400A minimum load tested as a complete system for a period of not less than 4 hours. NAVFACMAR PWD will not provide the load bank to load test the pier receptacles. Power required to load test shall be charged to the Contractor.

2.4.7 Conductors

2.4.7.1 All conductors (primary and secondary) including equipment buses, transformer windings, etc. shall be made of copper subject to UFC 3-550-01 Par 3-11.1 restrictions.

2.4.8 Asbestos, Other Environmental Hazards and Personnel Safety

2.4.8.1 NAVFACMAR PWD Utilities has information on the removal of asbestos fireproofing on primary cables in manholes. However, the designer is still required to field verify conditions.

2.4.8.2 NAVFACMAR PWD Utilities is not responsible for ensuring a safe working environment in manholes. Therefore, NFM is not responsible for testing for and removing asbestos, water, oil and oily water from manholes in support of a construction contract. Provide dewatering in accordance with approved waste water disposal plan.

2.4.8.3 All Contractors shall coordinate entry into manholes and substations with BOS Contractor via the Contracting Officer for the project. Cost associated with the support of the BOS Contractor shall be charged to the Construction Contractor.

2.4.9 Equipment Operation and Maintenance Manuals

2.4.9.1 NAVFACMAR PWD Utilities requires a minimum of three bound manuals and one digital version for new equipment. If new equipment is to be installed at multiple substations/locations, then the manuals shall be separated and identified by substation/location.

2.4.9.2 Submit the O&M manuals to NAVFACMAR PWD Utilities prior to start of acceptance (walk thru) inspection.

2.4.10 Prevention of Damage to Underground Utilities

2.4.10.1 Although clearances are issued by the BOSC, toning prior to any excavation is highly recommended. Contractor shall refrain from utilizing mechanized heavy equipment when excavating near known underground utility lines. Excavation should be performed by means of hand-held tools (e.g., shovel and pick) or small power tools. When hand-held power tools are utilized, extreme care must be practiced to avoid causing damage to any existing underground utility lines.

2.4.11 Emergency Eyewash Equipment

2.4.11.1 Emergency eyewash equipment shall conform to ANSI Z358.1 (Plumbed and Self-Contained Eyewash).

2.4.12 Warning Signs

2.4.12.1 Provide warning signs for new substations with equipment ratings that exceed 600 volts as required by ANSI Z35.1. Metal signs with the legend "DANGER HIGH VOLTAGE KEEP OUT" shall be provided in three lines of nominal 3-inch high letters and installed on the exterior walls (front, sides and rear) of the pad mounted equipment concrete enclosure.

2.4.13 Energization

Field test of all equipment (transformer, switchgears, cables, and other testing requirements results) shall be performed in accordance with the contract specifications. Contractors and Electrical Designer of Record shall certify and sign the test results and provide to NAVFACMAR PWD Utilities and the Project Design Engineer for review and acceptance. Copy of test results shall be provided to BOSC for review prior to energization date.

Field inspection to the new electrical equipment and any existing equipment affected by the construction work shall be performed prior to energization. PWD UEM/BOSC Utilities Engineering shall be informed in advance concerning any scheduled electrical utility inspection.

2.5 SYSTEM ADEQUACY

2.5.1 Contractor/Designer's Responsibility

It is the Contractor/Designer's responsibility to evaluate & ensure that the existing electrical system can accommodate any proposed increase in load. If the existing electrical system cannot accommodate the proposed increase, Contractor/Designer shall include in the design any necessary upgrades to accommodate the increase in load. Cost of upgrades shall be funded by the proposed project. Coordinate with NAVFACMAR UEM.

2.5.2 System Coordination & Design Analysis

System coordination study and design analysis, recommended ratings, and settings of protective devices shall be accomplished by a registered professional electrical engineer with a minimum of 5 years of current experience in the coordination of electrical power systems. The complexity and extent of the study is dependent on the work required (e.g. type and load of facility addition, reconfiguration or replacement of utility infrastructure, etc.). It is the Contractor/Designer's responsibility to ensure that the protective devices specified for any project coordinate properly with any existing upstream/downstream protective devices.

2.6 DUCT ASSIGNMENT

2.6.1 The identifying, routing and assignment of ducts will be the Design Engineer's responsibility.

2.6.2 NAVFACMAR PWD Utilities requirements are summarized below:

a. Verifying the existence and serviceability of existing ducts is the responsibility of the requesting party.
b. The last spare duct in each duct section is reserved for emergencies, and therefore is not available for use.

2.7 TELECOMMUNICATION (INCLUDING TELEPHONE, CATV, AND FIBER OPTIC CABLES)

Designers/Contractors shall coordinate design and construction with the respective telecommunication owners, unless otherwise specified in the projects' specifications.

Designers/Contractors shall provide the necessary ducts and fiber optic cables/connections for the appropriate Industrial Control System (e.g. DDC, SCADA, AMI) required to be installed and shall follow section 5.

CHAPTER 3 - SEWER

3.1 GENERAL INFORMATION.

This section covers general information for sewer facilities including wastewater distribution and lift station systems, as applicable.

3.1.1 Subsurface Oil.

When performing excavations in areas where oil may be encountered, include appropriate construction/contract provisions to address the handling and disposal of the oil as necessary and to prevent the inflow of this ground oil into the sewer collection system from construction activities.

3.1.2 Existing Underground Utility Lines.

Plans and specifications shall require the toning of any area to be excavated for underground utility lines. In areas where non-metallic pipe lines may be present, ultrasonic detection methods or field-locating grade nodes (manholes, cleanouts) may be used as appropriate. Gravity sewer alignments and depths can generally be determined from open inspections of existing grade provisions (manholes and cleanouts). Ground Penetrating Radar (GPR) systems shall be used prior to excavation in all Shipyard areas. Research “as-built” construction drawings, and perform field investigations, to ensure that all known underground utility lines are identified on the construction drawings prior to actual field excavations. Perform soil borings sampling and testing when required. Include a note and/or specification to indicate the cost of repairing any damaged underground utility line shall be borne by the Contractor regardless of whether or not the utility lines are depicted on the construction drawings.

3.1.3 Diversion of Sewage/Spills.

Plans and specifications shall require the Contractor to be responsible for diverting sewage as necessary for performance of work. The Government will not perform sewage diversion operations for the Contractor however will provide an end point for sewer disposal. The Contractor shall supply all labor and equipment necessary to compliantly perform his operations which may include the use of bypass pumps, tank trucks, temporary piping/hoses, etc. The Contractor will also be responsible for any sewage spills and regulatory fines resulting from construction operations. See section 3.1.7 for outages.

3.1.4 Temporary Connections for Contractor Trailers.

Any Contractor requiring a temporary sewer connection shall submit a request to perform work on the Navy's sewerage system with plans or sketches to NAVFACMAR BOSC for review and approval prior to making the connection (see section 3.5.1). The Contractor is responsible for metering utility consumption for billing purposes. The submittal should be made through the Contracting Officer or facilities Project Manager as appropriate. Upon completion of the work, the Contractor shall terminate the connection as prescribed by NAVFACMAR BOSC. Onsite Government inspection may be required. Abandoned temporary connections with open cleanouts are not allowed.

3.1.5 Dewatering into the Sewer Collection System.

Construction dewatering into the Navy's sewer collection system is not permitted. Batch discharges of other types of wastewater into the Navy's sewer collection system require case by case approval by NAVFACMAR EV. Discharges of hydro-test water, dechlorinated water from pipe line disinfection and flush water from storm drain cleaning is not permitted into the Navy's wastewater collection system. These are considered to be non-industrial wastewaters that can be disposed of by means other than by discharge into the domestic sewer collection system.

3.1.6 Construction Notes.

Construction drawings should include pertinent project-specific sewer notes or construction notes to clarify or bring attention to certain construction requirements that directly or indirectly affect the Navy's sewer collection/transmission systems and those who work on these systems. Some of the following sewer notes may apply to typical sewer construction work. The designer may choose to modify these notes and/or provide other project-specific notes as deemed applicable to the scope of work.

a. The Contractor shall be responsible for performing and maintaining any incidental sewage bypass pumping or diversion work that will be required to accomplish the construction work.
b. For any new concrete surface that will be exposed to sewage flow, the Contractor shall maintain sewage bypass/diversion operations for the duration of the specified curing time for the concrete.
c. The Contractor shall be responsible for providing and maintaining temporary power as necessary to maintain normal lift station operations.
d. The Contractor shall be responsible for damage to any Government utility system resulting from construction operations; any damage shall be reported immediately to the Contracting Officer or appropriate Government Representative. Any sewer repair performed by the

Contractor shall be inspected by the NAVFACMAR PWD Utilities via the Contracting Officer's representative prior to backfilling.

e. The Contractor will be responsible for regulatory fines or penalties that may be imposed by environmental regulatory agencies (NAVFACMAR EV and/or EPA) in the event of sewage overflow or spill resulting from construction operations.
f. The Contractor shall reimburse the Government for any emergency response effort that may be required by Government forces to mitigate the adverse effects of any sewage overflow or spill resulting from the Contractor's operations.
g. Any sewer manhole to be abandoned shall have its cone section removed and disposed of, pipe penetrations plugged with Class "C" concrete and the remaining riser structure backfilled and compacted to finish grade.
h. Cleanouts on any abandoned service lateral shall be plugged and terminated a minimum of 12 inches below finish grade.
i. Prior to abandonment, pipe shall be filled with flowable fill as noted.
j. The Contractor shall contact NAVFACMAR BOSC Wastewater Manager (phone: 339-1794) via the Contracting Officer's representative to make arrangements for the Government to take custody of salvageable sewer manhole frames and covers. Manhole frames and covers not accepted by the Government shall be disposed of by the Contractor.
k. When working on dockside or under pier ship wastewater collection system piping, the Contractor shall first mechanically secure and tag out hose connections along the entire length of the common pressure manifold prior to working on the system.
l. Potentially lethal levels of hydrogen sulfide (H2S) gas may develop in the gravity sewer collection system.
m. The Contractor shall ensure that loose material, tools and equipment from construction operations are appropriately removed from the sewer collection system. Any damage to downstream lift station equipment resulting from negligence will be assessed to the Contractor.
n. Prior to securing potable water outages in mains or service connections, the Contractor shall first provide and maintain a backup seal water provision to lubricate pump seals at the affected sewer lift station shown on the plans. Coordinate access to the affected lift station, at least 3 days in advance of the outage, with the NAVFACMAR BOSC Wastewater Manager (phone: 339-1794) via the Contracting Officer's representative.
o. Adjust all manhole frames and covers to the new finish grade and ensure the adjustments prevent surface runoff inflow. Mark all covers as SEWER.
p. Provide 3 days advance notice to NAVFACMAR PWD Utilities via the Contracting Officer, for joint ROICC or FEAD/NAVFACMAR PWD

Utilities inspection of any new wye saddle construction for new service connections to existing sewer mains.

q. During periods of non-work and for the duration of contract work within the secured perimeter of the lift station, the Contractor is responsible for securing access gates, doors and security. After normal working hours, the Contractor is responsible for properly securing access gates, doors and security fencing.
r. Upon completion of the sewer construction, make advance arrangements (3 working days minimum), through the Contracting Officer's representative, with NAVFACMAR PWD Utilities Water/Wastewater Superintendent (phone: 339-2397) for final acceptance inspection of the new sewer construction.
s. Construction dewatering into the Navy's sewer collection system is prohibited.

3.1.7 Outages.

As much as possible, sewage flow shall not be interrupted. Contractor-provided bypass measures should be incorporated into the design of the project. When brief outages will be required at sewage lift stations for work involving motor controls, control valves and pressure mains, the designer should determine a reasonable outage period based on available engineering information. The designer should also coordinate construction requirements with the NAVFACMAR BOSC Wastewater Manager (phone: 339-1794). The ideal time for lift station outages would be during low-flow periods, normally at midnight. The designer should, during the design phase, discuss the details of such planned outages with the Lift Station section Supervisor. In rare situations, Government forces may be required to assist the Contractor by securing operational controls during the outage period. Such Government services will be charged to a pre-established and cost-reimbursable Contractor or project-sponsor job order account and shall be arranged/planned in advance with the NAVFACMAR BOSC. For lift station outages, the Contractor should also plan for and provide standby emergency contingencies, to prevent system overflows (Contractor's responsibility). Contractors shall provide and maintain interim emergency generators or portable pumping provisions to maintain normal sewage flow as needed to perform the work.

3.1.8 Requests for Information from Government Contractors and Outside Parties.

All requests for information on the Navy's wastewater system by Government Contractors and other outside parties shall be made via the cognizant Navy Contract Administrator, Project Design Engineer, Program/Project Manager or responsible Navy Facilities Representative who will validate the requests against the scope of contracted services to

ensure that only information pertinent to the scope of contracted services is released. The Navy makes no representation that released documents and files (e.g. record drawings, maps, reports, studies, etc.), hard copy or otherwise, or the information they contain, are accurate, current or complete.

3.1.9 Contractor Submittals.

Contractor submittals, as noted, shall be forwarded to NAVFACMAR PWD UEM, via the Contracting Officer, for review and approval as applicable. Also see Chapter 1 for project submittals.

3.1.9.1 Post-Construction CCTV Video.

Provide a post-construction video recording (DVD) of the pipe interior for all new or replaced sewer mains (manhole-to-manhole). See section 3.2.12.5.

3.2 SEWER LINES.

This section covers requirements for new sewer installations and repairs, as applicable.

3.2.1 General Location.

Structures (including but not limited to buildings, backflow preventers, transformer pads, mechanical equipment and anchor walls) shall not be built over new or existing sewer lines. As a general rule-of-thumb, consider a 1:2 depth-to-width sewer line excavation clearance. For structures that can transmit live loads to the foundation (e.g. – flag poles, utility poles), a structural or soils engineer should establish the appropriate horizontal setback distance, but in no instance shall any structure be located closer than 3-feet from any sewer line. To the fullest extent possible, a horizontal clearance of at least 10-feet shall be provided between water lines and sewer lines. New sewers crossing above potable water lines must be constructed of suitable pressure pipe or fully encased in concrete horizontally 10 feet on each side of the crossing with a vertical distance of 12 inches from the bottom elevation of the concrete encasement or pressure pipe to the top elevation of the water pipe. Force mains will have no joint closer horizontally than 3 feet to the crossing, unless the joint is encased in concrete. The thickness of concrete encasement will be a minimum of 4 inches at pipe joints. Depressed sewers crossing potable water lines must be installed below the water line with a minimum vertical clearance of 2 feet. Sewer joints will not be closer horizontally than 3 feet to the crossing, unless the joints are fully encased in concrete as required above. Sewerlines shall not be designed within roadway areas unless the sewerline’s crossing is required for tie-in and/or

completing the design for the service area.

3.2.2 Manhole and Valve Locations.

Traffic rated manholes and valve structures shall be located adjacent to roadway areas or in serviceable vehicle corridors, especially in family housing areas. This is to ensure that maintenance vehicles are not forced to drive over grassed lawns or landscaped areas. Adequate clearance or minimum of 5 feet between the edge of a building (wall and roof line) and other structures should be provided to enable repair of the lines by use of heavy equipment. Traffic rated manholes and valve structures shall be required in all areas. Manholes and valve structures shall not be allowed in roadway areas. In family housing areas, concrete and grout shall be provided to remove trip hazards and sharp edges of manhole frames and structures.

3.2.3 Cover.

The minimum cover for sewer lines and force mains shall be 3 feet (sufficient cover shall be provided to protect the pipe from superimposed surface loads in accordance with applicable UFC standards). Require the installation of a buried warning and identification tape on all sewer lines and installation of tracer wire over non-metallic sewer pipes.

3.2.4 Pipe Jackets.

Use reinforced concrete pipe jackets where minimum pipe cover is not available. Use of reinforced concrete pipe jackets should also be considered at sewer and water line crossings, where minimum horizontal and vertical clearances between sewer and water lines cannot be obtained. All concrete jackets shall be structurally reinforced. Concrete jackets shall fully envelop the nearest pipe joint to ensure that no adverse shear stresses are placed on the joint.

3.2.5 Deflections.

Maximum deflection for pipe joints shall be limited to 80% of the deflection recommended by the manufacturer.

3.2.6 Velocity.

Flow velocities for gravity and pressure mains shall be as follows:

a. Flow velocities in gravity mains shall be within the range of 2 feet per second to 10 feet per second. Design sewers to give mean velocities of not less than 2 feet per second when flowing full.

b. Flow velocities in pressure mains shall be designed to be within the range of 3-5 feet per second to ensure adequate scouring during diurnal peak flow periods. In order to minimize pipe friction losses, maximum transmission velocities shall not exceed 6 feet per second under normal operating conditions.

3.2.7 Flow.

Manning design flow calculations shall be submitted with design review submittals. In the absence of any hydraulic assessment based on actual measured flow data, and as a condition of allowing a service connection, NAVFACMAR PWD Utilities may require that any facility project that proposes to increase flow in an existing system also upgrade the size(s) of downstream collection mains as deemed necessary to compliantly accommodate peak design flows. This assessment is best made during the planning stage of a project, through consultation with NAVFACMAR PWD Utilities prior to developing project cost estimates. Generally, it is not desirable to design sewers for full flow, even at peak rates. Therefore trunk and interceptor sewers will be designed to flow at depths not exceeding 90 percent of full depth; laterals and main sewers, 80 percent; and building connections, 70 percent. This design approach will provide sufficient air space above the liquid space to assure proper ventilation, preventing the accumulation of explosive, corrosive or odorous gases, reducing the generation of hydrogen sulfide, and preventing the sudden loss of carrying capacity with surcharging at manholes. However, regardless of flow and depth, the minimum sizes to be used are 6-inch for building connection and 8-inch for all other sewers. Building connection that do not carry sanitary waste and will transport liquids with little or no solids can be smaller than 6-inch, but no smaller than 4-inch. Industrial applications will use the same design criteria as sanitary sewers, except pipe material that is resistant to the waste will be specified. To minimize the propensity for pump cavitation problems and to ensure that an efficient hydraulic transmission system is provided, provide Hazen-Williams hydraulic system calculations to justify transmission system designs.

3.2.8 Pipe Slope.

Minimum pipe slopes for design purposes are as follows:

Diameter (inches)	Min. Slope (ft/ft)
6	0.0060
8	0.0044
10	0.0032
12	0.0032
15 and larger	0.0020

3.2.9 Pipe Bedding.

To minimize the development of concentrated stresses at pipe joints, provide graded granular trench bedding material around the entire circumference of all new sewer pipes. Provide a cross-sectional detail to depict this requirement.

3.2.10 Thrust Blocks.

Particular attention and caution shall be exercised when working near pressure main thrust blocks; the designer should include appropriate provisions in the design to prevent the disturbance of supporting soil around thrust blocks during construction operations. Thrust blocks for underground pressure lines are not typically shown on as-built file drawings. Soil buckling around thrust blocks for sewer force mains and water mains can result in major damage to underground utilities.

3.2.11 Landscape Setback.

Trees shall not be planted closer than 20 feet, and shrubs/hedges not closer than 5 feet from a new or existing sewer line. In exceptional situations where landscape setback requirements cannot be met, dwarf palm trees (such as Manila or Dwarf Date) may be planted up to 10 feet of a sewer provided the requestor (Class 1 property owner) is able to demonstrate that such plantings will not cause any damage to underground utility lines (e.g. – feeder roots will not penetrate gravity sewer pipe joints). Also, in the event excavation for future repairs to the underground utility lines become necessary, NAVFACMAR PWD Utilities will not fund for removal, relocation, disposal or replacement of any affected planting. The requestor shall fund for and make any necessary alternative arrangements with the Outdoor Circle (or any other concerned party), as necessary, to ensure that NAVFACMAR PWD Utilities is able to focus its limited resources in addressing wastewater mission requirements.

3.2.12 Gravity Lines.

3.2.12.1 Cleanouts.

Cleanout assemblies shall be constructed of cast iron (no-hub) pipe with “MG” couplings (sometimes called “portable hubs”), approved equal, or stainless steel couplings. MG couplings are preferred to stainless steel couplings due to its greater pull resistance and maximum joint strength.

The diameter size of all cleanouts shall be equal to the size of the downstream pipe (e.g. A nominal 4-inch cleanout should be installed on a 4-inch lateral, a nominal 6-inch cleanout should be installed on laterals 6-

inches and larger). With full-sized cleanouts, the proper maintenance cleaning heads can be used to restore the pipe to its full hydraulic capacity.

For all building sewers, including housing units, a sanitary cleanout shall be installed 5-feet from the building line, except where private utility sales agreements state otherwise. Additional building sewer cleanouts shall be installed at intervals not to exceed one hundred (100) feet (30.4m) in straight runs and at each horizontal change in direction in a sewer service lateral.

a. MG couplings (or approved equal) shall have a cast iron housing conforming to ASTM A-48, Class 30-A. The housing coating shall be a bituminous material. Gaskets shall be neoprene. Bolts and nuts shall be 18-8 stainless steel.
b. The ends of the cast iron cleanout pipe shall have an inner pipe thread to receive either raised or countersunk brass cleanout plugs (outer plug thread).
c. Prior to installation, the cleanout plug threads shall be greased to facilitate subsequent removal when performing line cleaning operations.
d. All cleanouts in grassed or landscaped areas shall be provided with an 18” square protective concrete grade collar. See section 3.5.4 for special details.
e. The type of pipe material downstream of the cast iron cleanout assembly shall be etched into the curing concrete grade collar (“PVC” for Polyvinyl Chloride Pipe, “CI” for Cast Iron Pipe). This will help maintenance personnel in determining the appropriate type of cleaning head to use when accessing the cleanout and will be especially beneficial when responding to emergencies at night.

3.2.12.2 Pipe Material.

Provide PVC pipe materials (other materials, such as HDPE, may be installed only with prior approval by NAVFACMAR PWD Utilities). When using PVC, specify SDR 35 or AWWA C-900. SDR 35 PVC pipe should indicate that the pipe is to be laid on a “uniform straight grade”. In areas where stiff fat clay in encountered, stiffer C-900 PVC pipe has been effective in resisting sagging and bowing due to ground movement. C-900 PVC pipe is also available with a double-gasketed, push-on, pressure-rated joint that is effective in controlling inflow and infiltration. For sewer installations within or near the water table, specify this type of pipe. However, it is preferred new sewer lines always be designed above the ground water table. Because PVC is not ultraviolet resistant, include appropriate provisions in the specifications requiring the Contractor to properly protect PVC pipe staged at the job site.

The NAVFACMAR BOSC Line Maintenance section stocks small quantities SDR 35 and C-900 PVC pipe for emergency repairs rather than other types of pipe. For this reason, PVC pipe should be specified for new projects, with the class of pipe to be determined by the available engineering data such as design pipe grades and soil characteristics inherent to the project site.

3.2.12.3 Fittings.

The type of fittings to be specified will be determined by the type of pipe used. Sanitary fittings shall be specified in all cases. Push-on type plastic or PVC fittings without sanitary sweeps will not be permitted. When specifying fittings for C-900 PVC pipe, the designer should check to ensure that the inside diameter of the fitting corresponds to the inside diameter of the C-900 PVC pipe specified since the inside pipe diameter is variable in achieving the desired shell thickness (stiffness). “Lips” at improperly specified fittings can snag solids resulting in hydraulic flow constrictions. If no-hub cast iron pipe installation is permitted, approved cast iron or stainless steel fittings shall be used.

3.2.12.4 Manholes.

Manholes shall be either pre-cast or cast-in-place reinforced concrete. Details of manholes shall clearly indicate a properly formed channelized base and shall indicate proper water-tight grouting of all pipe penetrations and precast sections. Manholes shall be provided without rungs. Deteriorated rungs often provide a false sense of security and pose a real safety hazard; NAVFACMAR BOSC maintenance personnel will use ladders to gain access to manhole confined spaces. Rungs, in general, also interfere with current confined space entry procedures.

All influent pipe connections to manholes shall be made at the properly channelized invert of the manhole, whether it is a direct connection or a drop connection. “Waterfall” type connections are substandard and will not be permitted. All pipe penetrations shall be made perpendicular to the circumference of the manhole – angled deflections at existing flow channels will not be permitted. Manhole frames shall be firmly (structurally) affixed to the top of the manhole cone and grouted around the ring of the frame. Standard-sized frames and covers shall be specified as depicted in approved standard details. Where a large junction structure is required, include a sufficient number of manholes on the structure to allow full direct access to all points in the structure.

Manholes shall not be situated in sump depressions or drainage swales where rainfall runoff can accumulate. The designer should carefully check finish grades to ensure that this manhole-orifice situation does not occur. The intent is to minimize direct inflow for all new manhole installations.

In rare situations where connections are made to existing manhole structures, where excavation for connection to the invert would encounter subsurface oil or ground contaminant, special interior manhole drop connections may be permitted on a case-by-case basis. Such special drop connections would typically consist of a straight-vertical sanitary tee fitting connection with an open-vented top; there shall be a base fitting to direct the flow into the existing base flow channel. The drop pipe shall also be structurally affixed to the interior wall of the manhole using stainless steel straps and mounting hardware. See section 3.5.4 for special details.

3.2.12.5 Post-Construction CCTV Inspection.

On contracts that involve the construction of new sewer mains (manhole-to-manhole), the replacement of sewer main pipe with new sewer pipe (manhole-to-manhole), or for projects where subsequent heavy grade compaction is performed after the laying of sewer collection mains, the contract documents shall include the requirement that a post-construction video recording of the interior of the constructed sewer main be submitted to NAVFACMAR PWD Utilities. The video shall include a progressive video recording of the main section using standard pipeline video equipment. The equipment used to video-document the interior of the main shall either be equipped with an inclinometer indicator that portrays the slope of the main on the video recording, or the video shall be recorded with partial flow in the main (or with a fully wetted invert) such that an assessment can be made of the trueness of grade (workmanship). The video shall also clearly depict all pipe joint sections along the entire length of pipe in a continuous recording sequence. The submittal of the video documentation shall be made a “Records” submittal requirement and will be reviewed by NAVFACMAR PWD Utilities prior to final Navy acceptance of any constructed wastewater provision. Past random post-construction video inspections performed by NAVFACMAR PWD Utilities have revealed separated pipe joints (which have the potential of evolving into sink holes) and detrimental sags (which collect grease) in newly-constructed sewer mains. Such deficiencies require corrective action through rework. Despite typical grade control measures and Contractor QC efforts, it appears that some of the damage to the new mains may occur during trench compaction. Pipe joint separation and sags that can occur during trench compaction operations can be minimized in a number of ways: (1) if PVC sewer pipe is used, double-gasketed push-on joints generally offer better shear and pull resistance over “mission” (rubber) couplings, and they also offer better joint stiffness (less joint deflection); (2) granular pipe support (self-compacting 3B-fine material) is provided around the full circumference of the pipe in order to minimize pipe movement during compaction.

3.2.13 Pressure Mains.

3.2.13.1 Pipe Material.

Sewer pressure mains shall be PVC C900/C905 heat fusion joint, or push-on joints w/ mechanical restraints or ductile iron with 316 stainless steel nuts and bolts unless otherwise approved by the NAVFACMAR PWD Utilities. In some situations, the use of high-density polyethylene (HDPE) pipe may be permitted provided thermal expansion factors are considered in the design. All ductile iron pipes without cathodic protection systems shall be installed with polyethylene encasement. If non-metallic pipe is approved for use, require that tracer wire be provided in addition to buried warning and identification tape. Specifications shall require that all pressure mains be leak-tested prior to final acceptance.

3.2.13.2 Air Release Valves.

Appropriate air release provisions shall be installed at all high points in the pressure main where air can accumulate. Air release valves specified shall be designed specifically for sewage applications and all interior mechanical components shall be fabricated of stainless steel. Valves with plastic components are not acceptable.

3.2.13.3 Pressure Cleanouts.

If isolation valves are installed in a pressure main, install pressure cleanouts immediately downstream of the isolation valve. On long pressure main runs, this would permit damaged sections of the pressure main to be bypassed for repairs. Viton-gasketed stainless steel pressure blank covers, or approved equal, shall be installed such that the cleanout flange face is parallel to the finish grade, 12-inches below grade and within a manhole structure.

3.2.13.4 Dock-side Ship Wastewater Collection System.

Dock-side ship wastewater collection systems normally consist of dock-side hose connections to under-pier pressure manifold piping. Occasionally, control valves are installed in the manifold pressure piping to pressure-isolate sections of the collection manifold. Such control valves are normally located in valve pits which are accessible from the deck. Ensure that dock-side control valves are easily and safely accessible for servicing and maintenance. Occasionally, check valves become clogged and removal is required for servicing. These valves shall be located to facilitate easy removal. If grates are utilized to secure deck-side valve pits, ensure that these grates are easily removable by a single worker. Also ensure that all nuts and bolts are easily accessible for removal of the valve. Access to all valves shall be provided from the deck, and

structurally sound working platforms shall be provided as necessary.

a. Specify flanged-end valves with 316 stainless steel nuts and bolts--galvanized or zinc-coated steel nuts and bolts will not be accepted.
b. Wherever possible, pinch valves shall be specified in lieu of plug valves. Pinch valves require minimum maintenance and are proven to be more cost effective than plug valves. If the use of pinch valves is allowed, the designer shall verify that the pinch valve is able to meet the discharge pressures anticipated at the collection manifold from all types of ships that discharge CHT at the serviced berth(s).
c. Under pier pipe hangers and other structural support provisions, including hanger rods and nuts/bolts, shall be 316 stainless steel. Locking nuts shall be provided for all pipe-support saddle assemblies and on all threaded hanger rods.

d. Standard 4" dockside CHT hose risers are terminated with a female cam-lock fitting (bronze to bronze flange) with a male cam-lock plug (bronze) that is affixed to the riser assembly with a corrosion-resistant chain. Provide a pressure isolation valve on each hose riser. On a case-by-case basis, consult with NAVFACMAR BOSC Port Operations for specifics regarding design and construction of CHT hose riser assemblies.

3.2.13.5 Transition Manhole (Pressure Sewer to Gravity Sewer)

Manholes must be placed where pressure sewer connect to gravity main line after the point at which the pressure line is in laminar non pressurized flow. The pressure line must enter the manhole at laminar flow and discharge into a channel in a Y-configuration in the direction of the gravity flow at the gravity invert elevation.

3.3 LIFT STATIONS.

This section covers requirements for lift stations systems.

3.3.1 Equipment.

In the design of a lift station system, the designer should provide the drawings a narrative on the sequence of operation of the equipment including electrical interlocks, alarms, timers, etc. The rationale behind the operation should also be provided. All equipment and major operational components shall be affixed with a manufacturer's nameplate data tag that includes the make, model, serial number and factory specified operational parameters such as amperage, voltage, frame size, frequency, etc. This information shall also be included in the O&M Manuals provided to the Government. Equipment located inside wetwell spaces shall be explosion proof. Provide digital controller and integration into the SCADA system per

section 3.3.15.

3.3.2 Electrical Wiring Diagram.

A copy of the station's electrical wiring diagram which depicts all breakers, relays, controls, switches, etc. shall be included in the final O&M manual. A laminated copy is also to be posted in a conspicuous location at the lift station as approved by the Contracting Officer.

3.3.3 Operation and Maintenance (O&M) Manuals.

For each operational sub-system, the Contractor shall provide manuals that are tailored to each individual component of the sub-system. The Contractor shall utilize specific information from the design drawings and equipment operating manuals to assemble the lift station O&M manuals that describe in detail the sequence of operation and the relationship between each component in the overall operation of each sub-system. Detailed preventive maintenance schedules and procedures shall also be included in this manual. The O&M manuals shall also include the manufacturer's factory-certified pump curves if new pumps are installed as part of the project. Of the total numbers of sets of O&M manuals that are to be provided by the Contractor, three (3) sets shall be provided to the NAVFACMAR BOSC Wastewater Manager (phone: 339-1794) via the Construction Management Engineer (CME) prior to the final acceptance inspection of the work.

3.3.4 Posting of Instructions/Diagrams.

For new and/or modified equipment such as generators, process equipment, pumps, valves, etc., require the posting of laminated or flexi glass-housed instructions and diagrams. Specify the specific information to be posted for each piece of equipment and the type of mounting material to be used. The locations of where to post instructions/diagrams are to be approved by the CME. Some types of posted information include:

a. Start-up sequence, normal running and shutdown sequences, along with maintenance checks and lubrication requirements, etc.
b. Information extracted from the design drawings and equipment manuals. Include sub-system schematic diagrams.

3.3.5 Labeling and Tagging of Electrical Wiring.

For all electrical work related to sewage equipment, require that the Contractor (or entity performing the work) label and tag all electrical connections in control boxes, power panels and motor control panels. Require also that the wiring be neatly bundled and that an "As-built" point-

to-point wiring diagram be mounted inside each electrical panel. The wiring diagram shall show the labels assigned to each circuit. This diagram shall also be included in the lift station O&M Manuals.

3.3.6 Training.

If training is required for the operation and/or maintenance of new equipment or a new process, indicate in the specifications the specific training requirements by specifying topics or equipment for which training is to be provided, qualifications of the instructors and duration of training. Require that the Contractor submit a lesson plan for approval by the Contracting Officer. O&M Manuals should be provided to the Government trainees prior to the formal training session(s).

3.3.7 Special Tool Requirements.

On occasion, special tools will be required for such work as operation, calibration, adjustment or service maintenance. For any type of equipment, if such special tools are required (including instruments and meters), the specifications are to require that these items be furnished as part of the contract. A list of special tools shall be provided in the O&M Manuals provided to the Government.

3.3.8 Spare Parts.

At least one (1) set of all manufacturer-recommended spare parts shall be provided with all operational equipment. This includes such items as “O” rings, bearing sets, belts, valve and pump packing material, etc. in addition, for chart recording equipment, a one-year supply of charts and ink shall be provided. A list of spare parts shall be included in the O&M Manuals provided to the Government.

3.3.9 Contractor-Furnished Fuel, Lubrication, Etc.

If fuel, lubrication, etc. are required for startup and/or testing of any equipment (e.g. emergency generators), the materials and associated labor are to be provided by the Contractor.

3.3.10 Cathodic Protection.

Sewer facilities may be located around the coastal areas where underground structures such as drywells are subject to contact with high-chloride ground water. The designer should determine the need for cathodic protection of such facilities as underground “can-type” lift stations. The designer should also check to determine if the new facility will be in the vicinity of existing impressed current systems; the new facility should be designed accordingly. If protecting a “can-type” underground

drywell, the design should include electrically-isolated pressure couplings on any metallic discharge pressure main exiting the lift station facility to ensure electrical discontinuity between the station structure and the pressure main piping. Due to varying ground current conductivity characteristics encountered with subsurface soil variation, any cathodic protection of pipelines should be independent of the system protecting the lift station. To the fullest extent possible, use of cathodic protection for wastewater systems should be avoided by specifying on-metallic (non-anodic) materials.

3.3.11 Location of Control Panels, Breaker Panels, Etc.

Occasionally, sewerage of a new naval facility requires the construction of an appurtenant lift station. Lift stations that will be operated and maintained by the NAVFACMAR BOSC are required to meet the minimum lift station design standards provided herein. All lift station control panels, breaker panels, telemetry panels, etc. are to be located at the lift station site. Access to these lift station panels by NAVFACMAR BOSC lift station personnel must not be encumbered by access controls other than lift station access control gates, especially after normal working hours. Also, electrical junction boxes and splice boxes shall not be located in the lift station wetwell.

3.3.12 Meters.

All lift stations shall be equipped with an electrical consumption meter. All lift stations with variable speed motor controls shall be equipped with magnetic sewage flow meters and electronic recorders. Generally, all duplex lift stations with individual constant speed primary pumps rated at 200 gallons per minute or greater will require a sewage flow meter with an electronic recorder. Consumption meters shall follow sections 2.3.4. and/or 4.4. Meters used in the SCADA system shall follow guidance in section 3.3.15. Provide test valves.

3.3.13 Potable Water Supply with Backflow Preventer.

All lift stations shall be provided with a potable water supply with a standard hose bib and a reduced-pressure type backflow preventer of a design approved by the NAVFACMAR BOSC Potable Water Division.

3.3.14 Variable Frequency Drives.

For all lift stations where variable speed pumping is required, variable frequency drives (VFD) shall be specified. The VFD installation shall include built-in harmonic filtering to prevent spikes from transitioning back into the alternating-current power supply, an external bypass feature to allow manual operation of the pump motor in the event of VFD

malfunction, and a built-in feature to prevent back-spin of the pump motors. The VFD shall be the constant-torque type and shall be provided with a manual bypass and programmable restart feature that allows for a minimum of five (5) programmable restarts. The selected VFD shall be oversized 10% above the motor amperage rating and shall be climate-protected according to the manufacturer's recommendations. External power surge protection shall be provided to protect the VFD from unstable source power, external power spikes, and lightning. The Contractor shall be required to provide the NAVFACMAR BOSC Wastewater Manager (phone: 339-1794) via the Contracting Officer's representative one set of manufacturer-recommended spare parts.

3.3.15 SCADA

3.3.15.1 When modifying or adding new SCADA components, the components shall be technically and operationally compatible with the existing Navy Waste Water SCADA system. The installer shall integrate all modified or added components with the existing SCADA system such that the following criteria are satisfied:

a. All components shall have permanent communications paths to the SCADA system server at Apra Harbor Waste Water Treatment Plant (WWTP) control room.
b. Communications and requirements for cybersecurity shall follow section 5.
c. Minimum points are to include pressure, flow rate, water level, intrusion detection, alarms for failure or warning conditions, and motor/pump control and status (runtime, temperature, speed, notifications of failures or malfunctions, etc.).

3.3.16 Sewage Pumps and Ejectors.

In the past, there have been a number of packaged-type pneumatic sewage ejector stations constructed for the Navy's various sewage collection systems. These pneumatic ejectors have proven to be very costly to maintain and will no longer be accepted. Wet wells with duplex submersible pumping units shall be specified in lieu of pneumatic ejectors. Sewage pumps shall be capable of passing 3-inch solids and shall be manufactured specifically for sewage applications. The Contractor shall be required to provide the NAVFACMAR BOSC Wastewater Manager (phone: 339-1794) one set of manufacturer-recommended spare parts (wear rings, mechanical pump seal kits, etc.). Also, affixed to each pump and pump motor shall be an embossed metallic manufacturer's nameplate data tag that identifies the model and serial numbers and factory-certified operational data. Factory-certified pump curves shall be included in the O&M Manuals provided to the Government. Elapsed time (run time) meters shall be provided for each sewage pump motor.

Flow velocities in pressure mains shall be designed to be within the range of 3-5 feet per second to ensure adequate scouring during diurnal peak flow periods. In order to minimize pipe friction losses and system energy consumption, maximum transmission velocities shall not exceed 6 feet per second. Hydraulic calculations that demonstrate proper transmission system sizing (force main and pump) shall be submitted with design review submittals.

3.3.16.1 Pump Types.

Submersible pumps, self-priming suction pumps and vertical dry-pit centrifugal sewage pumps will be considered for use in the Navy's wastewater collection systems. If provided, submersible pumps shall be furnished with stainless steel guide rails and stainless steel lift chains. Use of pumps other than submersible pumps must be reviewed and pre-approved by the NAVFACMAR BOSC Lift Station section (For NBG) on a case-by-case basis. Pump stations with duplex pumping units shall be designed with 100 percent pumping redundancy which allows for one pump to be removed for servicing with the remaining pump fully capable of handling the peak hydraulic pumping demand. Pump stations with more than two pumps shall be similarly designed with redundant pumping capability – they must be able to handle the peak hydraulic pumping demand with its largest pumping unit out of service.

3.3.16.2 Pumping Redundancy Requirement.

Duplex pump systems shall be designed for 100% pumping redundancy -- lift stations shall be designed to compliantly convey the peak design flow with one of the two primary pumping units out of service.

3.3.16.3 Pump Seals.

For centrifugal dry-pit pumps, pump seals shall be of the mechanical "split-seal" type which enables the replacement or repair of the pump seals in the field without the need for pump disassembly and impeller removal. Seal installation procedures and one set of manufacturer-recommended spare parts (mechanical split-seal kit which includes special installation tools) shall be provided to the Supervisor of the NAVFACMAR BOSC Lift Station section. Consult with the NAVFACMAR BOSC Lift Station maintenance Supervisor for proper seal selection. Pumps may be ordered from the manufacturer with the mechanical split-seal pre-installed at the factory or the pump can be ordered with standard gland packing and the split seal installed by the Contractor at the job site. In any case, the pump shall be covered by standard warranty provisions.

3.3.16.4 Pump Motor Controllers.

There are various types of pump controllers used for sewage lift stations--hydro-pneumatic bubblers, bulb float switches, axial ball floats, ultrasonic transducers and pressure transducers. The airline of a hydro-pneumatic bubbler can sometimes get clogged which will result in a malfunction in the motor control system. Bulb float switches and balls floats sometimes malfunction when they get hung up in the oil/grease blanket that forms on the liquid surface in a wetwell. Ultrasonic transducers can give false readings when well obstructions such as submersible pump guide rails, and interior piping and walls are detected. For this reason, do not specify these types of pump controllers unless otherwise approved by the NAVFACMAR BOSC Lift Station section.

By far, submersible pressure transducers that sense the varying well head pressures have proven to be the most reliable type of pump controller currently available. They also require the least amount of maintenance. Specify this type of controller for all new projects unless directed otherwise by NAVFACMAR BOSC Wastewater Manager (phone: 339-1794).

For lift stations with duplex pumping units, the motor control system shall include an alternator that automatically alternates pump starts to balance pump/motor run times. Although duplex lift stations are to be designed with 100 percent pumping redundancy, the motor control system shall also provide a high wetwell start for the “idle” pump in the event the “active” pump trips out or malfunctions. Also, the motor control system shall be equipped with a wetwell level indicator calibrated to correspond to wetwell level increments of no greater than 3-inches.

3.3.17 Stand-by Emergency Power Generator.

Most of the Navy’s lift stations are located around or near the waterfront. Others are located near drainage inlets and non-Department of Defense properties. It is preferred all new critical lift stations be equipped with standby emergency generators that are capable of handling the full electrical load of the lift station (environmental compliance requirement).

These generators shall be equipped with an automatic transfer switch (ATS) to automatically transfer the lift station electrical load to the stabilized emergency generator in the event of a power failure. ATS shall be located in the same room as the stand-by power generator. ATS shall be provided with (open transition) by-pass switch.

Provide removable blanket-type high thermal insulation for the generator’s exhaust muffler/exhaust piping system.

The appurtenant fuel tank shall be capable of supplying sufficient fuel to

support a single pumping unit for 48 hours of run time. Include information and data on emergency generators and automatic transfer switches in the O&M Manuals provided to the Government.

3.3.18 Valves and Fittings.

Lift station control valves and fittings shall be flanged with 316 stainless steel nuts and bolts. In order to prevent galvanic corrosion, all metallic materials that comprise the pressure piping system shall be compatible with each other. All pressure piping and fittings shall be current industry-standard and shall be available locally.

For lift stations with submersible sewage pumps, include a station air release valve at the high point of the discharge piping. This air release valve shall be designed specifically for sewage applications and all interior mechanical components shall be fabricated of stainless steel. Valves with plastic components will not be accepted. Discharge from the air release valves shall be vented to the wetwell or to an upstream influent manhole.

3.3.19 Wetwell.

Wetwells shall be designed to facilitate accessibility for cleaning purposes. They should also be properly configured based on the type of sewage pump specified. Wetwells are generally reinforced concrete structures. Due to the corrosive wetwell environment, surface concrete laminate spalls typically occur as the reinforcing bars oxidize. Prior to use, the inside walls of the well shall be coated with an appropriate type of enduring protective coating, such as a coal-tar epoxy seal, to preserve and protect the structural reinforcement. Joints of precast sections, as well as all pipe penetrations, shall be properly grouted prior to coating. Cast-in-place concrete shall be allowed to fully cure and any surface cracks that develop after the curing period shall be properly filled prior to coating the interior of the well. Ductile iron piping/fittings installed inside wet well shall be coated with appropriate type of enduring protective coating.

3.3.20 Security.

Fencing and Locking Devices. All lift stations shall be surrounded by a minimum 7-feet high security fence, a pedestrian swing gate and an outward swinging vehicle access gate that provides unobstructed access to the wetwell (for cleaning purposes) and to the lift station pumps and motors (for overhaul removal). All lift station building structures, vehicle gates, wetwell hatch doors and valve-pit hatch doors shall be equipped with padlock hardware. No key-locking hardware will be utilized for sewage lift stations. All operational lift station control panels and breaker panels shall be located within the lift station security fence.

3.3.21 Emergency Pump Connection.

All lift stations shall have an emergency bypass hose connection assembly to the pressure main exiting the lift station to allow a station lift bypass with a portable pump. This hose connection assembly shall be equipped with a plug valve in the closed position and 4-inch or 6-inch quick-coupling type cam-lock connectors (female) with protective cam-lock plugs (male). Nominal four-inch assemblies shall be used for all pressure mains up to 8 inches; 6-inch couplings shall be used for pressure mains up to 10 inches. This hose connection shall be located within proximity of the lift station's wetwell whereby suction hoses from a portable pump will be able to draw sewage from the station's wetwell and discharge into the pressure main via the bypass hose connection assembly.

3.3.22 Lift Station Lighting.

Operational lighting shall be provided at all lift stations for night-time work. Lighting shall include areas in or around the wetwell and at all control panels. Any lighting provided in a wetwell or around areas where sewer gases can vent shall be explosion-proof. Emergency lights shall also be provided as necessary.

3.3.23 Prequalification of Electrical Contractor.

For all projects requiring work on any sewage lift station motor control system, include the following electrical contractor prequalification requirements in the contract solicitation package.

a. The contractor shall have a minimum of 10 years' experience in industrial Motor Control Systems (installation, troubleshooting, repairing).
b. The contractor shall have at least 5 years of experience with Programmable Logic Control (PLC) sub-systems. The contractor shall demonstrate an understanding of how PLC sub-systems function in conjunction with Motor Control Systems.
c. The MCC supplier shall provide start-up and testing services.

3.4 INDUSTRIAL WASTEWATER DISCHARGE

NAVFACMAR EV currently does not have a pretreatment system for Industrial Wastewater. When an Industrial Wastewater Pretreatment Program is established this section will be developed further to manage, regulate and enforce the program.

No one shall discharge or cause to be discharged any industrial wastewaters into any NAVFACMAR wastewater collection systems without written approval from NAVFACMAR EV.

Hydro-test water, chlorinated or de-chlorinated water from pipe line disinfection operations and flush water from storm drain cleaning operations will be considered non-industrial wastewaters that can be disposed of by means other than by discharge into the domestic sewer collection system

For project designs that involve the discharge of industrial wastewater and which may require pretreatment devices such as oil-water separators, grease interceptors, sediment/lint traps, neutralization tanks, silver recovery units, etc., progress design submittals shall be provided to NAVFACMAR EV for review and approval prior to construction.

3.5 ATTACHMENTS AND FIGURES

3.5.1 Lift Station Requirements Checklist.

a. Constant-speed duplex pumping units with 100% pumping redundancy – single pumping unit must be independently able to convey peak design flow; alternating pump starts with Hand-Off-Auto controls for each pumping unit. Pumps must be able to pass 3” solids.
b. Dedicated lift station electrical feeder with power panel within the lift station compound. Electrical consumption meter that conforms to NAVFACMAR PWD Utilities standards. Standard 110V electrical outlets.
c. Potable water supply with backflow preventer that conforms to NAVFACMAR PWD Utilities Potable Water standards.
d. Standby emergency generator (with automatic transfer switch) that is capable of at least 48-hours of continuous run time for critical sewer pump stations. Generator shall be housed in a non-corrosive, all-weather enclosure. Provide lift station master switch (master breaker or manual throw-switch) to isolate shore power to the lift station for generator load tests.
e. Bypass riser with female cam-lock fitting and male plug that connects to the sewer pressure main for either a 4” or 6” discharge hose from a portable pump (design to dictate sizes of riser & fittings and number of hose connections). Provide a plug valve and check valve on the riser.
f. Standard control valves (plug/check) on each pump discharge line. For dry-pit pump designs, provide inlet control valves for each sewage pump. For dry-pit pump installations, also provide a ¾” stainless steel ball/shutoff valve on the pump to release entrapped air (in the event of pump air-lock); direct ¾” air-bleed piping to floor drain or to drywell sump pit.
g. Force main velocity of 3-5 feet-per-second. Minimum force main size of 4”.
h. Wetwell operational volume and lift station pumps designed for no more than 5-6 pump starts per hour.
i. “High Wetwell” alarm float (normally-open wetwell float switch).

3.5.2 Design Review Checklist.

In order to provide design and construction agents with insight on some common design/construction concerns of NAVFACMAR PWD Utilities a general design review checklist was developed. In addition to protecting and preserving the integrity of the Navy's wastewater systems, such basic design checks can prevent some common field problems and costly change orders during construction, as well as operational problems during post-construction systems maintenance. The design submittal-review process could be made more efficient if designers are aware of these basic checklist items. Most of the checklist items below are based on *"lessons learned"* from earlier facilities construction projects.

I. General

a. Check hydraulic calculations for proper scouring/flow velocities and flow capacities.

II. Plans

a. Sewer Notes

1. Check for applicable Sewer Notes from the Sewer Design and Construction Guide.

2. Include a note stating that any damage to Navy sewer lines shall be reported immediately to the NAVFACMAR BOSC Service Support Center (phone: 333-2011) via the Contracting Officer's Representative. Any sewer repair performed by the Contractor shall be inspected and approved by the Line Section of the NAVFACMAR PWD Utilities prior to backfilling.

3. Include a note requiring the Contractor to field-locate and mark all sewer lines within the project site prior to performing any site excavation. Ensure all known sewer lines are depicted on the various site plans – field topographic surveys should show the gravity lines between manholes. Gravity mains can generally be assumed to follow a straight alignment between manhole sections; field locating some old non-metallic force mains (e.g. - asbestos-cement pipe) may require the use of ultrasonic detection methods.

b. Design Drawings

1. Ensure that existing sewer lines and manholes are shown on the various base plans-field topographic surveys should show the gravity lines between manholes.

2. Review Electrical/Mechanical site plans against Civil site plans to check for areas of potential conflict – particularly for electrical duct crossings and mechanical grade provisions. Ensure Civil Engineer / Designer accounts for all crossings on new sewer line profiles. Where new electrical/communications ducts cross existing sewer lines, ensure that the plans establish and appropriately address line invert depths and protection of the existing sewer lines. Since Electrical and Civil site designs are usually performed independently, it is imperative that the Electrical, Mechanical and Civil designers coordinate their respective site design layouts. Check Mechanical designs for pad-mounted mechanical equipment and associated power feeders. For the benefit of the Electrical and Mechanical sub-contractors, and to ensure that their construction work accounts for the presence of site sewer provisions, the sewer system should also be shown on the various Electrical and Mechanical site plans (background).

3. Various Site Plans: Check all site plans to ensure that structures (including but not limited to buildings, backflow preventers, transformer pads, mechanical equipment and anchor walls) are not built over or too close to sewer lines – can use general rule-of-thumb of 1:1 excavation to width clearance, but not less than the minimum setback clearances established in the Sewer Design and Construction Guide. Assume that at some point in the future, sewer line excavation repairs may become necessary. Project designs shall include the relocation of existing sewer lines, as necessary, to comply with the structure setback requirement.

4. Landscape/Demo Plans/Civil: Check Landscape and Demo plans for tree removals and planting setbacks relative to sewer lines. Include Landscape/Demo note requiring Landscape/Demo Contractor to coordinate with the Site Contractor to field-locate and mark the locations of all sewer lines prior to commencing any site landscape/demo work. May also be applicable to site clearing/grubbing. For facility demolitions, ensure that sewer service connections are properly terminated prior to demolition – provide details.

5. Check various design plans for locations of light/utility poles, flag poles, structural guy anchors, sign post footings and fence post footings for potential conflict with sewer lines – especially if footing holes may be augered. Include appropriate notes and callouts to mitigate potential adverse impacts to sewer provisions. Wind loads on certain types of poles have the potential to exert lateral soil pressure on nearby sewer pipes; any excavation of the sewer pipe for repairs could result in collapse of poles due to reduced reactive soil pressure to support its footing – be especially wary of such

poles and have the Structural designer check for such loading conditions.

6. Structural/Civil: For mass excavations parallel to sewer carrier pipes, as is common along waterfront areas for sheet pile construction and for deep trench excavations, the Structural design should require underpinning of the excavations to prevent buckling of the trench wall (soil slip failure) that could easily result in damage to adjacent sewer pipes. For gravity mains, pipe joints and hydraulic profile could be affected; for pressure mains, be especially cognizant of concrete thrust blocks that could be undermined by such excavations.

7. Structural (Wall Footings): All structural wall footings crossing underground sewer lines should be profiled (show sewer crossings on footing profile) or detailed at sewer crossing locations. The Structural design shall include appropriate provisions to ensure that underground sewer lines are adequately protected from footing loads and possible long-term wall settlement. Address potential damage to sewer pipe from foundation compaction operations.

8. Civil/Mechanical (Cleanouts): (1) Check for required full-sized service cleanout 5' from the building line on each service lateral; (2) Check for cleanout detail with material schedule that clearly shows how the main line transitions through the riser section to the brass cleanout plug; (3) Provide concrete grade collar around cleanout head.

9. Civil/Landscape Plans (Manholes): (1) Check Grading and Landscape plans to ensure that work will not result in any buried manholes or manholes in sump areas – provide notes or callouts as appropriate to ensure that any affected manhole frame and cover are adjusted to the new finish grade – provide detail; (2) For work involving paving, resurfacing or sidewalk/slab construction include appropriate notes requiring the Contractor to adjust all affected manhole frames and covers to the new finish grade – provide detail.

10. Civil: All new sewer lines shall be profiled. Show all underground crossings along the sewer line profile alignment.

11. Civil: Check to ensure that the following details are provided as applicable: (1) Trench Section that shows enveloping granular pipe cushion, tracer wire and buried warning tape; (2) Standard Manhole Base Channelization Detail – be sure that the design does not allow for influent pipes to be constructed on top of existing channel benches – re-channelize all flow channels to Standard.

12. Civil: Check if the project may require any potable water outages that could adversely affect lift stations with mechanical pump water seals.

13. Civil: Ensure that safe vehicular access is provided to all manholes without having to drive over grassed lawns or landscaped areas.

14. Electrical/Mechanical: Check Electrical and Mechanical designs to ensure that nothing is grounded to any sewer system provision.

15. In general, City and County Sewer Design Standards would be acceptable with a few exceptions: (1) Rungs are not desired in manholes; (2) In rare and exceptional situations, internal manhole drop piping will be accepted. (3) Manholes and valve structures shall not be allowed in roadway areas.

16. Lift Stations: Because sewage lift station designs can vary greatly depending on flow demand, application and location, the cognizant Navy facilities representative (Planner, EIC/PDE) should consult with the NAVFACMAR PWD Utilities Collection Systems Engineer, as necessary, early in the planning/design process to establish site-specific design requirements. Basic requirements include full-load standby emergency generator, SCADA connected and integrated to the Apra Harbor WWTP per section 5 and three comprehensive sets of O&M manuals to include specified/certified pump and system curves. NAVFACMAR PWD Utilities Standard Details for a typical Duplex Submersible Pump Lift Station are available – contact the NAVFACMAR PWD Utilities Collection Systems Engineer. Also, a list of basic lift station requirements is provided in Attachment 5.2.

17. Dockside Ship Wastewater Provisions: Pipe hanger assemblies for suspended under pier collection manifold piping shall be 316 stainless steel (threaded rods, pipe saddles, nuts & bolts); provide locking nuts on assemblies. Terminal CHT hose connection risers shall have a pressure isolation valve and shall have a nominal 4" female cam-lock hose receptor with male cam-lock plug chained to the assembly. Ship services require that those receptor fittings be bronze (consult with Ship Services for specifics when detailing the hose receptor/riser provisions – dockside provisions should also be reviewed/approved by Ship Services, NAVFACMAR BOSC Port Operations.

III. Specifications

a. Check front-end general provisions to ensure that the contract does not commit NAVFACMAR PWD Utilities Work Centers to any work on the Contractor's work schedule. Include such wording as – "Contractor

shall independently field locate…", etc.

b. Clearing and Grubbing: Review this spec section against the scope of work to see if special provisions may be necessary for the protection of sewer system provisions. Check tree root removals in the vicinity of existing sewer lines.
c. For new sewer line construction, check to ensure that post-construction CCTV inspection provision is included in specs.
d. Review demolition specs to ensure that appropriate provisions are included to protect sewer lines from damage, demolition debris, landscape removals, etc.
e. Check wording of material and performance specs to ensure that there is no ambiguity between specs and drawings – in the event of a field conflict, specs will usually govern over drawings.
f. Contractor shall provide NAVFACMAR PWD Utilities, via the Contracting Officer, with a copy of all approved material submittals for wastewater system construction (pipe, fittings, couplings, valves, etc.).

3.5.2 Sewer Design Discussion.

This attachment is intended to provide insight into design and construction requirements referenced in sections 3.1, 3.2, 3.3, and 3.4 of this document. Discussion is provided for each section, as noted.

a. Existing Underground Utility Lines (Section 3.1.2).

If sewer manholes are depicted on topographic surveys, the designer shall ensure that connecting main lines are depicted as well so that other collateral site designers and construction agents are aware of where the underground mains are located. This will minimize the likelihood of damage to Navy sewer mains and costly change orders, warranty rework or post-warranty latent defect rework.

Figure 3-3 depicts a 2" diameter PVC conduit for a communications line that was constructed through a 6" diameter clay sewer main.

This was discovered during a CCTV sewer main inspection.

Other types of sewer line damage that have resulted from construction activities include the following:

Guy anchor rods driven through sewer pipe; electrical grounding rods driven through sewer pipe; augers (for sign/fence post footing construction) driven through sewer pipe; deep concrete mounting bases for light standards constructed over sewer pipe.

Figure 3-3

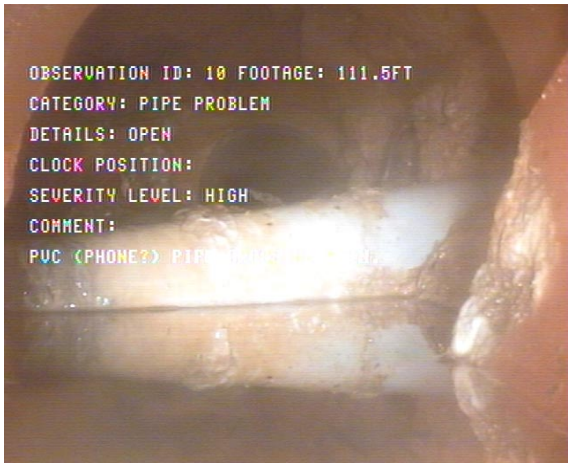
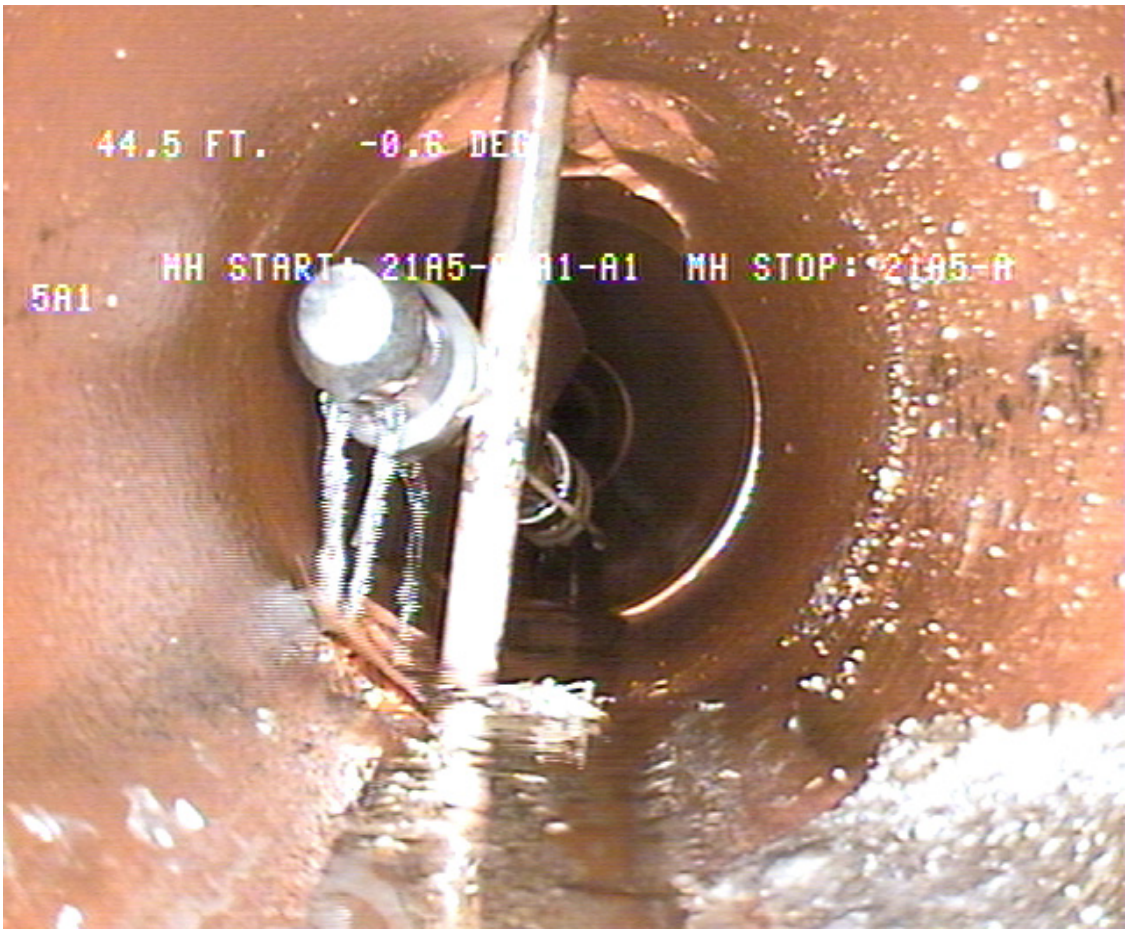


Figure 3-4 depicts a deep concrete mounting base for a parking lot light standard that was constructed directly over a 6" clay sewer main pipe. The background topographic features on the design site plan showed the existing sewer manholes, but no connecting mains were depicted. In multi-discipline project designs, such omissions can result in field conflict and costly change orders. The sewer main pipe was crushed, resulting in a major sewage backup.

Figure 3-4

Figure 3-5 depicts a sewer flush-cleaning head that got stuck on a grounding rod that was driven through a clay sewer main pipe.

Figure 3-5



b. Construction Notes (3.1.6).

1. The contractor shall be responsible for performing and maintaining any incidental sewage bypass pumping or diversion work that will be required to accomplish the construction work.

2. For any new concrete surface that will be exposed to sewage flow, the contractor shall maintain sewage bypass/diversion operations for the duration of the specified curing time for the concrete.

3. The contractor shall be responsible for providing and maintaining temporary power as necessary to maintain normal lift station operations.

   Discussion for notes "1", "2" and "3": Some projects may require a new manhole to be constructed over an existing live main that requires the field channelization of the new concrete base or demolition and reconstruction of the concrete base of an existing manhole to accommodate a new flow channel. Raw sewage shall not be permitted to contact the fresh concrete surface during its specified curing period. Also, brief outages may be necessary when working on primary or secondary power affecting an existing lift station. In such instances, the contractor shall provide and maintain bypass provisions or temporary generator power to maintain normal lift station operations. In cases where portable generator provisions may be needed in order to maintain normal lift station operations, the following note might be more applicable.

4. The contractor shall be responsible for damage to any Government utility system resulting from construction operations; any damage shall be reported immediately to the Contracting Officer or appropriate Government Representative. Any sewer repair performed by the contractor shall be inspected by the NAVFACMAR PWD Utilities Inspector prior to backfilling.

   Discussion for note "4": This general comment should be included on all construction drawings, whether or not work is to be performed on a utility system, especially when excavation is involved or where vibratory stresses may affect underground utility lines (such as pile driving operations or where site demolition may involve the use of a heavy tracked vehicle like an excavator). Also, projects that require the construction of wall footings, fence post footings, sign footings, concrete base mounts for outdoor lighting structures, guy anchors for poles and electrical grounding rods can also damage underground utility lines. For underground mounting structures that have the potential for exerting lateral soil pressures on adjacent underground utility lines (wind loads on flag poles, vehicle impacts to sign posts, etc.), a design evaluation should be

performed by a qualified structural or soils engineer.

5. The contractor will be responsible for regulatory fines or penalties that may be imposed by environmental regulatory agencies (EPA and/or State DOH) in the event of sewage overflow or spill resulting from construction operations.

   Discussion for note "5": The Navy's wastewater collection, transmission and treatment systems are under the strict regulatory guidance of the Federal Environmental Protection Agency (EPA) Region IX and the State of Hawaii Department of Health (DOH).

6. The contractor shall reimburse the Government for any emergency response effort that may be required by Government forces to mitigate the adverse effects of any sewage overflow or spill resulting from the contractor's operations.

   Discussion for note "6": This note would typically be used together with note "e" above. Contractors shall reimburse NAVFACMAR BOSC for costs associated with such government emergency response efforts, which may include material, equipment and labor costs. For certain critical projects, the contractor should have an account established with NAVFACMAR Comptroller prior to commencing construction work.

7. Any sewer manhole to be abandoned shall have its cone section removed and disposed of, pipe penetrations plugged with Class "C" concrete and the remaining riser structure backfilled and compacted to finish grade. (and/or)

8. Cleanouts on any abandoned service lateral shall be plugged and terminated a minimum of 12 inches below finish grade.

9. Prior to abandonment, pipe shall be filled with flowable fill as noted.

   Discussion for notes "7", "8" and "9": The intent of this requirement is to minimize the potential for localized soil erosion into abandoned void spaces that could eventually result in the development of sinkholes. This also prevents unauthorized connections to abandoned portions of the collection system. Under certain situations, NAVFACMAR PWD UEM may require that abandoned pipe be filled with flowable fill prior to abandonment.

10. The contractor shall contact the Supervisor of the NAVFACMAR BOSC Line Section to make arrangements for the Government to take custody of salvageable sewer manhole frames and covers. Manhole frames and covers not accepted by the Government shall be disposed of by the contractor.

Discussion for note "10": The applicability of this note would be determined on a case-by-case basis during the design phase based on the quantity and type(s) of frames and covers. Standard Type SA and SB frames and covers can be reused by the NAVFACMAR BOSC Line Section; older types generally do not have any reuse value.

11. When working on dockside or under pier ship wastewater collection system piping, the contractor shall first mechanically secure and tag out hose connections along the entire length of the common pressure manifold prior to working on the system.

    Discussion for note "11": In the field, it may not be readily apparent that dockside ship wastewater hose-connection risers are interconnected through a common under pier pressure collection manifold. Besides addressing the concern for possible sewage discharges into harbor waters, the primary intent of this note is to protect the contractor's workers from accidents that could result from unanticipated pressure discharges into the common pressure manifold from an adjacent ship berthing area, particularly from submarines (high pressure pneumatic blow downs). The designer should clearly depict the extent of any common pressure manifold in the construction drawings.

12. Potentially lethal levels of hydrogen sulfide (H2S) gas may develop in the gravity sewer collection system.

    Discussion for note "12": For a worker who is not familiar with the layout and operation of a localized portion of a sewer collection system, intermittent upstream pressure main discharges into the gravity collection system may not be readily apparent. During the time the upstream pressure transmission system is inactive (associated lift station not actively conveying flow), there is the potential for hazardous hydrogen sulfide gases to develop in the airspace of the inactive pressure main pipe. When the associated lift station initiates flow transmission in certain areas, the hydrogen sulfide gas that can form in the pressure main pipe can be evacuated into the downstream gravity collection system which could have an immediate adverse effect on the air quality in gravity system manholes immediately downstream of the pressure main discharge. The same kind of hazard can be encountered in gravity manholes immediately downstream of anaerobic ship/submarine collection and transfer (CHT) tank discharges. Under such circumstances, continuous monitoring of the air quality in the manhole space may not be sufficient to protect the life and safety of worker inside the manhole unless the worker is fully equipped with a self-contained breathing apparatus (SCBA). The designer should

ensure that applicable confined space entry requirements and specifications are included in the construction contract.

13. The contractor shall ensure that loose material, tools and equipment from construction operations are appropriately removed from the sewer collection system. Any damage to downstream lift station equipment resulting from negligence will be assessed to the contractor.

    Discussion for note "13": Such items as grout mix buckets and brushes (from manhole interior finishing), lengths of tracer wire, cable strands, mop heads, etc. have been dislodged from pump impellers. Also, backfill gravel and pavement base course material have been removed from gravity collection mains.

14. Prior to securing potable water outages in mains or service connections, the contractor shall first provide and maintain a backup seal water provision to lubricate pump seals at the affected sewer lift station shown on the plans. Coordinate access to the affected lift station, at least 3 days in advance of the outage, with the NAVFACMAR BOSC Lift Station Supervisor.

    Discussion for note "14": The sewage pump seals at most large (multi-level) Navy sewage lift stations are lubricated with water from the Navy potable water distribution system. Prolonged water outages will result in damage to pump seals and could ultimately result in pump failure. The designer should first identify any sewage lift station that may be affected by the water outage (plan file research, field investigation and/or consultation with cognizant NAVFACMAR Potable Water personnel) and ascertain whether its pumping units utilize potable water for pump seal lubrication (contact the NAVFACMAR BOSC Lift Station Supervisor).

15. Adjust all manhole frames and covers to the new finish grade.

    Discussion for note "15": There have been roadway resurfacing projects and pedestrian walkway projects that have effectively buried sewer manholes. This note should also be used on projects that involve the changing of finish grades in the vicinity of manholes. It is generally assumed that the designer for such projects will exercise due diligence in researching and identifying any and all underground utility systems that may be affected. On projects that involve manhole frame/cover adjustments, the designer should also provide a detail for the adjustment.

16. Make advance arrangements (3 working days minimum), through the Contracting Officer, with the Line Section Supervisor of

NAVFACMAR PWD Utilities for joint ROICC/NAVFACMAR PWD Utilities inspection of any new wye saddle construction. (applicable to new service connections to existing sewer mains)

Discussion for note "16": The construction contract shall require that a project account be established with the NAVFACMAR Comptroller for these special Government inspections; the cognizant ROICC construction contract administrator should provide the NAVFACMAR PWD Utilities with the applicable job order number for the inspection at the time of scheduling the inspection. Such inspections will be required for all construction projects where work is performed on the Navy's sewer system, even when such connections are an incidental part of a larger project scope. Poor workmanship in the construction of wye saddle connections has been a contributing factor in some line blockages; for this reason, sanitary wye fittings are preferred where possible. For new service connections to existing sewer manholes, the joint ROICC/ NAVFACMAR PWD Utilities inspection can be performed during the final acceptance inspection for the overall construction project.

17. During periods of non-work and for the duration of contract work within the secured perimeter of the lift station, the contractor is responsible for securing access gates, doors and security. After normal working hours, the contractor is responsible for properly securing access gates, doors and security fencing.

    Discussion for note "17": In most instances, it might be appropriate to use this construction note in conjunction with earlier note "e". During lunch breaks away from the lift station site, workers shall lock the access gate(s) to the lift station to prevent unauthorized entry. In some cases, the contractor may be permitted to temporarily remove perimeter chain link fence fabric to facilitate construction work at the lift station. In such instances, the contractor shall permanently re-affix the chain link fabric using appropriate hardware in order to prevent unauthorized access whenever the work site is left unattended.

18. Upon completion of the sewer construction, make advance arrangements (3 working days minimum), through the Contracting Officer, with NAVFACMAR PWD UEM for final acceptance inspection of the new sewer construction.

    Discussion for note "18": Field construction that is not covered by a CCTV inspection submittal (refer to Section 2.13.5, Post-Construction CCTV Inspection) will be addressed during the final walk-through inspection.

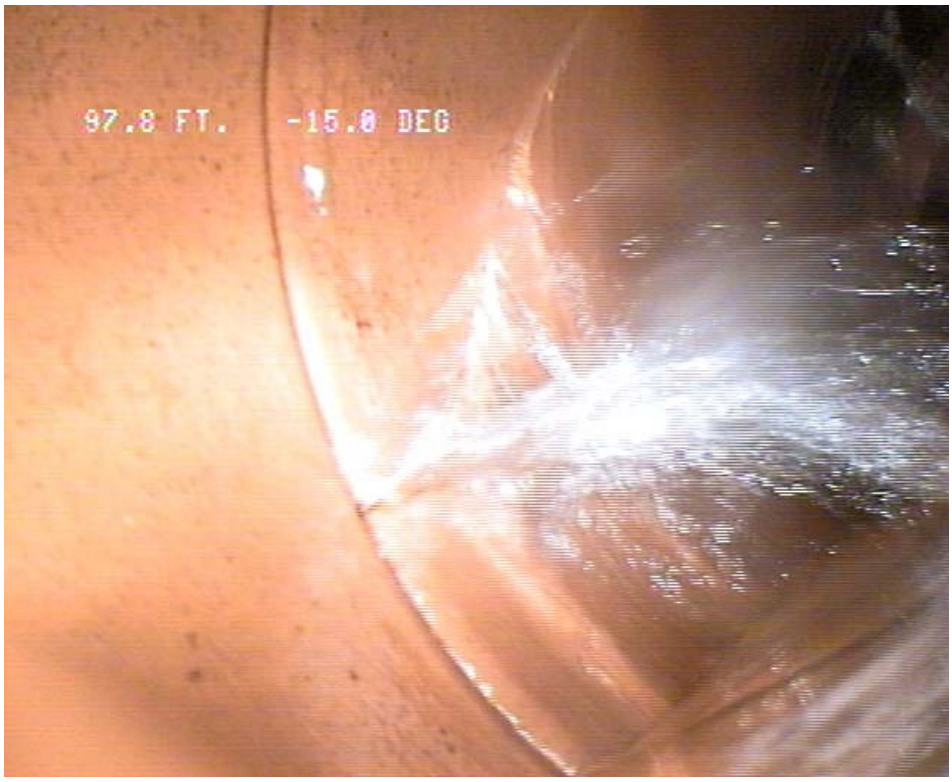
19. Construction dewatering into the Navy's sewer collection system is prohibited.

    Discussion for note "19": Environmental compliance requirement as directed by the Navy's Federal Facility Compliance Agreement with EPA Region IX.

c. Pipe Bedding (3.2.9).

Figure 3-6 depicts a fracture originating at a clay pipe joint with groundwater inflow. The 45-degree angle of the fracture relative to horizontal and vertical sectional planes suggests shear stress at work on the joint face. Providing graded granular trench bedding material around the entire circumference of the pipe will minimize the development of concentrated stresses at pipe joints.

Figure 3-6



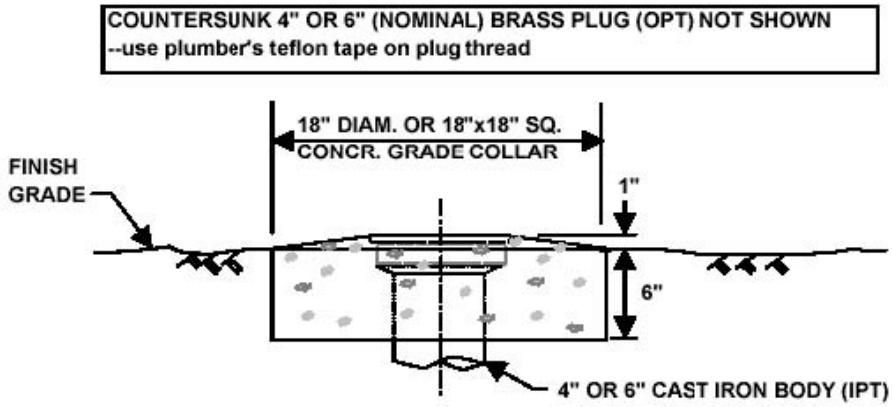
d. Emergency Pump Connection (3.3.21).

Figure 3-7 depicts a “riser” type hose connection assembly with a female cam-lock hose receptor and male plug, check valve and plug valve.

Figure 3-7

3.5.3 Special Details.

Figure 3-8



SPECIAL DETAIL ~ CLEANOUT GRADE COLLAR FOR UNPAVED AREAS

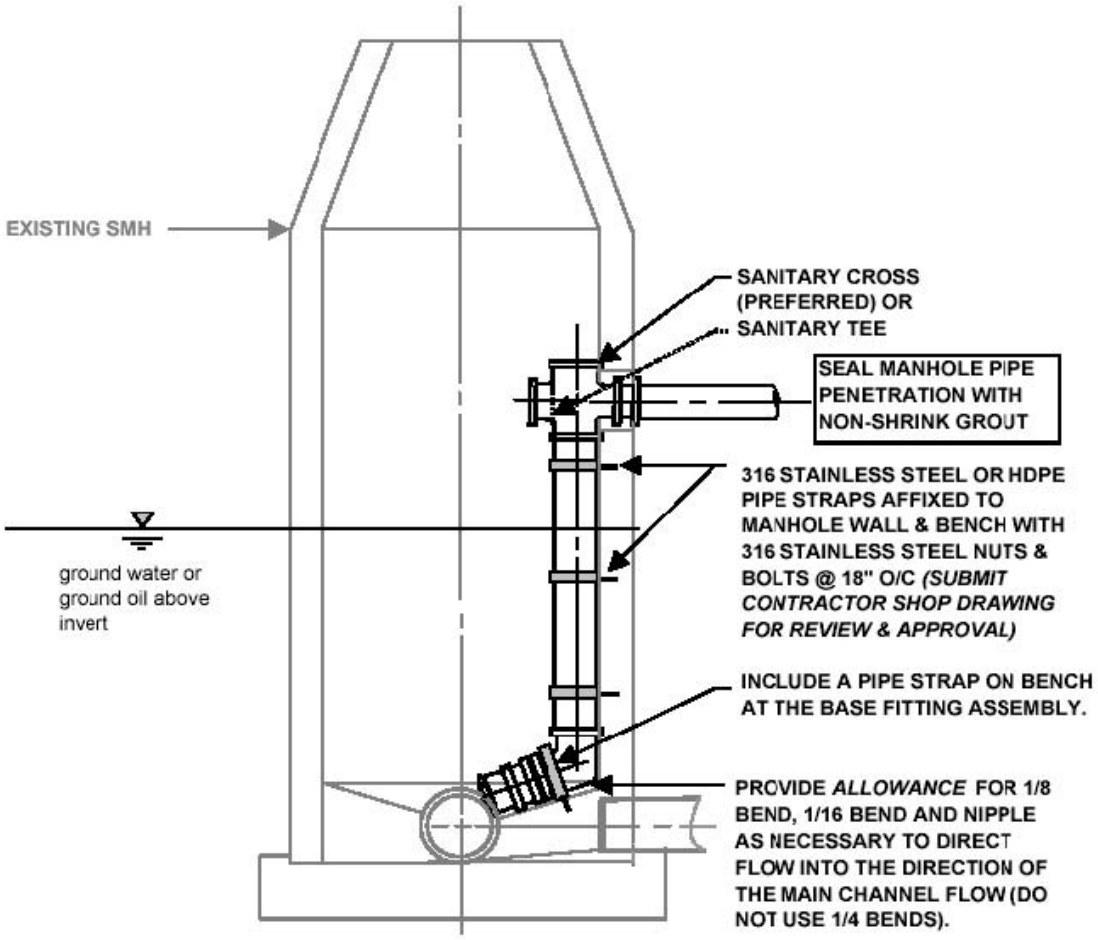
NOTES:

1. THE SIZE OF THE CLEANOUT RISER (4" or 6") WILL BE BASED ON THE SIZE OF THE SERVICE LATERAL PIPE.

2. THE DESIGNER SHALL PROVIDE A CLEANOUT ASSEMBLY DETAIL WITH A MATERIAL SCHEDULE (PIPES AND FITTINGS) OR MATERIAL CALLOUTS FROM THE SERVICE LATERAL PIPE THROUGH TO THE CLEANOUT PLUG.

3. FOR CLEANOUTS IN PAVED AREAS, THE DESIGNER SHALL PROVIDE A CLEANOUT GRADE COLLAR DESIGN DETAIL THAT IS REFLECTIVE OF THE PAVEMENT DESIGN SECTION AND ANTICIPATED PAVEMENT DESIGN LOADS.

Figure 3-9



SPECIAL DETAIL ~ INTERNAL SEWER MANHOLE PIPE DROP

NOTES:

1. USE OF THIS TYPE OF NON-STANDARD DROP CONNECTION WILL ONLY BE PERMITTED IN UNUSUAL SITUATIONS WHERE A STANDARD DROP CONNECTION CANNOT BE CONSTRUCTED -- SUCH AS IN AREAS WITH ENCROACHING GROUND WATER OR IN AREAS WITH KNOWN SUBSURFACE OIL CONTAMINATION -- CONSULT FIRST WITH THE PWC WASTEWATER DIVISION ENGINEER.

2. DESIGNER SHALL PROVIDE A PLAN PERSPECTIVE THAT SHOWS ALL EXISTING LINES AND FLOW CHANNELIZATION IN THE MANHOLE.

3. ALLOWABLE MATERIALS FOR PIPING AND FITTINGS -- PVC OR CAST IRON.

3.6 Special GWA Requirements for Tie-Ins.

Contractor shall comply with GWA Final Developer Guidebook 2010 for tie-in connections to existing GWA sewers.

CHAPTER 4 - WATER

4.1 GENERAL INFORMATION.

This section covers general information for the water distribution system, and water related facilities, including pump stations and reservoirs, as applicable.

4.1.1 Subsurface Oil.

For all excavation work in the Naval Station, and Fleet Industrial Supply areas, subterranean oil may be encountered. Check with the NAVFACMAR EV coordinator for known or suspect contaminated soil locations. Include appropriate construction and contract specifications to address the handling and disposal of contaminated materials as necessary.

4.1.2 Existing Underground Utility Lines.

Plans and specifications shall require toning for underground utilities. Toning of the excavation area shall be performed prior to commencement of any excavation work. In areas where nonmetallic pipe lines may be present, ultrasonic detection methods or field-locating grade nodes (manholes, valve boxes, cleanouts, etc.) may be used as appropriate. Ground Penetrating Radar (GPR) systems shall be used prior to excavation in all Shipyard areas. Research as-built construction drawings and perform field investigations to ensure all known underground utility lines are identified on the construction drawings prior to actual field excavations. Perform soil borings sampling and testing when required. Include a note and/or specification to indicate the cost of repairing any damaged underground utility line shall be borne by the Contractor regardless of whether or not the utility lines are depicted on the construction drawings.

4.1.3 Outages.

The contractor shall request water outages via the NAVFACMAR BOSC Service Support Center (telephone number 333-2011) via the Contracting Officer’s representative, thirty (30) days prior to the desired date of the outage. The contractor shall ensure that approval has been obtained for the outage prior to performing work. All water outages shall be performed by the NAVFACMAR BOSC, unless otherwise directed by the CME.

4.1.3.1 Outage Duration.

Coordinate the water outage duration with the NAVFACMAR BOSC. Water outages affecting an individual facility should not exceed four (4) hours. Provide temporary water service to affected facilities when water outages exceed four (4) hours, unless an outage duration beyond four (4) hours is approved by the facility or housing manager and the Guam Naval Base Fire Chief.

4.1.4 Connections to the Water Distribution System.

The Contractor shall provide the NAVFACMAR BOSC fourteen (14) days' notice prior to connecting to any waterline.

4.1.4.1 Wet Tapping Mains Twelve Inches (12") and Smaller.

a. The contractor shall be responsible for the following:

1. Material, Labor and Equipment – Except as otherwise indicated, the contractor shall provide all material, labor and equipment to connect new exterior water lines to the existing NAVFACMAR PWD water distribution systems by use of tapping sleeves and tapping valves or corporation stops.

2. Timing – The contractor shall perform the disinfection work at the connection just prior to installation of the tapping. The disinfection work shall be performed in the presence of the CME, NAVFACMAR PWD Utilities personnel, and NAVFACMAR EV personnel. The disinfection work shall be performed by a licensed Level 2 Water System Operator.

3. Coordination and Notification - The contractor shall coordinate work with the NAVFACMAR BOSC. The Contractor shall provide NAVFACMAR BOSC a minimum of 14 days advance notice prior to the date of the tap. Point of contact on this matter is NAVFACMAR BOSC Service Support Center, telephone number 333-2011.

4. Payment of Government Services - Work by NAVFACMAR PWD UEM on NAVFACMAR projects shall be done on a cost reimbursable basis. All contracts requiring tapping of existing NAVFACMAR PW exterior water lines shall reflect this reimbursement requirement (see section 4.1.6).

b. The Contractor will provide, install and operate the tapping machine. The equipment necessary for the installation and operation of the tapping machine as well as the necessary cutting blades will also be provided by the Contractor. Disinfection of the tapping machine will be

done by the Contractor. All other work not specifically indicated as being performed by the government shall be done by the contractor.

4.1.4.2 Tapping Sleeve and Valve Materials.

Tapping sleeves shall be either cast or ductile iron with mechanical joint ends, unless otherwise approved by NAVFACMAR PWD UEM. All tapping sleeves and tapping valves shall be a matched set and conform to AWWA specifications. (The project designer shall indicate the appropriate AWWA specifications.) The tapping valve shall be flanged by mechanical joint for connecting to the tapping machine.

4.1.4.3 Other Connections Including Wet Tapping Mains for Larger than 12" Lines.

The contractor shall perform all connection work. The connection work shall be performed in the presence of the CME. The contractor shall provide the NAVFACMAR BOSC a minimum of fourteen (14) days advanced notice for the above purpose. All work and services provided by the NAVFACMAR PWD UEM are on a cost reimbursable basis.

4.1.5 Contractor Submittals.

Contractor submittals shall be forwarded to NAVFACMAR PWD UEM, via the Contracting Officer, for review and approval as applicable. See Chapter 1.

4.2 WATERLINES.

This section covers requirements for waterline installations and repairs, as applicable.

4.2.1 General Location.

Structures shall not be located over existing waterlines, except that a building may be extended over laterals if the lateral serves only that building. Waterlines shall not be designed within roadway areas unless the waterline's crossing is required for tie-in and/or completing the design for the service area.

4.2.2 Clearances.

4.2.2.1 Clearances from Structures and Other Utilities (Excluding Sewer Lines).

Adequate clearance or a minimum of 5 feet between the edge of a building (wall and roof line) and a waterline should be provided to enable repair of the lines by use of heavy equipment. Three (3) feet horizontal

clearance shall be provided between waterlines and other utilities (except sewer lines). Vertical clearances shall be a minimum of six (6) inches. Whenever concrete jackets are involved, the clearances shall be the total clear distance between the concrete jacket and the utility line.

4.2.2.2 Horizontal Clearances from Sewer Lines.

A horizontal clearance of 10 feet shall be provided between water lines and sewer lines or manholes. If this clearance cannot be provided because of site conditions, the new waterline may be laid closer to 6 feet clearance between the lines provided the following requirements are met:

a. The bottom (invert) of the water piping shall be at least 12 inches above the top (crown) of the sewer piping. Where this vertical separation cannot be obtained, the sewer piping shall be constructed of AWWA-approved water pipe and pressure tested in place without leakage prior to backfilling.

b. The sewer manhole shall be of watertight construction and tested in place.

Note: Where water mains and sewers follow the same roadway, they will be installed on opposite sides of the roadway, as approved by NAVFACMAR PWD UEM.

4.2.2.3 Vertical Clearances from Sewer Lines.

Water piping shall cross above sewer piping and shall be laid to provide a separation of at least 24 inches between the bottom of the water piping and the top of the sewer piping. If this provision cannot be obtained because of site conditions, the following requirements shall be met.

a. If the new waterline crosses above the sewer line, provide a concrete jacket for the sewer line a horizontal distance of three (3) feet on both sides of the crossing.

b. If the new waterline crosses below the sewer line, provide a concrete jacket for the sewer line a horizontal distance of five (5) feet on both sides of the crossing. Provide adequate structural support for the sewer piping to prevent excessive deflection of the joints and settling on and breaking of the water piping. The length of the water piping at the crossing shall be a minimum of twenty (20) feet, and shall be centered at the point of the crossing so that the joints shall be equidistant and as far as possible from the sewer piping.

c. No water piping shall pass through or come in contact with any part of a sewer manhole.

4.2.3 Cover.

The minimum cover for transmission mains shall be three (3) feet. The minimum cover for water service laterals 2-1/2 inches and smaller shall be 2.5 feet in paved areas, and 2 feet in non-paved areas. The maximum cover over waterlines shall be eight (8) feet.

4.2.4 Pipe Jackets.

Use reinforced concrete pipe jackets where minimum pipe cover is not available, and where minimum vertical clearances between sewer and water lines cannot be obtained. When concrete jackets are provided, they shall be provided with reinforcement. All concrete jackets shall start and end at a pipe joint and the jacket shall be placed in a manner that will allow the aforementioned joints to deflect.

4.2.5 Warning Tape and Tracer Wire.

Require the installation of buried warning and identification tape for all waterlines. Require a tracer wire be provided for all non-metallic pipes. At water valve buffalo boxes, the tracer wire shall be cut and both ends shall extend to within 6” from the top of the boxes. At water valve boxes the tracer wire shall extend into the box.

4.2.6 Deflections.

Maximum deflection for pipe joints shall be limited to 80% of the deflection recommended by the manufacturer.

4.2.7 Pipe and Fittings.

Water distribution mains indicated as 100 through 400 mm (4 through 16 inches) diameter pipe sizes shall be polyvinyl chloride (PVC) plastic pipe, and as an option ductile-iron may be considered. Provide high density polyethylene (HDPE) pipe for 400 mm (16 inch) diameter or larger pipe sizes. Verify with NAVFACMAR PWD utilities for the appropriate use of HDPE as water distribution mains. The designer shall have the option of selecting High Density Polyethylene (HDPE) Plastic Piping, but shall verify if there are any adverse effects with long term exposure to chlorinated water on HDPE pipe. Pipe, tubing, and heat-fusion fittings for High Density Polyethylene pipe shall conform to AWWA C906, ASTM D 3035 and ASTM D 3261. The designer shall have the option of selecting Fusible Polyvinyl Chloride (PVC) Pipe, conforming to AWWA C-900/C-905, but shall verify with the Contracting Officer prior to designing.

4.2.7.1 Ductile Iron.

Ductile iron pipe and fittings shall conform to AWWA C151. Four (4) inch diameter mains shall be thickness class 53 (minimum). Mains six (6) inches in diameter and larger shall be thickness class 52 (minimum). Loading and pressure considerations shall determine if a higher class is required. Flanged pipe shall conform to AWWA C115, and flanged fittings shall conform to AWWA C110 or AWWA C153. Pipe and fittings shall have cement-mortar lining conforming to AWWA C104, standard thickness. Provide polyethylene encasement except when cathodic protection is provided.

4.2.7.2 PVC

PVC pipe shall conform to AWWA C900, and shall be a minimum pressure class 235 (DR 18). Pipes fourteen (14) inches through thirty-six (36) inches in diameter shall conform to AWWA C905. Fittings for PVC pipe shall be ductile iron.

4.2.7.3 Minimum Size

Minimum diameter for distribution mains and fire branches is six (6) inches.

4.2.8 Disinfection

All new or repaired potable water lines, fire protection main lines connected to the potable water system and that are upstream of the backflow prevention device, irrigation lines that are upstream of the backflow prevention devices and affected portions of existing potable water lines shall be flushed and disinfected. All work shall be done at the contractor's expense. The disinfection work shall be performed by a licensed Level 2 Water System Operator.

4.2.8.1 Disinfection of New Waterlines.

Include following notes in the project specifications or in notes on the drawings.

a. Disinfection of water lines, including flushing and bacteriological testing, shall be in accordance with AWWA C651 (latest edition) except as otherwise indicated below.

b. All connections to existing water lines shall be done in a "dry" trench. When the existing water line has to be dewatered, the contractor shall accomplish the dewatering of the line in a manner such that the connection to the existing system can be done in a "dry" trench. The

contractor shall submit a dewatering plan for approval.

c. For new pipe sections, chlorine shall be applied by the continuous feed method unless prior approval has been obtained to use a different method. Calcium hypochlorite granules shall be placed in new pipe sections (except solvent-welded plastic and screwed joint steel pipe) during construction as specified in AWWA C651.

d. When the line is chlorinated, water entering the line shall receive a dose of chlorine fed at a constant rate such that the water will have not less than 50 mg/L of free chlorine.

e. At the end of a 24-hour period the treated water shall have a residual of not less than 25 mg/L free chlorine.

f. During the chlorination period all valves and hydrants in the section being treated shall be operated a sufficient number of times to thoroughly disinfect the appurtenances.

g. All meters shall be disinfected with the water line except when otherwise approved by the Contracting Officer.

h. The contractor shall notify the CME three (3) working days prior to connecting to an existing Navy water line or disinfecting a new or existing line.

4.2.8.2 Disinfection for Repair and Connections to Existing Lines. Include following notes in the project specifications or in notes on the drawings.

a. Disinfection procedures for repairs/ connection work shall be as indicated in AWWA C651 under the paragraph titled “Disinfection Procedures When Cutting Into Or Repairing Existing Mains” except that a 5% hypochlorite solution shall be used.

b. All tapping sleeves shall be disinfected as follows:

1. Thoroughly clean the exterior surface of the main to be tapped, the surfaces of the tapping sleeve and the surfaces of the tapping equipment that will come into contact with the water.

2. Thoroughly swab the main, the tapping sleeve and the tapping equipment with a 5% sodium hypochlorite solution.

3. Any surfaces that become contaminated after being disinfected shall be re-cleaned and re-swabbed as indicated above.

c. After final flushing and prior to placing new lines in service,

bacteriological tests shall be performed as indicated in AWWA C651 and as follows:

1. Standard Conditions: At least one sample shall be collected from the end of each new main and one from the end of each new branch line. In addition, one additional sample shall be collected for each 4,000 feet of main or branch line. For example: for a 9,000 feet main, 3 samples are required i.e. 2 additional samples and one sample at the end. The location of the additional samples shall be determined by the contractor and approved by the Contracting Officer.

2. Special Conditions: If during construction, trench water has entered the line or if in the opinion of the Contracting Officer excessive quantities of dirt or debris have entered the line, samples shall be taken at intervals of approximately 200 feet and shall be identified by location.

d. Disinfection of mains and branch lines shall be repeated until samples show the absence of coli form organisms.

e. Final bacteriological test results, that show the absence of coli form organisms, shall be provided to the CME at the final inspection of the project or prior to placing the line in service whichever occurs first. The location where the bacteriological samples were taken shall be identified.

f. The contractor shall notify the CME three (3) working days prior to connecting to an existing Navy water line or disinfecting a new or existing line.

4.2.9 Cathodic Protection.

Unless specified otherwise, all runs of metallic pipes of 1000 feet or longer shall be provided with cathodic protection if the field conditions indicate that such protection is required. If cathodic protection is provided, polyethylene encasement shall not be provided. Check if the existing waterline that the project will be connected to has a cathodic protection system or provisions for such a system, and for existing impressed current systems in the vicinity of any new waterline. Design the connection point and new waterlines accordingly.

4.2.10 Coating for Waterlines under Piers.

New waterlines under piers shall have an epoxy-polyamide coating system conforming to MIL-P-24441. In addition, the word “water” shall be

stenciled onto the pipe.

4.3 WATER VALVES.

This section covers requirements for water valve installations.

4.3.1 Direction to Open.

The standard direction of opening shall be left (counterclockwise) as viewed from the top.

4.3.2 Valve Boxes.

Provide a valve box (not buffalo box) for all butterfly valves, for all gate valves 16” and larger and for those gate valves which have more than 5’ of cover measured from the top of the valve stem to the finish grade. When such a box is provided, the box shall have a 6” CI frame and cover over the valve operator to allow operation of the valve from ground level and the valve shall be NRS type. This latter requirement may not apply to large valves in meter boxes. These will be treated individually.

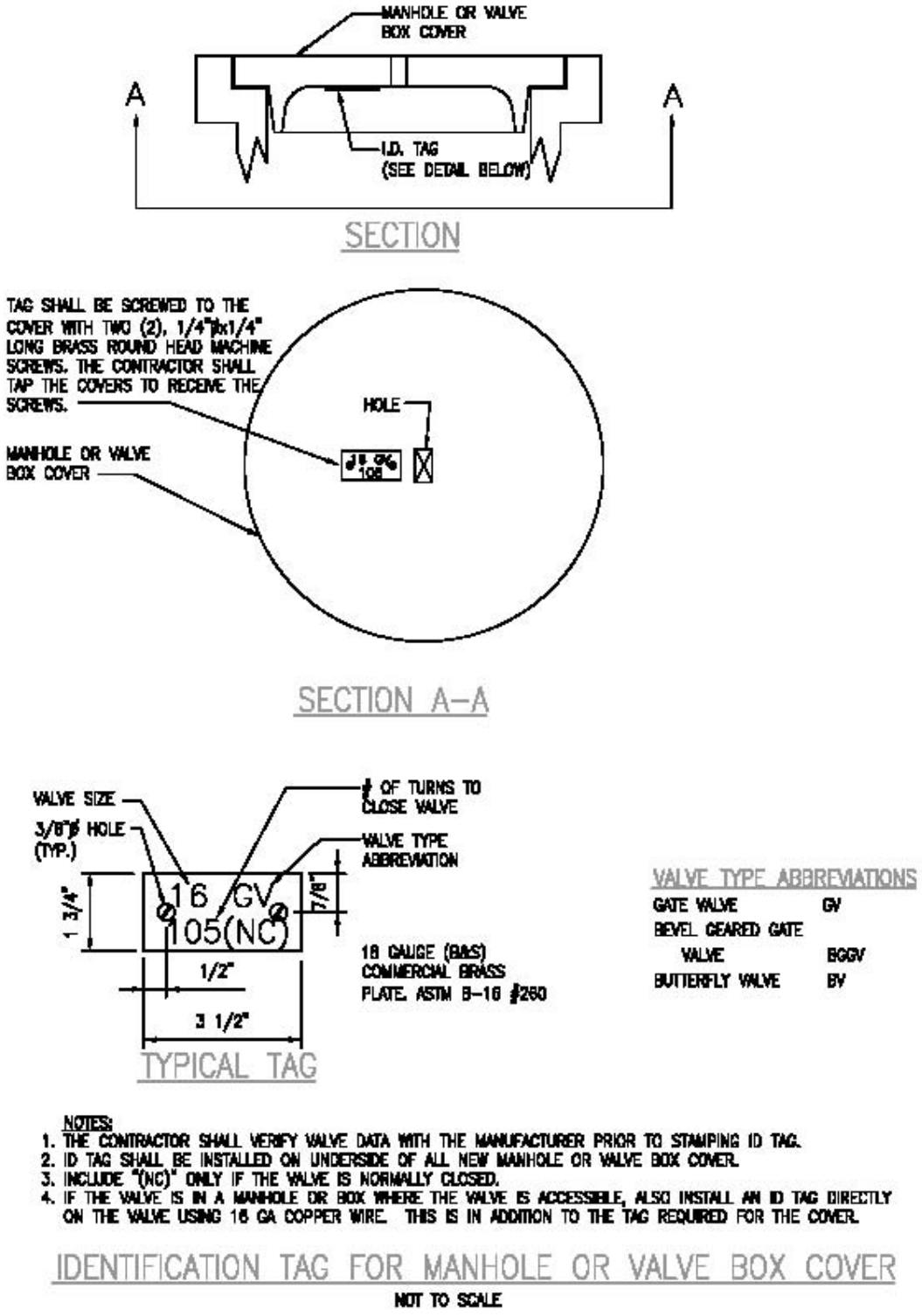
4.3.2.1 Painting of Valve Box Covers.

All valve covers shall be painted yellow except that covers for valves controlling fire hydrants shall be painted white, and covers for valves that are normally closed shall be painted yellow with a painted red diamond centered on the top of the cover. Valve box frames shall be painted with the same color as their cover except for valves that are normally closed, which shall be painted only red. Mark all covers.

4.3.2.2 Identification Tags.

Provide identification tags for valves, and affix to the underside of all new valve box or manhole covers. See Figure 4-1.

Figure 4-1


MANHOLE OR VALVE BOX COVER
A
A
I.D. TAG (SEE DETAIL BELOW)
SECTION
TAG SHALL BE SCREWED TO THE COVER WITH TWO (2), 1/4"ø x 1/4" LONG BRASS ROUND HEAD MACHINE SCREWS. THE CONTRACTOR SHALL TAP THE COVERS TO RECEIVE THE SCREWS.
HOLE
MANHOLE OR VALVE BOX COVER
SECTION A–A
VALVE SIZE
3/8"ø HOLE (TYP.)
OF TURNS TO CLOSE VALVE
VALVE TYPE ABBREVIATION
16 GV
105(NC)
1 3/4"
7/8"
1/2"
3 1/2"
18 GAUGE (B&S) COMMERCIAL BRASS PLATE. ASTM B-16 #260
TYPICAL TAG
VALVE TYPE ABBREVIATIONS
GATE VALVE GV
BEVEL GEARED GATE VALVE BGGV
BUTTERFLY VALVE BV
NOTES:
1. THE CONTRACTOR SHALL VERIFY VALVE DATA WITH THE MANUFACTURER PRIOR TO STAMPING ID TAG.
2. ID TAG SHALL BE INSTALLED ON UNDERSIDE OF ALL NEW MANHOLE OR VALVE BOX COVER.
3. INCLUDE "(NC)" ONLY IF THE VALVE IS NORMALLY CLOSED.
4. IF THE VALVE IS IN A MANHOLE OR BOX WHERE THE VALVE IS ACCESSIBLE, ALSO INSTALL AN ID TAG DIRECTLY ON THE VALVE USING 16 GA COPPER WIRE. THIS IS IN ADDITION TO THE TAG REQUIRED FOR THE COVER.
IDENTIFICATION TAG FOR MANHOLE OR VALVE BOX COVER
NOT TO SCALE

4.3.3 Corporation Stops for Valves.

All valves 16” and larger shall be provided with a corporation stop on each side of the valve.

4.3.4 By-Pass and Gearing.

Gate valves 16” and larger shall be provided with a by-pass and gearing.

4.3.5 Butterfly Valves.

Except where tapping valves are required for all valves 12” and larger shall be butterfly valves conforming to AWWA C504, CLASS 150B. Valves shall be short body type with a cast iron body. Provide bypass.

4.3.6 Resilient-Seated Gate Valves.

Except for high pressure water systems and special cases, require that gate valves 4” to 12” be resilient-seated type, conforming to AWWA C509. The valves shall also be suitable for throttling and be coated on the interior and exterior with an epoxy coating. The interior epoxy coating shall be suitable for potable water use. All buried valves shall be NRS type. Valves in boxes (non-buffalo type boxes) shall be labeled on the drawings as to type of operating mechanism i.e. OS & Y or NRS. (Note: these valves have a working pressure of 200 psi, therefore any references to 150 class valves should be deleted).

4.3.7 Flange Coupling Adapters.

Whenever possible, valves in boxes (non-buffalo type boxes) shall be provided with flange coupling adapters.

4.3.8 Anchor Blocks.

Reinforced concrete anchor blocks with 316 stainless steel straps and anchor bolts shall be provided for all valves connected to PVC pipes.

4.3.9 Service Saddles.

When required, service saddles shall be bronze with a 316 stainless steel double strap.

4.3.10 Backflow Preventers.

An approved backflow prevention device on a service lateral shall be required if there is a potential for contamination to the NAVFACMAR PW water supply and distribution system. NAVFACMAR BOSC will determine the degree of hazard for any new facility.

4.3.10.1 Testing and Inspection.

Require that all installed backflow preventers be tested and inspected by the contractor using a certified tester at the time of the tap. Backflow preventer testing and inspection by the NAVFACMAR BOSC shall be done on a cost reimbursable basis. Also require that all discrepancies found shall be repaired at the contractor's expense.

4.3.11 Fire Hydrants.

Only wet barrel type fire hydrants shall be specified. All fire hydrants shall be painted yellow, color 13655 of Federal Standard No. 595a.

4.4 WATER METERS.

This section covers requirements for water meter installations.

4.4.1 Meter Requirements.

For billing purposes, all potable water shall be metered for revenue purposes by either a master meter for the area or by an individual meter for the facility or site except as otherwise indicated. When a new service is within an area which already has a master meter, a new meter is always required if the activity who requires the service is different from the one who is billed by use of the master meter. Meters are owned and maintained as a functional part of the water distribution system, as well as the enclosures, switches,

For each facility/building consuming water, provide water consumption meters. Meters are owned and maintained as a functional part of the water distribution system, as well as the enclosures, switches, cabling, encoders, RTUs, and other accessories that are critical to meter operation.

The NAVFAC Marianas Advanced Metering (AMI) system is the required system for utility revenue meters to connect to. The AMI system uses Modbus/TCP over Cat6 Ethernet and single mode fiber to network all meters back to centralized servers. New utility revenue meters are required to be AMI meters, and shall be compatible, configured, and integrated with the AMI system in conformance to the AMI system architecture. All projects that will provide a new AMI meter shall include the following as part of planning, design, and construction:

a. Installation of new or upgraded OSP fiber optic cable infrastructure from the nearest NCTS wire center to the facility or structure that is being metered, as needed, to ensure at least two pairs of single mode fiber are available for use.

b. Installation of new or upgraded fiber optic cable termination panel, network switch, enclosure, intrusion detection relay and lock, and mounting pedestal, at the facility or structure that is being metered, as needed, to ensure conformance to the AMI system architecture.

c. Installation of new or upgraded meter vault, service pipe, meter bypass, valves, network cabling and drops, and electrical circuit (must be homerun to a point that is upstream of any electrical meter), as needed, to ensure conformance to the AMI system architecture.

d. Installation and commissioning of AMI meter, accessories, and all other AMI equipment, to also include submission of a change request form, cybersecurity commissioning as outlined in Section 5, delivery of AMI system inventory and network diagram documentation updates, and meter changeover documentation required by the NAVFAC Marianas UEM billing group.

Provide a test/calibration valve for meter calibration to be checked without needing to remove the meter. Meters shall be equipped with absolute encoders and RTUs that are capable of providing consumption and peak flow data via Modbus/TCP. Configure meter equipment with the nearest appropriate AMI electric meter so that the electric meter automatically queries and records consumption and peak flow data via the network.

Meter enclosures (and enclosures for associated equipment) shall be located on the facility exterior wherever possible, in a location that will ensure that utility personnel are able to freely access utility meters and their respective enclosures. If a suitable wall is not available for mounting AMI equipment, a reinforced concrete utility pedestal shall be provided to mount all necessary AMI equipment. Provide reinforced concrete bollards to prevent vehicle damage to AMI equipment if it is located such that it is susceptible to damage caused by vehicle traffic, but do not place bollards in such a way that access to the enclosures and equipment is limited. All enclosures shall be capable of being secured via padlock, and shall be rated NEMA 4X stainless steel grade 316 or better. Equip enclosures with molybdenum alloy stainless steel padlocks, common keyed to match existing. Provide surge protection devices and grounding as needed to protect AMI devices, accessories, and communications pathways. Provide a door sensor on the interior of each enclosure, to be wired as a digital input for intrusion detection purposes.

Coordinate all meter installations with the BOSC. The installer and the BOSC shall ensure that meter changeover information is properly documented at the time of any meters being changed out, using a form to be provided by NAVFAC Marianas UEM. Facility owner/activity must be identified properly on the form to ensure recording for billing purposes.

Provide complete manufacturer documentation including installation, maintenance, testing, and user manuals. Manufacturer documentation shall also be provided for all other provided devices, accessories, and software.

Requirements for network devices and pathways are given in Section 5.

4.4.2 Metering Exceptions.

Water which will be used only for fire sprinkler systems within buildings normally need not be metered.

4.4.3 Metering of Lawn Sprinkler Systems.

For water conservation purposes, all new or modified lawn sprinkler systems and other types of irrigation systems served by a 2-inch diameter or larger line shall be provided with its own meter. This meter is required even if the flow is already measured by another meter.

4.4.4 Meters 3 Inches and Larger.

Meters 3” and larger shall have a bypass if such an appurtenance is necessary to maintain service when the meter is being calibrated or repaired. Include provisions for testing the meter’s accuracy in the field. Provide adequate straight pipe sections before and after the meter as recommended by the manufacturer.

4.5 MECHANICAL AND ELECTRICAL EQUIPMENT.

This section covers requirements for mechanical and electrical equipment installations for water distribution.

4.5.1 Equipment.

In the design of a system, the designer should provide, on the drawings, a narrative on the sequence of operation of the equipment including electrical interlocks, alarms, timers, etc. The rationale behind the operation should also be provided.

4.5.2 Operation and Maintenance (O & M) Manuals.

a. For a system, require the contractor to provide a manual that is tailored to the system. The contractor must, in essence, extract the specific information from the design drawings and equipment operating manuals that he furnishes and describe in detail the sequence of operation and the relationship between each piece of equipment.

b. Provide four (4) sets of bound copies and one digital copy of O & M manuals to NAVFACMAR BOSC Water Manager (phone: 339-6109) via the Construction Management Engineer.

4.5.3 Posting of Instructions.

For new equipment such as generators, process equipment, treatment equipment, pumps, etc. require the posting of O & M instructions under glass. State explicitly what information is to be posted for each piece of equipment (some of the information which shall be posted is indicated below) and the type of material to be used to mount the instructions. The location where the instructions are to be posted is to be approved by the Contracting Officer. Some types of posted information include:

a. Start-up sequence, normal running and shutdown sequences, along with maintenance checks and lubrication requirements etc.

b. Information extracted from the design drawings and equipment manuals. Include a system schematic diagram and post it at the newly installed facility or equipment.

4.5.4 Labeling and Tagging of Electrical Wiring.

For all electrical work related to water process equipment, require that the contractor label and tag all electrical connections in control boxes and motor control panels. Require also that the wiring be neatly bundled and that an “as-built” point-to-point wiring diagram be provided (in an appropriate size) and mounted inside each electrical circuit. The diagram shall also be included in the O & M manuals submitted with the equipment.

4.5.5 Training.

If training is required for the operation and/or maintenance of new equipment, indicate the exact training requirements by mentioning topics or equipment for which training is to be provided, qualifications of the instructors, and duration of training. Require that the contractor submit a lesson plan for approval by the Contracting Officer. No training will be scheduled until seven days after receipt of approvable O&M manuals.

4.5.6 Special Tool Requirements.

For any type of equipment, if special tools are required for operating, maintaining or calibrating the equipment (including instruments and meters) then the specifications are to require that these items be furnished as part of the contract.

4.5.7 Spare Parts.

All spare parts recommended by the manufacturer should be provided with the equipment. In addition, for recording equipment, a one year supply of charts and ink shall be provided. Contractor Furnished Fuel, Lubrication, Etc. If fuel, lubrication, etc. are required for startup and/or testing of any equipment, the materials are to be provided by the contractor and not by the Government.

4.5.8 SCADA

4.5.8.1 When modifying or adding new SCADA components, the components shall be technically and operationally compatible with the existing Navy Potable Water SCADA system. The installer shall integrate all modified or added components with the existing SCADA system such that the following criteria are satisfied:

a. All components shall have permanent communications paths to the SCADA system server at Fena Water Treatment Plant (FWTP) control room.
b. Monitoring and control of chemical feeds shall include, but not limited to:

    1. Coagulant (granular/liquid) chemical feed
    2. Hypochlorite chemical feed
    3. Fluoride chemical feed
    4. Sodium hydroxide feed
    5. Phosphate feed
    6. Chloride level (at source)
    7. Hypochlorite generation
    8. Chlorine level/leak alarms
    9. Chlorine injection monitoring
    10. Chlorine Residual

c. Basic monitoring and controls shall include, but not limited to:

    1. Pressure
    2. Motor/pump control and status (runtime, temperature, speed, notifications of failures or malfunctions, etc.)
    3. Flow rate
    4. Surface pressure (both sides of regulator) - pressure near the wellhead and the discharge/distribution side
    5. Groundwater level
    6. Intrusion detection system alarm
    7. Flush valve sensor
    8. Filter flow/level control

4.6 MISCELLANEOUS APPURTENANTS.

This section covers other accessories installations for water distribution.

4.6.1 Valving.

Section valves are to be provided at all connections to the main. This includes pump discharge, distribution connections, fire hydrants, blow offs, air valves, and reservoir connection.

4.6.2 Air-vacuum Valves.

Combination air release and vacuum valves are to be installed at peaks, where the pipe slope changes from positive to negative, and long relatively straight stretches at ¼- to ½- mile intervals.

4.6.3 Blow-offs.

Blow-offs, with a drain to a disposal area, should be installed near low points and other suitable locations to facilitate draining the conduit and disposal of the water. Blow-offs will be designed with an air-gap to prevent contaminated water from backing up into the main.

4.7 STORAGE.

This section provides criteria for water storage requirements.

4.7.1 Flow Requirements.

Storage should meet peak flow requirements, equalize system pressures, and provide emergency water supply. The water supply system must provide flows of water sufficient in quantity to meet all points of demand in the distribution system and to satisfy maximum anticipated water demands.

4.7.1.1 Minimum Pressures.

Water distribution system, including pumping facilities and storage tanks and reservoirs, should be designed so that the water pressures of at least 40 psi at ground level will be maintained at all points in the system, including the highest ground elevations in the service area. Minimum pressures of 30 psi, under peak domestic flow conditions, can be tolerated in small areas as long as all peak flow requirements can be satisfied. During firefighting flows, water pressures should not fall below 20 psi at the hydrants.

4.7.1.2 Maximum Pressures.

Maximum water pressures in distribution mains and service lines should not normally exceed 75 psi at ground elevation. Static pressures up to 100 psi can be tolerated in distribution systems in small, low-lying areas. Higher pressures require pressure reducing valves on feeder mains or individual service lines to restrict maximum service pressures to 75 psi.

4.7.2 Water Storage Facilities.

Wherever feasible, design storage to provide flow through circulation, with compartments.

Reinforced concrete or Pre-stressed concrete is the desired construction of ground reservoirs and tanks because it produces structures with long service lives, meets seismic requirements and which require little maintenance. Concrete water tanks must be provided in accordance with AWWA Standard D110 Wire- and Strand- Wound, Circular, Pre-stressed Concrete Tanks, Type 1. Due to high maintenance, elevated steel storage tank is no longer desired.

All treated water tanks and reservoirs must be covered to prevent contamination by dust, birds, leaves, and insects. These covers will be watertight at all locations except vent openings. Special attention should be directed toward making all doors and manholes watertight. Vent openings must be properly sized and protected to prevent the entry of birds and insects; and vent screens should be kept free of debris so that the air can enter and leave the storage area. All overflows or other drain lines must be designed so as to eliminate the possibility of flood waters or other contamination coming in contact with the treated water. Maintain sufficient flow through the tank or reservoir so that stored water does not become stagnant.

4.7.2.1 Piping Arrangement.

For large tanks, place inlet and outlet pipes at opposite ends or sides, to provide circulation with the outlet pipe near the bottom. Otherwise, provide baffles in the tank. Provide overflow and drain pipes discharging to storm drains, but provide air gap to prevent contamination. Place valves on all pipes except overflow pipes. Install all valves so that they will stand out of groundwater or runoff, to prevent possible contamination, and to be easily accessible to operating personnel.

4.7.2.2 Appurtenances.

Include outside tank ladder, roof hatch with lock, screened vent, water

level indicator (and alarm), sampling access points, and altitude or float valves.

a. Provide altitude valve or float valve to fill, maintain water levels at, and prevent overflows at tanks or reservoirs. Altitude valves will be installed in concrete pits having provision for draining either by gravity or pumping. Drains will not be connected to sanitary sewers.

b. To keep out insects and rodents, provide 20-mesh bronze insect screens over all vent openings. The vents should be rain proofed by using goose necks.

4.7.2.3 Disinfection.

Potable water storage facilities, associated piping, and ancillary equipment must be disinfected before use. Disinfection will be accomplished following procedures and requirements of AWWA C652. In no event will any of the above equipment or facilities be placed in service prior to verification by bacteriological tests, that disinfection has been accomplished.

4.7.2.4 Corrosion Control.

To prevent corrosion, all steel water structures shall have a protective coating system, which prevents the current from flowing between the metal and electrolyte, and an impressed-current cathodic protection system.

4.7.2.5 Coatings.

Coatings used on interior surfaces of a tank, including that of a risers and all other surfaces in contact with the water, must not add taste, odor, toxicity, or impurities to the water; must readily adhere to the tank's surface while continuously submerged; must have a low rate of permeability; and must meet the minimum requirements of NSF Standard 61.

4.7.2.6 To divert the surface runoff, grade and drain around ground storage tanks or reservoirs.

Ground storage tanks and reservoirs should have watertight joints to avoid contamination from subsurface sources.

Vaults and valve chambers should be watertight or self-draining.

4.8 PUMP STATIONS.

This section provides requirements for booster pump station construction for water distribution.

4.8.1 Suction Piping Valves.

A gate valve will be installed in the suction piping so that the pump can be isolated from the line

4.8.2 Discharge Piping Valves.

A check valve and a gate or butterfly valve will be installed in the discharge piping with the check valve between the pump and the gate or butterfly valve. Pressure relief valves, commonly diaphragm activated globe or angle type, will be installed in discharge piping system for flow control and/or pressure regulation, and to protect pump equipment and piping system from excessive surge pressures.

4.8.3 Air Release and Vacuum Relief valves

Air release and vacuum relief valves will be used on discharge piping for vertical turbine pumps.

4.8.4 Metering

Pump Station shall be provided with a water & power meter.

4.8.5 Reliability.

Pump Station reliability will be considered. The number of pumps will depend upon present and future needs. Whenever a single pump is sufficient, two equal size pumps, each able to handle the peak demand, must be provided and set-up to alternate. Whenever two or more pumps are cost effective to meet the peak demand, additional pump capacity or pumps must be installed so that the peak demand can be met with the largest pump out of service. All pumps should alternate. VFD motors should be considered in all designs.

4.8.6 Backup (Emergency) Power Supply.

Design fuel storage to provide at least forty-eight (48) hours of continuous run-time operation.

4.9 WELLS.

This section provides requirements for potable water well installation.

4.9.1 Drilling, Testing, Sampling, Development and Construction.

Contractor shall comply with the Guam Water Resource Development and Operating Regulations (WRDOR) provisions, as amended and used by Guam EPA.

4.9.2 EPA Compliance Well Monitoring.

Contractor shall provide the following additional equipment and features for continuous compliance monitoring, to ensure minimum virus removal/treatment requirement is met.

a. Two (2) continuous monitoring chlorine analyzers (one where chlorine is added and another prior to the first customer)

b. pH meter

c. Temperature meter

d. Data recorder

e. Automatic switchover on chlorine tanks

f. Link shutoff of chlorine treatment system with shutoff of well or install back-up power supply (generator) at each well (that automatically switch on when power goes out).

g. Design well to provide chlorine contact time meeting the minimum virus removal treatment at the point of connection to the distribution system.

4.9.3 Backup (Emergency) Power Supply.

Design fuel storage to provide at least forty-eight (48) hours of continuous run-time operation.

4.10 CROSS-CONNECTION CONTROL AND BACKFLOW PREVENTION.

Contractor shall provide protection following the “NFESC UG-2029-ENV Cross-Connection Control and Backflow Prevention Program Implementation at Navy Shore Facilities, May 1998” guidance.

4.11 CONSTRUCTION NOTES.

Waterlines to be abandoned must be capped closest to the main waterline distribution source. Capping of waterlines for demo projects 5 feet from the structure will not be allowed. Active dead-end waterlines will compromise Water Quality promoting stagnant water and dissipation of chlorine residual, resulting in potential bacterial growth, NOV (Notice of Violation) and Fines. Prior to abandonment, pipe shall be filled with flowable fill concrete.

CHAPTER 5 - COMMUNICATIONS & CYBERSECURITY

5.1 OVERVIEW

Industrial Control Systems (ICS) generally consist of building control systems and utility control systems at Navy and Marine Corps installations. Requirements in this section are applicable to all ICS that support NAVFAC utility infrastructure and distribution, including Advanced Metering Infrastructure (AMI), Supervisorial Control and Data Acquisition (SCADA), and any Direct Digital Control (DDC) systems and/or Electronic Security Systems (ESS) at the relevant facilities. This section presents requirements for communications infrastructure, physical security, and cybersecurity, which are applicable to all projects wherein ICS equipment and/or software are being provided. The term ICS equipment consists of all devices that are functionally intended to be part of the respective systems, such as programmable logic controllers (PLCs), relays, remote terminal units (RTUs), servers, terminals, and meters, and also includes network switches and devices that are part of the overall data pathway from sensors and control points to the network.

At Joint Region Marianas (JRM), a base-wide Advanced Metering Infrastructure (AMI) system is in place for many facilities, to record electricity and water distribution and consumption metrics across a base-wide automated network. Some existing facilities do not have adequate communications infrastructure to maintain an adequate network connection for AMI, whereas some continue to be metered using standalone “legacy” meters, and family housing units are metered on a separate automated meter reading (AMR) network that is separate from the existing AMI network.

Base-wide Supervisorial Control and Data Acquisition (SCADA) systems are in place for the electrical, potable water, and wastewater systems. Separate systems exist in some cases for Andersen Air Force Base (NSA Andersen), with historically varying levels of network integration for geographic reasons. Some existing utility facilities do not currently have appropriate SCADA equipment or capabilities, and some do not have the necessary communications infrastructure to maintain an adequate network connection for SCADA.

5.2 GENERAL REQUIREMENTS FOR ICS

Projects are required to implement communications pathways as needed to integrate ICS equipment with their respective base-wide networks. Projects that add or modify ICS shall install or ensure communications pathways, active or inactive, to all ICS networks regardless of which ICS is

to be used in that project. NAVFACMAR requires dedicated communication pathways in each ICS connected building for each of its established ICS network and appropriate spares. Projects shall provide ICS-dedicated single-mode fiber strands for outside plant (OSP) communications between each facility and the nearest wire center (NCTS-operated aggregation facility), using one pair (two strands) for each ICS and two pairs (four strands) as spares, or a minimum total of six pairs (twelve strands), whichever is higher.

The required networks are:
a. AMI (ICS-PE)
b. DDC
c. Electric SCADA
d. Water SCADA
e. Sewer SCADA
f. ICS-PE spare
g. SCADA spare.

Communications pathways are required to be hardwired and protected in electrical conduit or cable tray (above-ground) and ductbank (below-ground), unless otherwise stated in this document. All building to building networks are required to be IP-based over Ethernet (Cat6) or single mode fiber optic cable, unless otherwise stated within this document. The point of connection for fiber backhaul (between facilities) should be the fiber patch panel in the facility telecommunications room. Networks may share the same fiber bundle or duct, but must be physically separated (as opposed to VPNs or virtual private networks). If authorized in writing by the NAVFAC Marianas Industrial Control Systems Program Manager (NFM ICS PM) upon request (per project), the communications pathway may be terminated at a single point of connection in anticipation of future fiber backhaul installation where none exists.

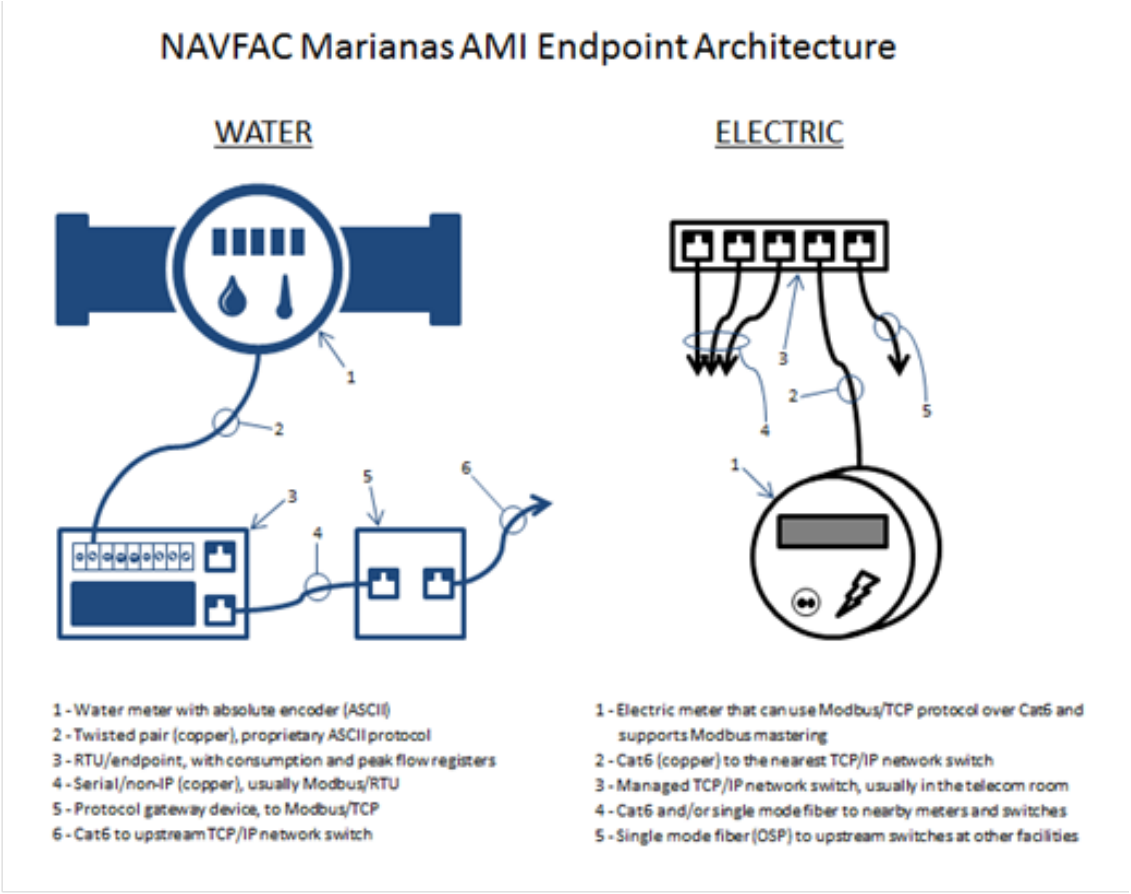
Where new fiber optic communications is to be installed, provide ICS-dedicated fiber strands for outside plant (OSP) communications between each facility and the nearest wire center (NCTS-operated aggregation facility). New fiber installed strictly for the project shall be minimum of 24 strands with 12 dedicated to ICS. Use of existing fiber or sharing of new fiber must allow for 6 separate networks through use of 12 strands of fiber or other technologies such as DWDM.

Terminate and test all ICS-dedicated fiber strands at the patch panel, and label intelligibly. If a facility only requires use of a portion of the ICS-dedicated fiber strands, the dark fiber shall terminate at the patch panel and be properly labeled, showing network type and termination. Projects making use of existing dark ICS dedicated pathways shall provide all equipment, network design for modifications, all required network

connections, integration into existing system and programing or re-programing of system and databases to allow for seamless integration of new devices or modifications into the system.

Implement electrical circuits as needed to power ICS equipment, which also includes network switches and devices that are part of the overall data pathway from sensors and control points to the network. Electrical circuits for SCADA equipment shall be equipped with uninterruptible power supply (UPS) and considered critical loads. Provide electrical power for electricity and water metering (AMI) system equipment from the facility electrical service entrance, at a point upstream of the electrical meter. For water metering equipment installations that are not clearly associated with a single facility, coordinate with the NFM ICS PM to determine the most appropriate source of electrical power for this purpose (e.g. potable water riser metering for ships should have electrical power sourced from the station service transformer at the nearest wharf substation).

General AMI network architecture at system endpoints is as indicated in the diagram below:



Network switches shall be managed switches, with SSH protocol capability. Telnet protocol is not permitted, and no telnet interface may be introduced to Navy networks. All networking equipment and control components shall be programmable and configurable from the respective system server to the greatest extent possible.

Configure HMIs, servers, and workstations with a dedicated main drive or partition (C drive) with at least 150GB capacity to allow for operating system software updates and patches independent of operational storage requirements.
Programmable logic controllers (PLCs) shall permit removal and insertion under power (RIUP). SCADA system mimic diagrams for all SCADA system workstations and Human Machine Interface (HMI) displays shall be updated to integrate all components to the greatest extent possible such that:

a. All sensory data must be viewable in real-time

b. All specified remote device operations must be achievable.

c. Mimic diagrams must be coordinated with system operators to ensure that appearance and use are intuitive and uniform to the greatest extent possible.

d. False data or indications must not occur as part of normal operations (loss of connectivity should be easily differentiated from spurious operating conditions).

Control logic and automated routines shall be created and/or updated to satisfy SCADA system operational requirements specific to each project.
Automated data collection and report generation processes shall be updated to integrate added components as applicable.

IT/OT work for both hardware and software shall be performed under the approval of CIO and PW. Contractor supplied hardware and software shall be approved by CIO and PW in the design stage. Prior to any changes being implemented to an existing system, or prior to new devices being connected to an existing system, a Change Request Form shall be submitted to the NFM ICS PM for approval by the Configuration Control Board (CCB). The submitter may be required to be present at the CCB if additional information is needed. The NFM ICS PM shall inform the submitter of approval and only then may implementation of the change begin.

Demolition of any ICS equipment shall not occur without the permission of the NAVFAC ICS Program Manager and an approval from the CCB.

Projects demolishing any ICS equipment shall ensure system integrity is maintained. Contractor shall perform all network design for modifications and shall make all network connections, integration into existing system and programing or re-programing of ICS and databases to allow for seamless departure of required equipment from the system. All IT/OT work shall be performed under the approval of CIO. If an ICS point of presence is demolished, project shall provide termination of fiber in handhole or other appropriate termination approved by the NAVFAC ICS Program Manager.

Alarm reporting systems shall not interfere with SCADA system operations and shall provide methods for controlling the impact of recurrent or long resolution alarms on the working environment. Alarm reporting systems shall include different levels of alarms (e.g. critical, non-critical, informational), allow operators to view active alarms while simultaneously interacting with the SCADA system, allow for acknowledging alarms prior to dismissing/resolving alarms, and allow for alarm reclassification as needed.

HMIs shall include trending/graph functions equivalent to those offered by the existing system.

Provide at least two spares of each unique PLC device and accessory (e.g. input/output devices). Provide at least two spare hard drives (direct replacement) for the shared storage system. Provide at least one spare SSD (direct replacement) for the workstations and two spare hard drives (direct replacement) for the servers.

ICS work shall carry a minimum one year warranty, to include at least one year of system maintenance, software/firmware updates and technical support for all systems and software being provided under the project. Response time for warranty and support calls shall be no longer than 24 hours, and on-site response shall be no longer than 72 hours as needed.

For major changes to the control systems, include at minimum:

a. Five days of training (8 hours per day) for up to 10 personnel to show how to operate, maintain, troubleshoot, repair, and reconfigure/ reprogram the system. This training should include opportunity for hands-on experience for at least 5 personnel as part of this training requirement. Coordinate the schedule and sequence of training with the government to ensure that Navy or BOS Contractor personnel can attend parts of the training that are specific to their role (e.g. network maintenance/troubleshooting).

b. Provide a SCADA operator manual with step-by-step instructions

(w/screenshots) showing how to perform key operational & maintenance or troubleshooting tasks.

c. Modify operator manual based on feedback received as a result of the training session.

Uninterrupted Power Supply (UPS) shall be provided for AMI & DDC. UPS may be provided by the facility via back-up generator and battery room or an individual UPS within the rack for facilities that do not have UPS power built in.

Network switches shall be managed type with cryptographic or comparable security feature image configured to enforce maximum compliance with applicable STIG and Risk Management Framework (RMF) controls. All networking equipment and control components shall be programmable and configurable from the respective system to the greatest extent possible.

5.3 CYBERSECURITY

The intent of the requirements in this section is to ensure that all ICS equipment, network architectures, programming/configuration, testing, commissioning, and documentation will facilitate system assessment and authorization under the Department of Navy Risk Management Framework (RMF) process. Conformance to Department of Defense (DoD) Information Assurance (IA) requirements shall be maintained as they related to components, installer prerequisites, performance of work, and security procedures, in order to achieve network infrastructure that is accreditable under the Department of Navy (DoN) Risk Management Framework (RMF) network accreditation process. SCADA system network accreditation documentation shall be created or updated as applicable, in coordination with NAVFAC Marianas Utilities and Energy Management PLC & CIO.

Personnel that are required to conduct ICS operations, maintenance, repair, programming, configuration, installation, and/or development of systems documentation, are required to be US citizens. Requirements for background investigations, non-disclosure agreements, systems use agreements, system access request forms, system change request forms, and basic cybersecurity awareness training, are required be executed by all personnel (as applicable) to the satisfaction of NAVFAC Marianas CIO.

Conduct all programming and script development in a secure environment that meets the Department of Defense requirements set forth in the standards and regulations referenced for cybersecurity in this document.

The Government shall be afforded the ability to monitor and witness all installation, testing, and on-site configuration/programming work. Applications are not permitted to be installed on Government systems without explicit request and Government approval. Government systems and systems provided to the Government shall not be outfitted with hardware or software "back doors" to permit remote access. Use of flash memory devices (including USB "thumb" drives) on Government equipment is also prohibited. Information used in the course of systems implementation shall be designated "For Official Use Only" (FOUO) and shall not be disseminated without written authorization from the Contracting Officer.

Perform cybersecurity commissioning: configure and document all provided networking equipment in accordance with the NAVFAC Marianas ICS Checklist in Appendix 4. All network capable devices are required to be scanned, secured, and deemed compliant by NAVFAC CIO as prior to being connected to an existing system.

All ICS infrastructure shall be able to pass the "assess & authorize" process under Department of Navy Risk Management Framework (RMF) process with minimal effort from NAVFAC CIO per the following Standards and Regulations:

- DoDD 8500.01, Cybersecurity (March 2014)
- DoD Instruction 8510.01, DoD Risk Management Framework (RMF) for DoD Information Technology (IT) (March 2014)
- NIST SP 800-37 (The Risk Management Framework) (latest edition)
- NIST SP 800-82 (Guide to Industrial Control Systems Security (ICS) (latest edition)
- NIST SP 800-53 (Security and Privacy Controls for Federal Information Systems and Organizations) (latest edition)

Current guidance available at:

- http://www.doncio.navy.mil/
- http://csrc.nist.gov
- https://www.dadms.navy.mil/

Industrial Control System Baseline Procurement Guidance. Refer to Appendix 5.

System Authorization Access Request (SAAR) Form for Industrial Control Systems (ICS) Standard Operating Procedures. Refer to Appendix 6.

Information System (IS) Privileged Access Agreement & Acknowledgement (PAA) of Responsibilities. Refer to Appendix 7

Appendix 1

FORM –
UTILITY CONNECTION PERMIT APPLICATION

UTILITY CONNECTION PERMIT APPLICATION Tracking #:_____

SECTION A - GENERAL INFORMATION

1. Requesting Activity: _____

2. Point of Contact: _____ Phone Number: _____

3. Project Location: _____

4. Type of Work: (Check all that apply.)
   ☐ New Construction ☐ Building Addition ☐ Renovation

   ☐ Demolition/Utility Disconnection ☐ Repair ☐ Utility Upgrade

5. Work will involve the following utilities: (Check all that apply.)
   ☐ Water ☐ Sewer ☐ Electric ☐ Steam ☐ Gas

   a. If Sewer is checked, will the connection be permanent or temporary?
   ☐ Permanent ☐ Temporary (Proceed to question 6)

   b. If a permanent connection is required and this project involves construction, contact the NAVFAC XXXXXX Environmental Business Line (Code EV) to determine if CTC/CTO is required before proceeding.

6. Work to be performed by:
   ☐ ROICC Contract ☐ NAVFAC XXXXXX Maintenance Department
   ☐ Contract ☐ NAVFAC XXXXXX Utilities and Energy Management Product Line
   ☐ Other: _____

7. Contract Title:_____

   Contract/J.O./MAXIMO Number: _____Drawing Number: _____
   ☐ NAVFAC ☐ NAVFAC XXXXXX ☐ Design Activity ☐ Other:_____

NOTE: Submit a complete set of drawings with the application. Include specifications if available.

SPECIFICATIONS INCLUDED: ☐ YES ☐ NO
DESIGN CALCULATIONS INCLUDED: ☐ YES ☐ NO

8. Designed by Firm/Activity:_____

   Point of Contact: _____ Phone: _____

9. Submitted by: (This is usually the Engineer in Charge (EIC) or AIC.):

   Name: _____ Signature: _____

   Title: _____ Request Date: _____ Phone: _____

10. Reviewed by:_____ Date:_____

    ☐ Approved ☐ Disapproved

SECTION B - WATER

PART A - DOMESTIC WATER SERVICE CONNECTIONS

Complete the following for all domestic water service connections to water distribution system lines.

1. Number of Domestic Water Service Connections

(a) Existing service connections disconnected from water line _____

(b) New service connections connected to water line _____

2. List the following for all new domestic water service connections to water distribution system lines. See Instructions for clarification.

(a) Pipe Size(s) _____

(b) Pipe Material(s) _____

(c) Pipe Class or Schedule _____

(d) Required Capacity (in gpm) _____

(e) Required Pressure (in psi) _____

(f) Meter Size(s) _____

(g) Meter Type(s) _____

(h) Backflow Preventer (Yes/No) _____

PART B - FIRE PROTECTION (HIGH PRESSURE/NON-POTABLE) WATER SERVICE CONNECTIONS

Complete the following for all fire protection (high pressure/non-potable) water service connections to fire protection system lines.

1. Number of Fire Protection (High Pressure/Non-Potable) Water Service Connections

(a) Number of existing service connections disconnected from fire protection line _____

(b) Number of new service connections connected to fire protection line _____

2. List the following for all new fire protection (high pressure/non-potable) water service connections to fire protection system lines. See Instructions for clarification.

(a) Pipe Size(s) _____

(b) Pipe Material(s) _____

(c) Pipe Class or Schedule _____

(d) Required Capacity (in gpm) _____

(e) Required Pressure (in psi) _____

(f) Backflow Preventer (Yes/No) _____

SECTION C - SANITARY SEWER

PART A - SANITARY SEWER LATERAL CONNECTIONS

Complete the following information for work involving all sanitary sewer lateral connections to sanitary sewer mains.

1. Number of Sanitary Sewer Laterals

(a) Existing laterals disconnected from sanitary sewer main _____

(b) New laterals connected to sanitary sewer main _____

2. List the following for all new sanitary sewer lateral connections. See Instructions for clarification.

(a) Pipe Size(s) _____

(b) Pipe Material(s) _____

(c) Pipe Class or Schedule _____

(d) Total Added Design Capacity (gpm)_____

3. Type of Discharge from New Sanitary Sewer Laterals

(a) Building Type: (Check all that apply)

☐ Office	☐ Residential Housing	☐ Recreational
☐ Warehouse	☐ Food Service	☐ Fuel Depot
☐ Commercial	☐ Barracks	☐ Trng. Facility
☐ Medical	☐ Industrial	☐ Aircraft Hangar
☐ Other (Specify)_____		

(b) Indicate below any of the operations occurring in the above buildings: (Please check all that apply. If none of these apply, check N/A.)

☐ N/A
☐ Food Preparation Operations
☐ Photo Processing or X-Ray Operations
☐ Laboratory or Clinics
☐ Industrial Laundry or Dry Cleaning
☐ Printing Operations (other than copy machines for office use)
☐ Handling or Collecting Used Oils, Solvents, Degreasers, or HW
☐ Grease Traps

PART B - SANITARY SEWER MAINS

Complete the following information for work involving all sanitary sewer mains.

1. Number of sanitary sewer manholes abandoned _____

2. Number of sanitary sewer manholes installed _____

3. Linear feet of sanitary sewer main abandoned _____

4. Linear feet of sanitary sewer main installed _____

5. List the following for all new sanitary sewer mains:

   (a) Pipe Size(s) _____

   (b) Pipe Material(s)_____

   (c) Pipe Class or Schedule_____

PART C - SANITARY SEWER PUMP STATIONS

Complete the following information for work involving all sanitary sewer pump stations.

1. Number of sanitary sewer pump stations abandoned _____

2. Number of sanitary sewer pump stations installed _____

3. Number of pumps installed at each pump station _____

4. Size of each pump installed _____

5. Attach details for pump station cut sheets, pump/ system curves, visible and audible alarms/ channels, bypass pump connections, valve and check valve connections, and wet well level monitoring systems.

SECTION D - ELECTRIC

PART A - PRIMARY

If the work involves the primary, complete the following:

1. System Voltage: ☐ 34.5 KV ☐ 19.9KV ☐ 13.2 KV ☐ 11.5 KV
   ☐ 4.16 KV ☐ 2.4 KV ☐ 2.3 KV

TRANSFORMER:

2. Installation: ☐ New ☐ Upgrade Existing ☐ Repair

3. Type: ☐ Pad mount ☐ Unit Substation ☐ Pole mount ☐ Station

4. Primary BIL: ☐ 200 KV ☐ 150 KV ☐ 95 KV ☐ 60 KV
   Secondary BIL: ☐ 150 KV ☐ 95 KV ☐ 60 KV ☐ 30 KV

5. Rating:_____KVA

6. Primary Connection: ☐ Live Front ☐ Dead Front

PRIMARY CONNECTION:

7. ☐ Overhead ☐ Underground

8. Conductor Size: _____ ☐ Copper ☐ Aluminum

9. Type: _____

10. Insulation Level: ☐ 133% ☐ 100%

11. Point of Connection to Utility: (Check all that apply)

    ☐ Existing Distrib. Switch ☐ Splice in Manhole ☐ Overhead Line Tap

    ☐ New Distribution Switch ☐ Other. (Specify.) _____

    Primary Circuit to be connected to (if known):_____

PART B - SECONDARY

If the work involves the secondary, complete the following:

12. Installation: ☐ New ☐ Upgrade (Load study required) ☐ Repair

13. Transformer Load Study Performed: ☐ Yes (Provide) ☐ No - Date expected:

14. Watt-hour meter: Form_____

    Type: ☐ Transformer rated ☐ Self-contained

SECTION E - STEAM

1. Purpose of new line/service: (Please check all that apply.)

☐ Building Heating ☐ Water Heating ☐ AC/Humidity Control
☐ Other (Specify)_____

2. Size of New Line_____

3. Size of Existing Line at Connection Point_____

4. Required Capacity (lbs./hr.)_____

5. Required Pressure (psi)_____

6. Meter model/size: _____

SECTION F - NATURAL GAS

1. Size of New Line_____

2. Size of Existing Line at Connection Point_____

3. Pipe Material_____

4. Required Capacity _____

5. Required Service Pressure_____

6. Meter model/size:_____

Appendix 2

INSTRUCTIONS -
UTILITY CONNECTION PERMIT APPLICATION

UTILITY CONNECTION PERMIT INSTRUCTIONS

All questions must be answered. DO NOT LEAVE BLANKS. If a question is not applicable, indicate it on the application. The following are instructions for the questions on the permit application.

SECTION A - GENERAL INFORMATION

1. Enter the name of the activity having financial responsibility for the facility being serviced by the proposed utility work.

2. Enter the name and phone number of an activity point of contact responsible for the proposed utility work.

3. Enter the building number and name that is serviced by the proposed utility work.

4. Check the categories that correspond to the majority of the work. Abandonment of utilities should be considered demolition. Check all that apply.

5. Check each utility being altered, added, or upgraded. For each utility checked, complete the appropriate section in the application.

6. Indicate the activity performing the construction or responsible for the administration of the construction contract.

7. Indicate the project title. Enter the construction contract number or job order number that identifies the construction project. Enter COMNAVFACENGCOM, NAVFAC XXXXXX, and/or design activity drawing number. Indicate the type of drawing. Attach all existing design drawings or sketches showing proposed work to the utility systems. Indicate if specifications are included.

8. Enter the name of the organization, a point of contact, and a phone number for the party responsible for the design of the proposed work.

9. Enter the name, job title, application submission date, phone number, and signature of the Engineer in Charge (EIC) or Architect in Charge (AIC) completing the application.

10. Provide all design analyses performed along with drawings and specifications.

SECTION B - WATER

PART A - DOMESTIC WATER SERVICE CONNECTIONS

1. Enter the number of:

   a. Existing domestic water service connections/laterals disconnected from the Utilities and Energy Management Product Line-owned water distribution system involved in the proposed work.

   b. New domestic water service connections/laterals connected to the Utilities and Energy Management Product Line-owned water distribution system involved in the proposed work.

2. Indicate the:

   a. Size(s) of the water pipe to be tied into the domestic water distribution system.

   b. Type(s) of water pipe material to be tied into the domestic water distribution system (e.g. ductile iron, PVC, copper).

   c. Class of water pipe that is to be tied into the domestic water distribution system (e.g. Class 150, Class 250, Schedule 40, and Schedule 80).

   d. Design capacity for all new domestic water service connections tying into Utilities and Energy Management Product Line-owned water lines.

   e. The design pressure for all new domestic water service connections tying into Utilities and Energy Management Product Line-owned water lines.

   f. Size(s) of the water meter to be installed.

   g. Type(s) of water meter to be installed (e.g. positive displacement, turbine, dual flow).

h. Indicate whether or not a backflow prevention device is to be installed.

PART B - FIRE PROTECTION (HIGH PRESSURE/NON-POTABLE) WATER SERVICE CONNECTIONS

1. Enter the number of:

   a. Existing fire protection (high pressure/non-potable) water service connections disconnected from the Utilities and Energy Management Product Line-owned fire protection water distribution system involved in the proposed work.

   b. New fire protection (high pressure/non-potable) water service connections connected to the Utilities and Energy Management Product Line-owned fire protection water distribution system involved in the proposed work.

2. Indicate the:

   a. Size(s) of the water pipe to be tied into the fire protection (high pressure/non-potable) water distribution system.

   b. The type(s) of water pipe material to be tied into the fire protection (high pressure/non-potable) water distribution system (e.g. ductile iron, PVC, copper).

   c. The class of water pipe that is to be tied into the fire protection (high pressure/non-potable) water distribution system (e.g. Class 150, Class 250, Schedule 40, and Schedule 80).

   d. The design capacity for all new fire protection (high pressure/non-potable) water service connections tying into the Utilities and Energy Management Product Line-owned fire protection water lines.

   e. The design pressure for all new fire protection (high pressure/non-potable) water service connections tying into the Utilities and Energy Management Product Line-owned fire protection water lines.

f. Whether or not a backflow prevention device is to be installed.

SECTION C – SANITARY SEWER

Note: If a permanent sewer connection is required and construction is involved, a Certificate to Construct (CTC)/ Certificate to Operate (CTC) from Virginia Department of Environmental Quality (VDEQ) may be necessary. Please contact the NAVFAC XXXXXX Environmental Business Line (Code EV) to ensure compliance with this regulation.

PART A - SANITARY SEWER LATERAL CONNECTIONS

1. Enter the number of:

a. Existing sanitary sewer laterals disconnected from the Utilities and Energy Management Product Line-owned sanitary sewer collection system involved in the proposed work.

b. New sanitary sewer laterals connected to the Utilities and Energy Management Product Line-owned sanitary sewer collection system involved in the proposed work.

2. Indicate the:

a. Size(s) of the sanitary sewer pipe to be tied into the sanitary sewer collection system.

b. Type(s) of sanitary sewer pipe material to be tied into the sanitary sewer collection system (e.g. ductile iron, PVC).

c. Class or schedule of sewer pipe that is to be tied into the sanitary sewer collection system (e.g. DR 35, DR 18, SDR 32.5, SDR 17).

d. Design capacity for all new sewer laterals connected to Utilities and Energy Management Product Line-owned sanitary sewer collection system.

3. Check all that apply:

a. Building types that will be served by the proposed sanitary sewer connections. If there is a building type that applies and is not listed, check "Other" and indicate type of building.

b. Choices that may discharge to the sanitary sewer through the proposed connections. If none of these apply, check "N/A".

PART B - SANITARY SEWER MAINS

1. Enter the number and/or quantity of:

a. Sanitary sewer manholes abandoned in the proposed work.

b. Sanitary sewer manholes installed in the proposed work.

c. In linear feet, of sanitary sewer main abandoned in the proposed work.

d. In linear feet, of sanitary sewer main abandoned in the proposed work.

e. In linear feet, of sanitary sewer main installed in the proposed work.

2. Indicate the:

a. Size(s) of the sanitary sewer pipe to be used for the new sanitary sewer main.

b. Type(s) of the sanitary sewer pipe material to be used for the new sanitary sewer main (e.g. ductile iron, PVC).

c. Class of pipe that is to be used for the new sanitary sewer main (e.g. DR 35, DR 18, SDR 32.5, SDR 17).

PART C - SANITARY SEWER PUMP STATIONS

1. Enter the number of:

a. Sanitary sewer pump stations abandoned in the proposed work.

b. Sanitary sewer pump stations installed in the proposed work.

2. Indicate the:

   a. The number of pumps for each pump station installed in the proposed work.

   b. The size, including horsepower (hp) and rated flow, of each pump for each pump station in the proposed work. Include a manufacturer's cut sheet and pump/system curve for each pump.

3. Provide details for:

   a. The visible and audible alarms and channels.

   b. The bypass pump connections.

   c. The valve and check valve specifications.

   d. The wet well level monitoring system.

SECTION D - ELECTRIC

PART A - PRIMARY ELECTRICAL SYSTEM

Complete this section when any additions, modifications, or deletions are being made to the electrical distribution system.

1. Indicate the voltage rating of the system being modified.

2. Indicate the type of work to be performed (e.g. New transformer installation, switch removal, cable splicing, etc.)

3. Indicate the type of equipment being installed or removed.

4. If new equipment is being installed, indicate the equipment Basic Impulse Levels (BIL) rating (primary and secondary for transformers).

5. Indicate the transformer rating in Kilovolt Amperes (KVA).

Indicate other equipment ratings as applicable (e.g. KVA for transformers, amperage for switches and cables).

6. If installing a new transformer, indicate the type of transformer primary termination being made.

7. Indicate if primary connection is overhead or underground.

8. Indicate the size of the conductors to be installed.

9. Indicate the type of conductors (e.g. ERP, XLP).

10. Indicate the cable insulation level.

11. Indicate if the connection to the utility is to be a termination on an existing distribution switch, a primary cable splice in a manhole, a tap to an existing overhead circuit, or a new distribution switch. If the connection to the utility is by some means other than those listed, check other and indicate the proposed method. Indicate primary circuit to be tapped, if known. Use the Utility and Energy Management Product Line circuit designations.

PART B - SECONDARY ELECTRICAL SYSTEM

1. Indicate if work is to install a new transformer and secondary load, or if work is to upgrade or repair an existing transformer due to a secondary load addition.

2. Indicate if a load study has been performed on the transformer that is having the secondary load increased. If yes, provide a copy of the study. If no, indicate when the study will be completed.

3. Indicate the watt-hour meter form and type to be provided.

SECTION E - STEAM

1. Check all services to be supplied by the proposed connection and indicate the:

   a. Size of the new steam line.

   b. Size of the existing steam line to which service is to be connected.

c. Design capacity for the system to be supplied by the new connection.

d. Design pressure of the system to be supplied by the new connection.

e. Model and size of meter being installed.

SECTION F - NATURAL GAS

1. Indicate the:

   a. Pipe size of the new gas line.

   b. Pipe size of the existing gas line to which service is to be connected.

   c. Pipe material of the new gas line to which service is to be connected.

   d. Design capacity for the system to be supplied by the new connection.

   e. Required service pressure for the system to be supplied by the new connection.

   f. Meter manufacturer, model, and size to be installed.

Appendix 3

FORMS & INSTRUCTIONS - UTILITY METER CHANGE

CHANGE METER RECORD

WATER

CUSTOMER INFORMATION

ACTIVITY/ REQUESTED BY:
CUSTOMER:

NEW METER INSTALLATION

EXACT METER LOCATION						
PWC ID/ METER NO.	SERIAL NO.	NAME/ TYPE METER	SIZE			
DIGITS	MULTIPLIER	REGISTER				
INSTALLED BY		READING	DATE/ TIME REQ./ DATE INSTALLED			
NEW ROUTE NO.		ROUTE BOOK NO.				
WALK SEQUENCE	AFTER ROUTE NO	SUB METER OF RTE				
TEST PLUG	TEST PLUG SIZE	CHECK VLV	CHECK VLV SIZE	BY PASS SYS	BY PASS SYS SIZE	VANE ADJUST TYPE
REMARKS						

METER DISCONNECT

EXACT METER LOCATION						
PWC ID/ METER NO.	SERIAL NO.	NAME/ TYPE METER	SIZE			
DIGITS	MULTIPLIER	REGISTER				
REMOVED BY		FINAL READING	DATE/ TIME REQ./ DATE REMOVEED			
ROUTE NO.		BOOK NO.				
WALK SEQUENCE	AFTER ROUTE NO	SUB METER OF RTE				
REMARKS						

_____ Prepared By

_____ Approved By

CHANGE METER RECORD

POWER

INSTALLED			
ACTIVITY/ REQUESTED BY			
EXACT METER LOCATION			
PWC ID/ METER NO.	SERIAL NO.	NAME/ TYPE METER	SIZE
WIRE	PHASE	AMP	VOLT/ VOLTAGE RATING
CT	PT	MULTIPLIER FROM	MULTIPLIER TO
SUBMETER/ RECORD NO.	LOCATION OF SUB		BY PASS OPEN
SET BY		READING	DATE/ TIME REQ./ DATE INSTALLED
NEW ROUTE NO.		ROUTE BOOK NO.	DIGITS
PLACEMENT/ LOCATION OF METER			

REMOVED			
ACTIVITY/ REQUESTED BY			
EXACT METER LOCATION			
PWC ID/ METER NO.	SERIAL NO.	NAME/ TYPE METER	SIZE
WIRE	PHASE	AMP	VOLT/ VOLTAGE RATING
CT	PT	MULTIPLIER FROM	MULTIPLIER TO
SUBMETER/ RECORD NO.	LOCATION OF SUB		BY PASS OPEN
REMOVED BY		READING	DATE/ TIME REQ./ DATE REMOVED
ROUTE NO.		ROUTE BOOK NO.	DIGITS
PLACEMENT/ LOCATION OF METER			
REMARKS			

Prepared By

Approved By

Last Revised: MAR 2017

CHANGE METER RECORD

POWER

INSTALLED

ACTIVITY/ REQUESTED BY:
For AMI electric meters, coordinate w/ ICS for the meter point ID No. For regular electric meters - Coordinate w/ govt project oversight to determine which activity the project belongs to.

EXACT METER LOCATION
Provide equipment ID No. & address

PWC ID/ METER NO. To be filled-up by BOSC Annex 1602 Meter/Relay	SERIAL NO. Meter Device S/N	NAME/ TYPE METER Meter Form (e.g. 5S, 9S, 36S & etc.)	SIZE Meter number of terminals (check the meter's back side)
WIRE e.g. 3-Wire Delta or 4-wire WYE, etc	PHASE Single Phase or Three Phase	AMP Applicable meter's amperage e.g.2.5 A	VOLT/ VOLTAGE RATING Applicable Transformer's Secondary Voltage or Service Voltage
CT N/A if not applicable, otherwise indicate Current Transformer Ratio (CTR)	PT N/A if not applicable, otherwise indicate applicable Potential Transformer ratio	MULTIPLIER FROM 1.0 for AMI Electric meters, otherwise quotient of the applicable CTR	MULTIPLIER TO 1.0 for AMI Electric meters, otherwise quotient of the CTR
SUBMETER/ RECORD NO. Upstream KWH meter	LOCATION OF SUB Facility number or Bldg., number where the upstream KWH meter is located		BY PASS OPEN N/A if not applicable
SET BY Contractors Name		READING Initial reading of the kWh meter	DATE/ TIME REQ./ DATE INSTALLED Date/Time when kWh meter is energized
NEW ROUTE NO. To be filled-up by BOSC Annex 1602 Meter/ Relay		ROUTE BOOK NO. To be filled-up by BOSC Annex 1602 Meter/Relay	DIGITS Refer to kWh meter's Product Data and provide " Number" of digits
PLACEMENT/ LOCATION OF METER			

REMOVED

ACTIVITY/ REQUESTED BY			
EXACT METER LOCATION			
PWC ID/ METER NO.	SERIAL NO.	NAME/ TYPE METER	SIZE
WIRE	PHASE	AMP	VOLT/ VOLTAGE RATING
CT	PT	MULTIPLIER FROM	MULTIPLIER TO
SUBMETER/ RECORD NO.	LOCATION OF SUB		BY PASS OPEN
REMOVED BY		READING	DATE/ TIME REQ./ DATE REMOVED

ROUTE NO.	ROUTE BOOK NO.	DIGITS
PLACEMENT/ LOCATION OF METER		
REMARKS Indicate pertinent information (e.g. PWD UEM performed Field Inspection; BOSC Meter/Relay performed Bench Testing; kWh meter is for Temporary use; kWh meter/Smart meter is Factory programmed, etc.)		

_____ _____

Prepared By Approved By

CHANGE METER RECORD

WATER

CUSTOMER INFORMATION
ACTIVITY/ REQUESTED BY: Coordinate w/ government project oversight to determine which activity the project belongs to.
CUSTOMER: End user, who meter will be billed/was billed to. To be provided by Government oversight team.

NEW METER INSTALLATION							
EXACT METER LOCATION Provide equipment ID No. & address							
PWC ID/ METER NO. To be filled-up by BOS Contractor	SERIAL NO. Meter Device S/N	NAME/ TYPE METER Make & Meter type	SIZE Meter size				
DIGITS Number of digits	MULTIPLIER Ex, 10X, 100X, etc.	REGISTER US Gallons, Liters					
INSTALLED BY Contractors Name		READING Initial reading of the water meter	DATE/ TIME REQ./ DATE INSTALLED Date/Time when water meter is installed				
NEW ROUTE NO. To be filled-up by BOS Contractor		ROUTE BOOK NO. To be filled-up by BOS Contractor					
WALK SEQUENCE To be filled-up by BOS Contractor	AFTER ROUTE NO To be filled-up by BOS Contractor	SUB METER OF RTE To be filled-up by BOS Contractor					
TEST PLUG If Applicable	TEST PLUG SIZE If Applicable	CHECK VLV If Applicable	CHECK VLV SIZE If Applicable	BY PASS SYS If Applicable	BY PASS SYS SIZE If Applicable	VANE ADJUST TYPE If Applicable	
REMARKS							

METER DISCONNECTION							
EXACT METER LOCATION Provide equipment ID No. & address							
PWC ID/ METER NO. To be filled-up by BOS Contractor	SERIAL NO. Meter Device S/N	NAME/ TYPE METER Make & Meter type	SIZE Meter size				
DIGITS Number of digits	MULTIPLIER Ex, 10X, 100X, etc.	REGISTER US Gallons, Liters					
REMOVED BY Contractors Name		FINAL READING Final reading of the water meter	DATE/ TIME REQ./ DATE REMOVEED Date/Time when water meter is removed				
ROUTE NO. To be filled-up by BOS Contractor		BOOK NO. To be filled-up by BOS Contractor					
WALK SEQUENCE To be filled-up by BOS Contractor	AFTER ROUTE NO To be filled-up by BOS Contractor	SUB METER OF RTE To be filled-up by BOS Contractor					
REMARKS							

_____ Prepared By

_____ Approved By

Appendix 4

FORM –
NAVFAC MARIANAS ICS CHECKLIST

NAVFAC MARIANAS ICS CHECKLIST v2.1 FOR [SYSTEM NAME]

NOTES/COMMENTS	DATE Finished	CTR Init's	GOV Witness	DESCRIPTION
				Remove all Software and Services not required for operation and/or maintenance of the product:
				If removal is not technically feasible, then disable software not required for the operation and/or maintenance of the product. This removal shall not impede the primary function of the product. If software that is not required cannot be removed or disabled, document a specific explanation and provide risk mitigating recommendations and/or specific technical justification. Provide documentation on what is removed and/or disabled. The software/service to be removed and/or disabled shall include, but not be limited to:
				• Games
				• Device drivers for product components not procured/delivered
				• Messaging services (e.g., email, instant messenger, peer-to-peer file sharing)
				• Source code
				• Software compilers in user workstations and servers
				• Software compilers for programming languages that are not used in the energy delivery system
				• Unused networking and communications protocols
				• Unused administrative utilities, diagnostics, network management, and system management functions
				• Backups of files, databases, and programs used only during system development
				• All unused data and configuration files
				Provide documentation of software/firmware that supports the product, including scripts and/or macros, run time configuration files and interpreters, databases and tables, and all other included software (identifying versions, revisions, and/or patch levels, as delivered). The listing shall include all ports and authorized services required for normal operation, emergency operation, or troubleshooting.
				Remove and/or disable, through software, physical disconnection, or engineered barriers, all services and/or ports in the procured product not required for normal operation, emergency operations, or troubleshooting. This shall include communication ports and physical input/output ports (e.g., USB docking ports, CD/DVD drives, video ports, and serial ports). Provide documentation of disabled ports, connectors, and interfaces.
				Configure the product to allow the ability to re-enable ports and/or services if they are disabled by software.
				Disclose the existence of all known methods for bypassing computer authentication in the product, often referred to as backdoors, and provide written documentation that all such backdoors created have been permanently deleted from the system.
				Provide summary documentation of the procured product's security features and security-focused instructions on product maintenance, support, and reconfiguration of default settings.
				Access Control
				Implement a warning banner on terminal interfaces that conforms to DoD warning banner guidelines
				Configure each component of the product to operate using the principle of least privilege. This includes operating system permissions, file access, user accounts, application-to-application communications, and energy delivery system services.
				Provide user accounts with configurable access and permissions associated with one or more organizationally defined user role(s), where roles are used.
				Provide a system administration mechanism for changing user(s') role (e.g., group) associations.
				Configure the product such that when a session or interprocess communication is initiated from a less privileged application, access shall be limited and enforced at the more critical side.
				Provide a method for protecting against unauthorized privilege escalation.
				Document options for defining access and security permissions, user accounts, and applications with associated roles. Configure these options, as specified.
				Prevent unauthorized changes to the Basic Input/Output System (BIOS) and other firmware and document if not feasible, provide mitigation recommendations.
				Verify and provide documentation for the procured product, attesting that unauthorized logging devices are not installed (e.g., key loggers, cameras, and microphones).
				Account Management
				Document all accounts (including, but not limited to, generic and/or default) that need to be active for proper operation of the product.
				Change default account settings to specific settings (e.g., length, complexity, history, and configurations) provided by government rep. Changed account information will not be published. All new account information will be provided by a protected mechanism.
				Remove or disable any accounts that are not needed for normal or maintenance operations of the energy delivery system.
				Accounts for emergency operations shall be placed in a highly secure configuration and documentation on their configuration.
				Session Management
				Configure system to disallow multiple concurrent logins using the same authentication credentials, allow applications to retain login information between sessions, provide any auto-fill functionality during login, or allow anonymous logins.
				Implement account-based and group-based configurable session-based logout and timeout settings (e.g., alarms and human-machine interfaces).
				Authentication/Password Policy and Management

				Document the levels, methods, and capabilities for authentication and authorization. Deliver a product that adheres to standard authentication protocols.
				Implement a configurable account password management system that allows for, but is not limited to, the following:
				• Changes to passwords (including default passwords)
				• Selection of password length
				• Frequency of change
				• Setting of required password complexity
				• Number of login attempts prior to lockout
				• Inactive session logout
				• Screen lock by application
				• Comparison to a library of forbidden strings
				• Derivative use of the user name
				• Denial of repeated or recycled use of the same password
				Ensure/verify that passwords are not stored within or around the system in clear text, and not hardcoded into software or scripts.
				Implement a centralized and local account management interface.
				Implement a secure method of authentication (e.g., strong two-factor authentication) to allow for single sign-on authentication to a suite of applications.
				Ensure/verify the protection of key files and access control lists used by the authentication system from non-administrative user read, write, and delete access. The authentication system must resolve each individual user's credentials, roles, and authorizations to each application.
				Provide documentation on configuring a single-sign-on system, as well as documentation showing equivalent results in running validation tests against the direct login and the single sign-on.
				Logging and Auditing
				Implement logging capabilities or the ability to support the existing logging system. Logging capabilities shall be configurable by the government and support the governments security auditing requirements. As specified by the government, the procured product shall cover the following events, at a minimum (as appropriate to their function):
				• Information requests and server responses
				• Successful and unsuccessful authentication and access attempts
				• Account changes
				• Privileged use
				• Application start-up and shutdown
				• Application failures
				• Major application configuration changes
				Implement standard time synchronization in the procured product (e.g., Global Positioning System [GPS], Network Time Protocol [NTP], and IEEE 1508-2008). If not providing standard time synchronization and is providing an alternate authoritative time source, the procured product shall be configured to synchronize to that authoritative time source.
				Ensure/verify that time stamp audit trails and log files are automatically generated, as specified by the Acquirer.
				Provide a list of all log management capabilities that the product is capable of generating and the format of those logs. This list shall identify which of those logs are enabled by default.
				Communication Restrictions
				Document all remote access entry pathways and ensure that they can be enabled or disabled by the Acquirer as needed.
				Ensure/verify that a method is provided for managing the network components of the procured product and changing configurations, including hardware and software configurations (e.g., addressing schemes).
				Verify and document how the network configuration management interface is secured.
				Malware Detection and Protection
				Implement the capability to automatically scan any removable media that is introduced to the product being acquired.
				Implement **both** of the following:
				• Provide a host-based malware detection capability. Quarantine (instead of automatically deleting) suspected infected files. Provide an updating scheme for malware signatures. Test and confirm compatibility of malware detection application patches and upgrades.
				• Provide an application whitelisting solution that is tested, validated, and documented that shall only permit approved applications to run.
				Validate that cybersecurity services running on the procured product (e.g., virus checking and malware detection) do not conflict with other such services running on the procured product.
				Reliability and Adherence to Standards
				Verify that the addition of security features does not adversely affect connectivity, latency, bandwidth, response time, and throughput specified.
				Physical Access System Components
				Provide lockable or locking enclosures or rooms for energy delivery systems and system components (e.g., servers, clients, and networking hardware) and for the systems used to manage and control physical access (e.g., servers, lock controllers, and alarm control panels).
				Provide a method for tamper detection on lockable or locking enclosures. If a physical security and monitoring system is used, tamper detection shall be compatible.
				Change locks, locking codes, keycards, and any other keyed entrances or provide the tools and instructions for making these changes.

				Verify that physical security features do not hamper energy delivery system operations.
				Reprogram codes (e.g., remove default codes) on provided locks and locking devices so that the codes/passwords are unique and do not repeat codes used in the past. Convey all codes/passwords to the government at system operational turnover.
				General Wireless Technology Provisions
				Document specific protocols and other detailed information required for wireless devices to communicate with the control network, including other wireless equipment that can communicate with the supplied devices.
				Document use, capabilities, and limits for the wireless devices.
				Document the power and frequency requirements of the wireless devices (e.g., microwave devices meet the frequency requirements of Generic Requirements [GR]-63 Network Equipment Building System [NEBS] and GR-1089).
				Document the range of the wireless devices and verify that the range of communications is minimized to both meet the needs of the proposed deployment and reduce the possibility of signal interception from outside the designated security perimeter.
				Document that the wireless technology and associated devices comply with standard operational and security requirements specified in applicable wireless standard(s) or specification(s) (e.g. applicable IEEE standards, such as 802.11).
				Document the configuration control options that enable varying of the security level of the devices.
				Recommend alarm settings in accordance with the needs of the system, and implement in accordance with government direction.
				Patch Management and Updates
				Verify and document that all products (including third-party hardware, software, firmware, and services) have appropriate updates and patches installed.

I, [name of contractor QC Manager], attest that all of the items on this checklist have been verified and witnessed, and that comprehensive information for each item has been provided as applicable

_____ _____

SIGNATURE *DATE*

Appendix 5

INDUSTRIAL CONTROL SYSTEM BASELINE PROCUREMENT GUIDANCE
Version 2.1

This PWUC supersedes: PWUC dated 14July2011; Revision 1 dated 02April2015

Industrial Control System Baseline Procurement Guidance v2.1

NAVFAC Marianas CI4 / CIO

24 August 2016

The objective of this document is to provide contract language and requirements that can be used in NAVFAC construction procurements of Industrial Controls Systems and parts of those systems. Within NAVFAC, these systems generally consist of utility SCADA systems, building DDC systems, and AMI systems, although much of this language can be used to support procurement of other kinds of cybersecure systems (non-standard IT).

The language in this document should be modified as needed and inserted into RFPs and other contract documents where appropriate. Coordinate this language and other requirements of this nature with the local CIO4 branch to ensure that the language (as modified and inserted) is sufficient to meet CIO4 expectations, since much of the cybersecurity assessment and authorization process will be conducted by CIO4.

Apart from the provided language, the checklist attachment is for system installers to review and coordinate with CIO4 support (or CME who is qualified and trained for this purpose) during installation and testing. The checklist is intended to be a contract attachment. An Excel format copy should be given to the winning bidder so that the actual spreadsheet can be annotated with comments and validation notes as per the instructions included in the language below.

General Guidance

The intent of this project is for all Industrial Controls Systems (ICS) equipment, network architectures, programming/configuration, testing, commissioning, and documentation to be assessed and authorized under the Department of Navy Risk Management Framework (RMF) process per the most current versions of the following standards and regulations:

- DoDI 8500.01, Cybersecurity
- DoDI 8510.01, DoD Risk Management Framework (RMF) for DoD Information Technology (IT)
- NIST SP 800-37, The Risk Management Framework
- NIST SP 800-82, Guide to Industrial Control Systems (ICS) Security
- NIST SP 800-53, Security and Privacy Controls for Federal Information Systems and Organizations

Current guidance is available at:

- http://www.doncio.navy.mil/
- https://www.dadms.navy.mil/
- http://csrc.nist.gov/publications/PubsSPs.html

For all provided systems and parts of systems, the Government shall be afforded the capability to seamlessly and efficiently understand, operate, test, maintain, secure from unauthorized access, diagnose and troubleshoot problems, and recover from run-time errors.

All provided equipment and software shall be currently marketed products, not currently scheduled for end of life or obsolescence, to ensure system sustainability. Where older versions of software are provided due to incompatibility concerns between different versions, provide the Government with the means (licenses, install disks, and any other installation materials) to fully update the provided software to the latest marketed version. Hardware and software products for systems networking should have been evaluated and accredited at a licensed/approved evaluation facility and listed as being in conformance to the Common Criteria for IT Security Evaluation (ISO Standard 15408, visit https://www.niap-ccevs.org for more information); products shown to be in the evaluation process for this purpose are acceptable. Operating systems and malware/antivirus protection application(s) must also be approved for use by the Department of the Navy in the DoN Applications and Database Management System (https://www.dadms.navy.mil). All software licenses are required to be in the name of the Department of the Navy.

Legacy devices that are not required in the new system configuration shall be disconnected, removed and turned over to the government unless otherwise indicated.

Contractor Personnel Requirements

Personnel installing and/or interacting with new or existing systems hardware and software are required to be United States citizens. Personnel requesting access to existing Navy systems for the purpose of installing new software, programming/configuring software, or modifying code for existing software are required to have a favorable security background check in accordance with IT-II designation, per SECNAV M-5510.30.

Individuals developing or using Security Controls documentation, or other documents that are designated "For Official Use Only" (FOUO), will be required to complete and submit a signed Non-Disclosure and Data Handling Agreement for FOUO information. Individuals installing and/or interacting with new or existing systems equipment will be required to submit documentation showing compliance with the following additional requirements:

a) Fill out and sign/submit the NAVFAC Marianas SCADA Change Request Form (as needed)
b) Fill out and sign/submit the ICS SAAR-N Systems Access Authorization Request Forms
c) Fill out and sign/submit the ICS IA Addendum
d) Finish DoD CyberAwareness training (http://iase.disa.mil/eta/cyberchallenge/launchPage.htm)
e) Fill out and sign/submit the NAVFAC Marianas ICS Privileged Access Form (for elevated privileges, such as for administrator or programmer tasks)

Individuals engaged in systems design, programming, and configuration activities, shall possess at least 3 years of documented experience in implementing similar systems, specific project experience that is relevant to the type of work being done on the system, and manufacturer training in the use and programming of any controls devices being installed.

Installation Requirements

Existing systems shall remain operable and services shall not be interrupted during the construction process to the greatest extent possible unless otherwise indicated. Coordinate construction phasing in the project schedule/connection or tie-in plan and safety plan with the government and the system operator for approval prior to start of construction.

Systems may be located within controlled access areas. Access request procedures and requirements for access must be followed for these locations. Escorts may be necessary in many if not all circumstances. The Contractor will be responsible for coordinating access and escorts with the Government.

The Government shall be afforded the ability to monitor and witness all installation, testing, and on-site configuration/programming work.

Due to rigorous network security requirements, access to existing systems is not permitted without the individual's consent to a systems use agreement. In general, no applications may be installed on government systems without explicit request and Government approval. Government systems and systems provided to the Government shall not be outfitted with hardware or software "back doors" to permit remote access. Use of flash memory devices (including USB "thumb" drives) on Government equipment is also prohibited. Information used in the course of systems implementation shall be designated "For Official Use Only" (FOUO) and shall not be disseminated without written authorization from the Contracting Officer.

Programming and configuration requirements

For programmable or configurable interfaces, coordinate requirements with the system operator and submit draft interface diagrams (and mimic diagrams as applicable) and descriptions for Government approval to ensure compliance with system operator requirements.

Configure all provided systems and parts of systems as needed to comply with the NAVFAC Marianas ICS Checklist.

All programmed code and scripts developed under this project shall be documented and contain annotations within the code structure in accordance with industry best practices, for ease of understanding in troubleshooting or adapting. Code shall be organized into logical sections, clearly defined, with comments indicating the function of each section, including any expected inputs, outputs, and calling functions. Modifications to existing code shall be properly annotated, including date of change, reason for change, any changes to expected for inputs or outputs. All scripts and source code shall be delivered to the Government in readable format as part of close-out submittals, unless this requirement is waived by NAVFAC Marianas CIO. Conduct code reviews at regular intervals to ensure quality and reduce the likelihood of errors and security vulnerabilities. Document the results of this process and provide for Government review upon request.

Systems with programmable interfaces shall be configured with adequate interfaces and mimic diagrams (as applicable) for operators to easily view and understand all available data and system conditions. Mimic diagrams shall bear resemblance to actual equipment and process layouts to the satisfaction of the Government and the system operators. Where possible, a graphical network analysis/status interface shall be provided to allow for troubleshooting and verification of network conditions. Interfaces shall not display false information, and should accurately convey fault conditions such as when network connectivity for particular devices has been lost.

All code programming and script development under this project shall be conducted in a secure environment that meets the Department of Defense requirements set forth in the Standards and Regulations referenced for cybersecurity in this document.

Copies of code modified or produced under this contract shall only be retained while under a sustainment or support contract with the Government, and shall only be used for the purposes described within the bounds of the agreement unless expressly authorized in writing by NAVFAC Marianas CIO. Code modified or generated under this contract shall be disposed of as described in the Non-disclosure and Data Handling agreement.

Testing and commissioning requirements

Request an editable version of the NAVFAC Marianas ICS Checklist from the government, and annotate with information required by the checklist, as well as the date and name of the government representative who witnessed validation of each item. (Demonstrate to the satisfaction of the government that system components are in compliance with the NAVFAC Marianas ICS Checklist and Security Controls documentation prior to commissioning. Facilitate government testing of the system via network scans and Security Template Implementation Guide (STIG) testing, and provide support for interpreting scan and STIG test results as needed). Show to the satisfaction of the Government that all provided system components are in compliance with the NAVFAC Marianas ICS Checklist and Security Controls documentation prior to commissioning.

Conduct systems testing and verification, witnessed by the government and its system operator as each system component is brought online and commissioned. Systems testing and verification shall show via operator interface(s) that system statuses and measurements are reported accurately, controls are fully operable, and programming/configuration conforms to statement of work and operator requirements. Notify the contracting officer forthwith of any equipment or system malfunctions encountered before or during testing that are outside the scope of work. Detailed test procedures, results, date/time, witnessing personnel, and other conditions as applicable shall be documented for submission as part of close-out submittals.

Training requirements

Provide on-site training for length of time and personnel as indicated to show how to operate, maintain, troubleshoot, repair, and reconfigure/reprogram the system. This training should include opportunity for hands-on experience as part of this training requirement. Develop and provide an operator manual

with step-by-step instructions (w/screenshots) showing how to perform key operational & maintenance/troubleshooting tasks. Modify the operator manual based on feedback received as a result of the training session.

Evaluation factors

As part of the technical narrative, detail programmer certification and training requirements, and provide a plan describing how code reviews will be conducted and documented for Government review in a way that is verifiable (automated code review tools with summary report printouts are recommended). Describe software development practices and standards applied to control system software and firmware that is written by the offeror and/or any planned subcontractors. Provide detailed information about quality assurance programs that are in place for the provided control system software and firmware, as well as quality control testing methods and results, also including unresolved vulnerabilities and recommended mitigation measures. Quality control testing should include fuzz testing, static testing, dynamic testing, and penetration testing, as well as use of positive and appropriate negative tests to verify that the procured product operates in accordance with requirements and without extra functionality, as well as monitoring for unexpected or undesirable behavior during these tests. Indicate approach and capability to remediate newly reported zero-day vulnerabilities.

Submittal requirements

Operator Manual: provide bound hard copies as indicated for training purposes. Provide final Operator Manuals (including modifications based upon feedback) in conjunction with OMSI submittals for all installed equipment in accordance with specification 01 78 24.05 20. All documents shall be submitted in native (editable) and PDF formats on CD-R or DVD-R in the quantities indicated.

Sustainment materials: provide the following for every PLC, RTU, Supervisory Controller, or other network-capable (whether networked or not upon delivery) control device, organized by device and delivered on CD-R or DVD-R in conjunction with OMSI submittals:

a) Original firmware
b) Original firmware hash
c) SOP for application of firmware updates/patches
d) POC or website for firmware updates/patches
e) Count of interfaces and types
f) Protocols in use, per interface
g) Configuration file
h) SOP for configuration

Security Controls documents: edit existing documentation where applicable; otherwise provide new documentation as described. Provide draft Systems Authorization documents, Access Controls Summary, Auditing Controls Summary, Configuration Management Plan, Contingency Plan, Security Features Guide, Vulnerability Management Plan, and Maintenance Plan documents, as well as Documented Statements along with all formal design submittals, complete with all information available

at the time of the submittal. Provide a document changelog and outline or mark sections of documents that have been changed from originals and from each previous submittal. Provide final Security Controls documents in conjunction with As-Builts submittals, and additionally include the completed NAVFAC Marianas ICS Checklist. Request editable templates for hardware and software lists from the Government, as well as an example network diagram for use as guidance. Hardware and software lists shall be in formats editable via Microsoft Excel 2010. Network diagrams shall be in formats editable via AutoCAD 2010. All documents shall be submitted in native (editable) and PDF formats on CD-R or DVD-R in the quantities indicated.

System Authorization Documents

a) Draft hardware list (include the following for each device):
   - Manufacturer,
   - Product line,
   - Model (and specific variant if applicable),
   - Product type,
   - Location (installation/special area/building/floor/room),
   - key technical ratings (e.g. memory),
   - Serial number,
   - MAC addresses,
   - IP addresses,
   - Unique Navy identifier or barcode (if assigned)
   - Operating system software (cross reference with software list)
   - Application software (cross reference with software list)
   - Network connections and types (cross reference with network diagram)

b) Software List (include the following for all software):
   - Manufacturer
   - Version/subversion,
   - Location/device,
   - Used network ports/protocols/services.

   (Both hardware and software lists should also include Common Criteria EAL status, DADMS entry number, and OS/IOS/Firmware version(s) as applicable).

c) Network diagram
   - Network diagram must show equipment locations, names, models, and IP addresses on network communications schematic.

Access Controls Summary

a) Information on software access controls, port control, and protection.
b) System user roles implemented by application and access privileges assigned by default to each role. If privileges can be added to, or removed from, a role, so specify.
c) Details on system logon, including denial after three (3) invalid attempts, how to delay subsequent logons.
d) Details on privileged accounts - who should have them and when are they used.
e) Details on kinds of accounts, their associated privileges, which roles should have access, and so on - servers, wireless, equipment, meters.
f) User ID/Password requirements and/or PKI requirements including details on shadowing, enforcement of password strength, encryption of passwords.
g) Details of system library structure and what roles should be allowed what access privileges to library components.
h) Details on remote (wireless) access by laptops or servers to meter and/or radio data.

Auditing Controls Summary

a) Details on auditing controls and auditing (creation of system audit trail for user accountability).

Configuration Management Plan

a) Vendor configuration management plan.
b) Information required to verify and test all patches and upgrades prior to deployment, including resources, capabilities, and coordination as required with any test procedures run at vendor labs.

Contingency Plan

a) Restoration Procedures – Guidance on restoring vendor software & hardware including guidance to help determine priority for restoration.
b) Startup & Shutdown Procedures – Details of system initialization, shutdown/aborts designed to ensure secure system state.

Security Features Guide

a) List and discussion of all security features of Vendor hardware and software.
b) Document use of mobile code (e.g. scripts, such as Java) and protections in place to prevent malicious content from using associated runtime systems.
c) Documented FIPS 140-2 validated cryptography (or equivalent) compliance.

Vulnerability Management Plan

a) Information required to verify and test all patches and upgrades prior to deployment, including resources, capabilities, and coordination as required with any test procedures run at vendor labs.
b) Security issues associated with implementation and maintenance of the application.
c) Cybersecurity POC for resolution of Cybersecurity issues post accreditation.

Maintenance Plan

a) Names and other required information of personnel who will be authorized to perform maintenance in accordance with maintenance agreement

Documented Statements

a) Declaration that public domain software (e.g., freeware, shareware) is not used in the system.
b) Information on Common Criteria or National Information Assurance Partnership (NIAP) or Federal Information Processing Standards (FIPS) evaluation status of hardware and software.

Appendix 6

FORM –
SYSTEM AUTHORIZATION ACCESS REQUEST (SAAR)
FOR INDUSTRIAL CONTROL SYSTEMS (ICS)

Naval Facilities Engineering Command Marianas

Command Information Office

System Authorization Access Request (SAAR) Form For

Industrial Control Systems (ICS)

Standard Operating Procedures

Version 3.0

05 April 2017

Contents

ENCLOSURES

1) System Authorization Access Request Navy (SAAR-N) Form
2) NAVFAC Marianas ICS IA Addendum
3) Information System (IS) Privileged Access Agreement and Acknowledgement (PAA) of Responsibility

OVERVIEW

1. Purpose. The purpose and intention of this SOP is to provide standardized guidance and procedures for the completion, review, validation and processing of System Authorization Access Request Navy (SAAR-N) form.

2. Background. There are varying procedures for completion of the SAAR-N form, depending on the type of request being submitted.

3. Procedures. The below provides detailed information regarding the completion, review, validation and processing of the SAAR-N.

4. Record Retention. The NAVFAC Marianas IAM will maintain copies of the completed SAAR-N form to ensure the accountability of personnel with access.

The following is the recommended process for record retention:

a) Electronic requests:

1) File copy of requests & supporting documentation (training certificate) in appropriate folder on shared drive

2) Annotate system access in spreadsheet

b) Non-electronic requests:

1) Scan SAAR-N and training & file in appropriate folder on shared drive

2) File original form in BINDER

SYSTEM ACRONYMS

MAR-AMI	Marianas – Advanced Metering Infrastructure
NB-WWTP-SCADA	Naval Base – Waste Water Treatment Plant – Supervisory Control and Data Acquisition
NB-FWTP-SCADA	Naval Base – Fena Water Treatment Plant – Supervisory Control and Data Acquisition
NB-ELECT-SCADA	Naval Base – Electric – Supervisory Control and Data Acquisition
NB-EPGCS	Naval Base – Emergency Power Generation Plant Control System
AA-WWWTP-SCADA	Andersen Air – Waste and Water Treatment Plant – Supervisory Control and Data Acquisition
FN-HMCS	Finegayan – HVAC Monitoring and Control System
FN-EPGCS	Finegayan – Emergency Power Generation Plant Control System

REQUEST FOR ACCESS TO SYSTEMS

The following outlines the specific procedures for requesting access to the following systems:

1. MAR-AMI
2. NB-WWTP-SCADA
3. NB-FWTP-SCADA
4. NB-ELECT-SCADA
5. NB-EPGCS
6. AA-WWWTP-SCADA
7. FN-HMCS
8. FN-EPGCS

TYPES OF ICS REQUESTS:

There are primarily three (3) types of access requests using the SAAR-N:

1. **Initial** – to request account creation for new personnel (part of in-processing)
2. **Modification** – to request changes to existing account (expiration date, name change, etc.)
3. **Deactivate** – to request account be deactivated/deleted (part of out-processing)
   Note: Only page 1 is required to submit request to Deactivate

REQUIRED FORMS

1) System Authorization Access Request Navy (SAAR-N), OPNAV 5239/14 (Rev 9/2011)
2) NAVFACMAR ICS IA Addendum
3) Information System (IS) Privileged Access Agreement and Acknowledgment (PAA) of Responsibility, SECNAV 5239/1 (Apr 2016)

PROCESSING & SIGNATURE ORDER

The following procedures are for completion of the SAAR-N:

1) User: Requesting user will complete and submit the following:
- a) SAAR-N:
  - (1) Header
  - (2) Part I, Blocks 1 thru 10
  - (3) User Agreement, Blocks 22 thru 25
- b) NAVFACMAR ICS IA Addendum
- c) Attach copy of Certificate of training for IA Training

2) Supervisor: Complete blocks 15-16b
3) Security Manager: Complete blocks 27 thru 30
4) Information Owner: Complete blocks 17 thru 17b
5) Information Assurance Manager: Complete blocks 18 thru 21
6) System Administrator: Complete blocks 31 thru 32b

AUTHORIZED SIGNATURES

The following personnel are authorized to sign the SAAR-N:

User: The requesting account holder
Supervisor: Varies by System and Employee Status (See Quick Reference/Cheat Sheet)
Information Owner: ICS UEM PM (Personnel Designated in Writing)
Information Assurance Manager: NAVFAC Marianas IAM/Alternate IAM
Security Manager: NAVFAC Marianas Security Manager (Letter must be on file)

QUICK REFERENCE/CHEAT SHEET

System Requested	Employee Status	Supervisor	Information Owner	Form Submission
MAR-AMI	Contractors (BOSC) NFM Employee	ACR (Phil Ada) Immediate Supervisor	UEM ICS PM (Armando Abad)	CIO
NB-WWTP-SCADA	Contractors (BOSC) NFM Employee	ACR (Danny Dungca) Immediate Supervisor	UEM ICS PM (Armando Abad)	CIO
NB-FWTP-SCADA	Contractors (BOSC) NFM Employee	ACR (Danny Dungca) Immediate Supervisor	UEM ICS PM (Armando Abad)	CIO
NB-ELECT-SCADA	Contractors (BOSC) NFM Employee	ACR (Phil Ada) Immediate Supervisor	UEM ICS PM (Armando Abad)	CIO
NB-EPGCS	Contractors (BOSC) NFM Employee	ACR (Phil Ada) Immediate Supervisor	UEM ICS PM (Armando Abad)	CIO
AA-WWWTP-SCADA	NFM Employee	Immediate Supervisor	Water Systems Supervisor (Ramon Frias)	CIO
FN-HMCS	NFM Employee	Immediate Supervisor	CI Supervisor (Antonio Cruz)	CIO
FN-EPGCS	NFM Employee	Immediate Supervisor	CI Supervisor (Antonio Cruz)	CIO

SYSTEM AUTHORIZATION ACCESS REQUEST NAVY (SAAR-N)

PRIVACY ACT STATEMENT

AUTHORITY: Executive Order 10450, Public Law 99-474, the Computer Fraud and Abuse Act; and System of Records Notice: NM0500-2 Program Management and Locator System.
PRINCIPAL PURPOSE: To record user identification for the purpose of verifying the identities of individuals requesting access to Department of Defense (DOD) systems and information.
ROUNTINE USES: The collection of data is used by Navy Personnel Supervisors/Managers, Administration Office, Security Managers, Information Assurance Managers, and System Administration with a need to know.
DISCLOSURE: Disclosure of this information is voluntary; however, failure to provide the requested information may impede, delay or prevent further processing of this request.

TYPE OF REQUEST: ☐ INITIAL ☐ MODIFICATION ☐ DEACTIVATE ☐ USER ID _____	DATE *(DDMMMYYYY)*:
SYSTEM NAME *(Platform or Application)*:	LOCATION *(Physical Location of System)*:

PART I ***(To be completed by Requester)***

1. NAME *(Last, First, Middle Initial)*:	2. ORGANIZATION: NAVFAC Marianas
3. OFFICE SYMBOL/DEPARTMENT:	4. PHONE *(DSN and Commercial)*: DSN: COM:

5. OFFICIAL E-MAIL ADDRESS:	6. JOB TITLE AND GRADE/RANK:	
7. OFFICIAL MAILING ADDRESS: PSC 455 BOX 195 FPO AP 96540-2937	8. CITIZENSHIP: ☐ US ☐ FN ☐ LN ☐ Other _____	9. DESIGNATION OF PERSON ☐ MILITARY ☐ CIVILIAN ☐ CONTRACTOR

10. INFORMATION ASSURANCE (IA) AWARENESS TRAINING REQUIREMENTS *(Complete as required for user or functional level access.)*:

☐ I have completed Annual IA Awareness Training. DATE *(DDMMMYYYY)*: _____

PART II - ENDORSEMENT OF ACCESS BY INFORMATION OWNER, USER SUPERVISOR OR GOVERNMENT SPONSOR (If an individual is a contractor - provide company name, contract number, and date of contract expiration in Block 14a).

11. JUSTIFICATION FOR ACCESS:
Required for performance of duties.

12. TYPE OF ACCESS REQUIRED: ☒ AUTHORIZED ☐ PRIVILEGED	12a. If Block 12 is checked "Privileged", user must sign a Privileged Access Agreement Form.	DATE SIGNED *(DDMMMYYYY)*:

13. USER REQUIRES ACCESS TO:
☒ UNCLASSIFIED ☐ CLASSIFIED *(Specify Category)*: _____ ☐ OTHER: _____

14. VERIFICATION OF NEED TO KNOW: I certify that this user requires access as requested. ☒	14a. ACCESS EXPIRATION DATE *(Contractors must specify Company Name, Contract Number, Expiration Date)*:

15. SUPERVISOR'S ORGANIZATION/DEPARTMENT:	15a. SUPERVISOR'S E-MAIL ADDRESS:	15b. PHONE NUMBER:
16. SUPERVISOR'S NAME *(Print Name)*:	16a. SUPERVISOR'S SIGNATURE	16b. DATE *(DDMMMYYYY)*:
17. SIGNATURE OF INFORMATION OWNER/OPR:	17a. PHONE NUMBER:	17b. DATE *(DDMMMYYYY)*:

18. SIGNATURE OF IAM OR APPOINTEE:	19. ORGANIZATION/DEPARTMENT: NAVFACMAR/CIO2	20. PHONE NUMBER: 333-1014	21. DATE *(DDMMMYYYY)*:

22. **USER AGREEMENT** - STANDARD MANDATORY NOTICE AND CONSENT PROVISION:

By signing this document, you acknowledge and consent that when you access Department of Defense (DoD) information systems:

- You are accessing a U.S. Government (USG) information system (IS) (which includes any device attached to this information system) that is provided for U.S. Government-authorized use only.

- You consent to the following conditions:

- The U.S. Government routinely intercepts and monitors communications on this information system for purposes including, but not limited to, penetration testing, communications security, (COMSEC) monitoring, network operations and defense, personnel misconduct (PM), law enforcement (LE) and counterintelligence (CI) investigations.
- At any time, the U.S. Government may inspect and seize data stored on this information system.
- Communications using, or data stored on, this information system are not private, are subject to routine monitoring, interception and search, and may be disclosed or used for any U.S. Government-authorized purpose.
- This information system includes security measures (e.g., authentication and access controls) to protect U.S. Government interests--not for your personal benefit or privacy.
- Notwithstanding the above, using an information system does not constitute consent to personnel misconduct, law enforcement, or counterintelligence investigative searching or monitoring of the content of privileged communications or data (including work product) that are related to personal representation or services by attorneys, psychotherapists, or clergy, and their assistants. Under these circumstances, such communications and work product are private and confidential, as further explained below:

  - Nothing in this User Agreement shall be interpreted to limit the user's consent to, or in any other way restrict or affect, any U.S. Government actions for purposes of network administration, operation, protection, or defense, or for communications security. This includes all communications and data on an information system, regardless of any applicable privilege or confidentiality.
  - The user consents to interception/capture and seizure of ALL communications and data for any authorized purpose (including personnel misconduct, law enforcement, or counterintelligence investigation). However, consent to interception/capture or seizure of communications and data is not consent to the use of privileged communications or data for personnel misconduct, law enforcement, or counterintelligence investigation against any party and does not negate any applicable privilege or confidentiality that otherwise applies.
  - Whether any particular communication or data qualifies for the protection of a privilege, or is covered by a duty of confidentiality, is determined in accordance with established legal standards and DoD policy. Users are strongly encouraged to seek personal legal counsel on such matters prior to using an information system if the user intends to rely on the protections of a privilege or confidentiality.
  - Users should take reasonable steps to identify such communications or data that the user asserts are protected by any such privilege or confidentiality. However, the user's identification or assertion of a privilege or confidentiality is not sufficient to create such protection where none exists under established legal standards and DoD policy.
  - A user's failure to take reasonable steps to identify such communications or data as privileged or confidential does not waive the privilege or confidentiality if such protections otherwise exist under established legal standards and DoD policy. However, in such cases the U.S. Government is authorized to take reasonable actions to identify such communication or data as being subject to a privilege or confidentiality, and such actions do not negate any applicable privilege or confidentiality.
  - These conditions preserve the confidentiality of the communication or data, and the legal protections regarding the use and disclosure of privileged information, and thus such communications and data are private and confidential. Further, the U.S. Government shall take all reasonable measures to protect the content of captured/seized privileged communications and data to ensure they are appropriately protected.

- In cases when the user has consented to content searching or monitoring of communications or data for personnel misconduct, law enforcement, or counterintelligence investigative searching, (i.e., for all communications and data other than privileged communications or data that are related to personal representation or services by attorneys, psychotherapists, or clergy, and their assistants), the U.S. Government may, solely at its discretion and in accordance with DoD policy, elect to apply a privilege or other restriction on the U.S. Government's otherwise-authorized use or disclosure of such information.
- All of the above conditions apply regardless of whether the access or use of an information system includes the display of a Notice and Consent Banner ("banner"). When a banner is used, the banner functions to remind the user of the conditions that are set forth in this User Agreement, regardless of whether the banner describes these conditions in full detail or provides a summary of such conditions, and regardless of whether the banner expressly references this User Agreement.

USER RESPONSIBILITIES:

I understand that to ensure the confidentiality, integrity, availability, and security of Navy Information Technology (IT) resources and information, when using those resources, I shall:

- Safeguard information and information systems from unauthorized or inadvertent modification, disclosure, destruction, or misuse.
- Protect Controlled Unclassified Information (CUI), to include Personally Identifiable Information (PII), and classified information to prevent unauthorized access, compromise, tampering, or exploitation of the information.
- Protect authenticators (e.g., Password and Personal Identification Numbers (PIN)) required for logon authentication at the same classification as the highest classification of the information accessed.
- Protect authentication tokens (e.g., Common Access Card (CAC), Alternate Logon Token (ALT), Personal Identity Verification (PIV), National Security Systems (NSS) tokens, etc.) at all times. Authentication tokens shall not be left unattended at any time unless properly secured.
- Virus-check all information, programs, and other files prior to uploading onto any Navy IT resource.
- Report all security incidents including PII breaches immediately in accordance with applicable procedures.
- Access only that data, control information, software, hardware, and firmware for which I am authorized access by the cognizant Department of the Navy (DON) Commanding Officer, and have a need-to-know, have the appropriate security clearance. Assume only those roles and privileges for which I am authorized.
- Observe all policies and procedures governing the secure operation and authorized use of a Navy information system.
- Digitally sign and encrypt e-mail in accordance with current policies.
- Employ sound operations security measures in accordance with DOD, DON, service and command directives.

(Block 22 Cont)

I further understand that, when using Navy IT resources, I shall not:
- Auto-forward any e-mail from a Navy account to commercial e-mail account (e.g., .com).
- Bypass, stress, or test IA or Computer Network Defense (CND) mechanisms (e.g., Firewalls, Content Filters, Proxy Servers, Anti-Virus Programs).
- Introduce or use unauthorized software, firmware, or hardware on any Navy IT resource.
- Relocate or change equipment or the network connectivity of equipment without authorization from the Local IA Authority (i.e., person responsible for the overall implementation of IA at the command level).
- Use personally owned hardware, software, shareware, or public domain software without written authorization from the Local IA Authority.
- Upload/download executable files (e.g., exe, .com, .vbs, or .bat) onto Navy IT resources without the written approval of the Local IA Authority.
- Participate in or contribute to any activity resulting in a disruption or denial of service.
- Write, code, compile, store, transmit, transfer, or Introduce malicious software, programs, or code.
- Use Navy IT resources in a way that would reflect adversely on the Navy. Such uses include pornography, chain letters, unofficial advertising, soliciting or selling except on authorized bulletin boards established for such use, violation of statute or regulation, inappropriately handled classified information and PII, and other uses that are incompatible with public service.
- Place data onto Navy IT resources possessing insufficient security controls to protect that data at the required classification (e.g., Secret onto Unclassified).

23. NAME *(Last, First, Middle Initial)*:	24. USER SIGNATURE:	25. DATE SIGNED *(DDMMMYYYY)*:

PART III - SECURITY MANAGER VALIDATES THE BACKGROUND INVESTIGATION OR CLEARANCE INFORMATION

26. TYPE OF INVESTIGATION:		26a. DATE OF INVESTIGATION *(DDMMMYYYY)*:	
26b. CLEARANCE LEVEL:		26c. IT LEVEL DESIGNATION ☐ LEVEL I ☐ LEVEL II ☐ LEVEL III	
27. VERIFIED BY *(Print name)*:	28. SECURITY MANAGER TELEPHONE NUMBER:	29. SECURITY MANAGER SIGNATURE:	30. DATE *(DDMMMYYYY)*:

PART IV - COMPLETION BY AUTHORIZED STAFF PREPARING ACCOUNT INFORMATION

31. TITLE:	31a. SYSTEM:	31b. ACCOUNT CODE:
	31c. DOMAIN:	
	31d. SERVER:	
	31e. APPLICATION:	
	31h. DATASETS:	
	31f. DIRECTORIES:	
	31g. FILES:	
32. DATE PROCESSED *(DDMMMYYYY)*:	32a. PROCESSED BY:	32b. DATE *(DDMMMYYYY)*:
33. DATE REVALIDATED *(DDMMMYYYY)*:	33a. REVALIDATED BY:	33b. DATE *(DDMMMYYYY)*:

INSTRUCTIONS

A. PART I: The following information is provided by the user when establishing or modifying their USER IDENTIFICATION (ID).

(1) Name. The last name, first name, and middle initial of the user.
(2) Organization. The user's current organization (i.e., USS xx, DoD,and government agency or commercial firm).
(3) Office Symbol/Department. The office symbol within the current organization (i.e., SDI).
(4) Telephone Number/DSN. The Defense Switching Network (DSN) and commercial phone number of the user.
(5) Official E-mail Address. The user's official e-mail address.
(6) Job Title/Grade/Rank. The civilian job title (i.e., Systems Analyst YA-02, military rank (CAPT, United States Navy) or "CONT" if user is a contractor.
(7) Official Mailing Address. The user's official mailing address.
(8) Citizenship (United States (US), Foreign National (FN), Local National (LN), or Other), Identify appropriate citizenship in accordance with (IAW) SECNAV M-5510.30.
(9) Designation of Person (Military, Civilian, Contractor).
(10) IA Training and Awareness Certification Requirements. User must indicate if he/she has completed the Annual Information Awareness Training and the date of completion.

B. PART II: The information below requires the endorsement from the user's Supervisor or the Government Sponsor.

(11) Justification for Access. A brief statement is required to justify establishment of an initial USER ID. Provide appropriate information if the USER ID or access to the current USER ID is modified.
(12) Type of Access Required: Place an "X" in the appropriate box. (Authorized - Individual with normal access. Privileged - Those with privilege to amend or change system configuration, parameters or settings.)
(12a) If Block 12 is Privileged, user must sign a Privilege Access Agreement form. Enter date of when Privilege Access Agreement (PAA) form was signed. Users can obtain a PAA form from the Information Assurance Manager (IAM) or Appointee.
(13) User Requires Access To. Place an "X" in the appropriate box. Specify category.
(14) Verification of Need to Know. To verify that the user requires access as requested.
(14a) Expiration Date for Access. The user must specify expiration date if less than 1 year.
(15) Supervisor's Name (Print Name). The supervisor or representative prints his/her name to indicate that the above information has been verified and that access is required.
(15a) Supervisor's Signature. Supervisor's signature is required by the endorser or his/her representative.
(15b) Date. Date supervisor signs the form.
(16) Supervisor's Organization/Department. Supervisor's organization and department.
(16a) Official E-mail Address. Supervisor's e-mail address.
(16b) Phone Number. Supervisor's telephone number.
(17) Signature of Information Owner/OPR. Signature of the functional appointee responsible for approving access to the system being requested.
(17a) Phone Number. Functional appointee telephone number.
(17b) Date. The date the functional appointee signs the OPNAV 5239/14.
(18) Signature of Information Assurance Manager (IAM) or Appointee. Signature of the IAM or Appointee of the office responsible for approving access to the system being requested.
(19) Organization/Department. IAM's organization and department.
(20) Phone Number. IAM's telephone number.
(21) Date. The date the IAM signs the OPNAV 5239/14 form.
(22) Standard Mandatory Notice and Consent Provision and User Responsibilities. These items are in accordance with DoD Memo dtd May 9, 2008 (Policy on Use of DoD Information Systems - Standard Consent Banner and User Agreement) and DON CIO message Responsible and Effective Use of Dept of Navy Information Technology Resources" DTG 161108Z JUL 05.
(23) Name. The last name, first name, and middle initial of the user.
(24) User Signature. User must sign the OPNAV 5239/14 with the understanding that they are responsible and accountable for their password and access to the system(s). User shall digitally sign form. Pen and ink signature is acceptable for users that do not have a Common Access Card (CAC) or the ability to digitally sign the form.
(25) Date. Date signed.

C. PART III: Certification of Background Investigation or Clearance.

(26) Type of Investigation. The user's last type of background investigation (i.e., National Agency Check (NAC), National Agency Check with Inquiries (NACI), or Single Scope Background Investigation (SSBI)).
(26a) Date of Investigation. Date of last investigation.
(26b) Clearance Level. The user's current security clearance level (Secret or Top Secret).
(26c) Identify the user's IT designation level. If Block 12 is designated as "Authorized" then IT Level Designation is "Level III". If Block 12 is designated as "Privileged" then IT Level Designation is "Level I or II" based on SECNAV M-5510.30 dtd June 2006.
(27) Verified By. The Security Manager or representative prints his/her name to indicate that the above clearance and investigation information has been verified.
(28) Security Manager Telephone Number. The telephone number of the Security Manager or his/her representative.
(29) Security Manager Signature. The Security Manager or his/her representative indicates that the above clearance and investigation information has been verified.
(30) Date. The date that the form was signed by the Security Manager or his/her representative.

D. PART IV: This information is site specific and can be customized by either the functional activity or the customer with approval from OPNAV. This information will specifically identify the access required by the user.

(31 - 33b). Fill in appropriate information.

E. DISPOSITION OF FORM:

TRANSMISSION: Form may be electronically transmitted, faxed or mailed. If the completed form is transmitted electronically, the e-mail must be digitally signed and encrypted.

FILING: Form is purposed to use digital signatures. Digitally signed forms must be stored electronically to retain non-repudiation of electronic signature. If pen and ink signature must be applied, original signed form must be retained. Retention of this form shall be IAW SECNAV Manual M-5210.1, Records Management Manual. Form may be maintained by the Navy, the user's IAM, and/or Security Manager. Completed forms contain Personal Identifiable Information (PII) and must be protected as such.

SYSTEM AUTHORIZATION ACCESS REQUEST NAVY (SAAR-N)

PRIVACY ACT STATEMENT

AUTHORITY: Executive Order 10450, Public Law 99-474, the Computer Fraud and Abuse Act; and System of Records Notice: NM0500-2 Program Management and Locator System.
PRINCIPAL PURPOSE: To record user identification for the purpose of verifying the identities of individuals requesting access to Department of Defense (DOD) systems and information.
ROUNTINE USES: The collection of data is used by Navy Personnel Supervisors/Managers, Administration Office, Security Managers, Information Assurance Managers, and System Administration with a need to know.
DISCLOSURE: Disclosure of this information is voluntary; however, failure to provide the requested information may impede, delay or prevent further processing of this request.

TYPE OF REQUEST: ☐ INITIAL ☐ MODIFICATION ☐ DEACTIVATE ☐ USER ID _____	DATE *(DDMMMYYYY)*:
SYSTEM NAME *(Platform or Application)*: Industrial Control Systems	LOCATION *(Physical Location of System)*: NAVFACMAR ICS Systems

PART I ***(To be completed by Requester)***

1. NAME *(Last, First, Middle Initial)*:	2. ORGANIZATION: NAVFAC Marianas
3. OFFICE SYMBOL/DEPARTMENT:	4. PHONE *(DSN and Commercial)*: DSN: COM:

5. OFFICIAL E-MAIL ADDRESS:	6. JOB TITLE AND GRADE/RANK:	
7. OFFICIAL MAILING ADDRESS: PSC 455 BOX 195 FPO AP 96540-2937	8. CITIZENSHIP: ☐ US ☐ FN ☐ LN ☐ Other _____	9. DESIGNATION OF PERSON ☐ MILITARY ☐ CIVILIAN ☐ CONTRACTOR

10. INFORMATION ASSURANCE (IA) AWARENESS TRAINING REQUIREMENTS *(Complete as required for user or functional level access.)*:

☐ I have completed Annual IA Awareness Training. DATE *(DDMMMYYYY)*: _____

PART II - ENDORSEMENT OF ACCESS BY INFORMATION OWNER, USER SUPERVISOR OR GOVERNMENT SPONSOR (If an individual is a contractor - provide company name, contract number, and date of contract expiration in Block 14a).

11. JUSTIFICATION FOR ACCESS:
Access to the following ICS's is required for performance of duties as _____(i.e. SysAdmin/NetAdmin/IAO).

___ MAR-AMI ___ NB-EPGCS
___ NB-WWTP-SCADA ___ AA-WWWTP-SCADA
___ NB-FWTP-SCADA ___ FN-HMCS
___ NB-ELECT-SCADA ___ FN-EPGCS

12. TYPE OF ACCESS REQUIRED: ☐ AUTHORIZED ☒ PRIVILEGED	12a. If Block 12 is checked "Privileged", user must sign a Privileged Access Agreement Form.	DATE SIGNED *(DDMMMYYYY)*:

13. USER REQUIRES ACCESS TO:
☒ UNCLASSIFIED ☐ CLASSIFIED *(Specify Category)*: _____ ☐ OTHER: _____

14. VERIFICATION OF NEED TO KNOW: I certify that this user requires access as requested. ☒	14a. ACCESS EXPIRATION DATE *(Contractors must specify Company Name, Contract Number, Expiration Date)*:

15. SUPERVISOR'S ORGANIZATION/DEPARTMENT:	15a. SUPERVISOR'S E-MAIL ADDRESS:	15b. PHONE NUMBER:
16. SUPERVISOR'S NAME *(Print Name)*:	16a. SUPERVISOR'S SIGNATURE	16b. DATE *(DDMMMYYYY)*:
17. SIGNATURE OF INFORMATION OWNER/OPR:	17a. PHONE NUMBER:	17b. DATE *(DDMMMYYYY)*:

18. SIGNATURE OF IAM OR APPOINTEE:	19. ORGANIZATION/DEPARTMENT: NAVFACMAR/CIO2	20. PHONE NUMBER: 333-1014	21. DATE *(DDMMMYYYY)*:

22. **USER AGREEMENT** - STANDARD MANDATORY NOTICE AND CONSENT PROVISION:

By signing this document, you acknowledge and consent that when you access Department of Defense (DoD) information systems:

- You are accessing a U.S. Government (USG) information system (IS) (which includes any device attached to this information system) that is provided for U.S. Government-authorized use only.

- You consent to the following conditions:

- The U.S. Government routinely intercepts and monitors communications on this information system for purposes including, but not limited to, penetration testing, communications security, (COMSEC) monitoring, network operations and defense, personnel misconduct (PM), law enforcement (LE) and counterintelligence (CI) investigations.
- At any time, the U.S. Government may inspect and seize data stored on this information system.
- Communications using, or data stored on, this information system are not private, are subject to routine monitoring, interception and search, and may be disclosed or used for any U.S. Government-authorized purpose.
- This information system includes security measures (e.g., authentication and access controls) to protect U.S. Government interests--not for your personal benefit or privacy.
- Notwithstanding the above, using an information system does not constitute consent to personnel misconduct, law enforcement, or counterintelligence investigative searching or monitoring of the content of privileged communications or data (including work product) that are related to personal representation or services by attorneys, psychotherapists, or clergy, and their assistants. Under these circumstances, such communications and work product are private and confidential, as further explained below:

  - Nothing in this User Agreement shall be interpreted to limit the user's consent to, or in any other way restrict or affect, any U.S. Government actions for purposes of network administration, operation, protection, or defense, or for communications security. This includes all communications and data on an information system, regardless of any applicable privilege or confidentiality.
  - The user consents to interception/capture and seizure of ALL communications and data for any authorized purpose (including personnel misconduct, law enforcement, or counterintelligence investigation). However, consent to interception/capture or seizure of communications and data is not consent to the use of privileged communications or data for personnel misconduct, law enforcement, or counterintelligence investigation against any party and does not negate any applicable privilege or confidentiality that otherwise applies.
  - Whether any particular communication or data qualifies for the protection of a privilege, or is covered by a duty of confidentiality, is determined in accordance with established legal standards and DoD policy. Users are strongly encouraged to seek personal legal counsel on such matters prior to using an information system if the user intends to rely on the protections of a privilege or confidentiality.
  - Users should take reasonable steps to identify such communications or data that the user asserts are protected by any such privilege or confidentiality. However, the user's identification or assertion of a privilege or confidentiality is not sufficient to create such protection where none exists under established legal standards and DoD policy.
  - A user's failure to take reasonable steps to identify such communications or data as privileged or confidential does not waive the privilege or confidentiality if such protections otherwise exist under established legal standards and DoD policy. However, in such cases the U.S. Government is authorized to take reasonable actions to identify such communication or data as being subject to a privilege or confidentiality, and such actions do not negate any applicable privilege or confidentiality.
  - These conditions preserve the confidentiality of the communication or data, and the legal protections regarding the use and disclosure of privileged information, and thus such communications and data are private and confidential. Further, the U.S. Government shall take all reasonable measures to protect the content of captured/seized privileged communications and data to ensure they are appropriately protected.

- In cases when the user has consented to content searching or monitoring of communications or data for personnel misconduct, law enforcement, or counterintelligence investigative searching, (i.e., for all communications and data other than privileged communications or data that are related to personal representation or services by attorneys, psychotherapists, or clergy, and their assistants), the U.S. Government may, solely at its discretion and in accordance with DoD policy, elect to apply a privilege or other restriction on the U.S. Government's otherwise-authorized use or disclosure of such information.
- All of the above conditions apply regardless of whether the access or use of an information system includes the display of a Notice and Consent Banner ("banner"). When a banner is used, the banner functions to remind the user of the conditions that are set forth in this User Agreement, regardless of whether the banner describes these conditions in full detail or provides a summary of such conditions, and regardless of whether the banner expressly references this User Agreement.

USER RESPONSIBILITIES:

I understand that to ensure the confidentiality, integrity, availability, and security of Navy Information Technology (IT) resources and information, when using those resources, I shall:

- Safeguard information and information systems from unauthorized or inadvertent modification, disclosure, destruction, or misuse.
- Protect Controlled Unclassified Information (CUI), to include Personally Identifiable Information (PII), and classified information to prevent unauthorized access, compromise, tampering, or exploitation of the information.
- Protect authenticators (e.g., Password and Personal Identification Numbers (PIN)) required for logon authentication at the same classification as the highest classification of the information accessed.
- Protect authentication tokens (e.g., Common Access Card (CAC), Alternate Logon Token (ALT), Personal Identity Verification (PIV), National Security Systems (NSS) tokens, etc.) at all times. Authentication tokens shall not be left unattended at any time unless properly secured.
- Virus-check all information, programs, and other files prior to uploading onto any Navy IT resource.
- Report all security incidents including PII breaches immediately in accordance with applicable procedures.
- Access only that data, control information, software, hardware, and firmware for which I am authorized access by the cognizant Department of the Navy (DON) Commanding Officer, and have a need-to-know, have the appropriate security clearance. Assume only those roles and privileges for which I am authorized.
- Observe all policies and procedures governing the secure operation and authorized use of a Navy information system.
- Digitally sign and encrypt e-mail in accordance with current policies.
- Employ sound operations security measures in accordance with DOD, DON, service and command directives.

(Block 22 Cont)

I further understand that, when using Navy IT resources, I shall not:
- Auto-forward any e-mail from a Navy account to commercial e-mail account (e.g., .com).
- Bypass, stress, or test IA or Computer Network Defense (CND) mechanisms (e.g., Firewalls, Content Filters, Proxy Servers, Anti-Virus Programs).
- Introduce or use unauthorized software, firmware, or hardware on any Navy IT resource.
- Relocate or change equipment or the network connectivity of equipment without authorization from the Local IA Authority (i.e., person responsible for the overall implementation of IA at the command level).
- Use personally owned hardware, software, shareware, or public domain software without written authorization from the Local IA Authority.
- Upload/download executable files (e.g., exe, .com, .vbs, or .bat) onto Navy IT resources without the written approval of the Local IA Authority.
- Participate in or contribute to any activity resulting in a disruption or denial of service.
- Write, code, compile, store, transmit, transfer, or Introduce malicious software, programs, or code.
- Use Navy IT resources in a way that would reflect adversely on the Navy. Such uses include pornography, chain letters, unofficial advertising, soliciting or selling except on authorized bulletin boards established for such use, violation of statute or regulation, inappropriately handled classified information and PII, and other uses that are incompatible with public service.
- Place data onto Navy IT resources possessing insufficient security controls to protect that data at the required classification (e.g., Secret onto Unclassified).

23. NAME *(Last, First, Middle Initial)*:	24. USER SIGNATURE:	25. DATE SIGNED *(DDMMMYYYY)*:

PART III - SECURITY MANAGER VALIDATES THE BACKGROUND INVESTIGATION OR CLEARANCE INFORMATION

26. TYPE OF INVESTIGATION:		26a. DATE OF INVESTIGATION *(DDMMMYYYY)*:	
26b. CLEARANCE LEVEL:		26c. IT LEVEL DESIGNATION ☐ LEVEL I ☐ LEVEL II ☐ LEVEL III	
27. VERIFIED BY *(Print name)*:	28. SECURITY MANAGER TELEPHONE NUMBER:	29. SECURITY MANAGER SIGNATURE:	30. DATE *(DDMMMYYYY)*:

PART IV - COMPLETION BY AUTHORIZED STAFF PREPARING ACCOUNT INFORMATION

31. TITLE:	31a. SYSTEM:	31b. ACCOUNT CODE:
	31c. DOMAIN:	
	31d. SERVER:	
	31e. APPLICATION:	
	31h. DATASETS:	
	31f. DIRECTORIES:	
	31g. FILES:	
32. DATE PROCESSED *(DDMMMYYYY)*:	32a. PROCESSED BY:	32b. DATE *(DDMMMYYYY)*:
33. DATE REVALIDATED *(DDMMMYYYY)*:	33a. REVALIDATED BY:	33b. DATE *(DDMMMYYYY)*:

INSTRUCTIONS

A. PART I: The following information is provided by the user when establishing or modifying their USER IDENTIFICATION (ID).

(1) Name. The last name, first name, and middle initial of the user.
(2) Organization. The user's current organization (i.e., USS xx, DoD,and government agency or commercial firm).
(3) Office Symbol/Department. The office symbol within the current organization (i.e., SDI).
(4) Telephone Number/DSN. The Defense Switching Network (DSN) and commercial phone number of the user.
(5) Official E-mail Address. The user's official e-mail address.
(6) Job Title/Grade/Rank. The civilian job title (i.e., Systems Analyst YA-02, military rank (CAPT, United States Navy) or "CONT" if user is a contractor.
(7) Official Mailing Address. The user's official mailing address.
(8) Citizenship (United States (US), Foreign National (FN), Local National (LN), or Other), Identify appropriate citizenship in accordance with (IAW) SECNAV M-5510.30.
(9) Designation of Person (Military, Civilian, Contractor).
(10) IA Training and Awareness Certification Requirements. User must indicate if he/she has completed the Annual Information Awareness Training and the date of completion.

B. PART II: The information below requires the endorsement from the user's Supervisor or the Government Sponsor.

(11) Justification for Access. A brief statement is required to justify establishment of an initial USER ID. Provide appropriate information if the USER ID or access to the current USER ID is modified.
(12) Type of Access Required: Place an "X" in the appropriate box. (Authorized - Individual with normal access. Privileged - Those with privilege to amend or change system configuration, parameters or settings.)
(12a) If Block 12 is Privileged, user must sign a Privilege Access Agreement form. Enter date of when Privilege Access Agreement (PAA) form was signed. Users can obtain a PAA form from the Information Assurance Manager (IAM) or Appointee.
(13) User Requires Access To. Place an "X" in the appropriate box. Specify category.
(14) Verification of Need to Know. To verify that the user requires access as requested.
(14a) Expiration Date for Access. The user must specify expiration date if less than 1 year.
(15) Supervisor's Name (Print Name). The supervisor or representative prints his/her name to indicate that the above information has been verified and that access is required.
(15a) Supervisor's Signature. Supervisor's signature is required by the endorser or his/her representative.
(15b) Date. Date supervisor signs the form.
(16) Supervisor's Organization/Department. Supervisor's organization and department.
(16a) Official E-mail Address. Supervisor's e-mail address.
(16b) Phone Number. Supervisor's telephone number.
(17) Signature of Information Owner/OPR. Signature of the functional appointee responsible for approving access to the system being requested.
(17a) Phone Number. Functional appointee telephone number.
(17b) Date. The date the functional appointee signs the OPNAV 5239/14.
(18) Signature of Information Assurance Manager (IAM) or Appointee. Signature of the IAM or Appointee of the office responsible for approving access to the system being requested.
(19) Organization/Department. IAM's organization and department.
(20) Phone Number. IAM's telephone number.
(21) Date. The date the IAM signs the OPNAV 5239/14 form.
(22) Standard Mandatory Notice and Consent Provision and User Responsibilities. These items are in accordance with DoD Memo dtd May 9, 2008 (Policy on Use of DoD Information Systems - Standard Consent Banner and User Agreement) and DON CIO message Responsible and Effective Use of Dept of Navy Information Technology Resources" DTG 161108Z JUL 05.
(23) Name. The last name, first name, and middle initial of the user.
(24) User Signature. User must sign the OPNAV 5239/14 with the understanding that they are responsible and accountable for their password and access to the system(s). User shall digitally sign form. Pen and ink signature is acceptable for users that do not have a Common Access Card (CAC) or the ability to digitally sign the form.
(25) Date. Date signed.

C. PART III: Certification of Background Investigation or Clearance.

(26) Type of Investigation. The user's last type of background investigation (i.e., National Agency Check (NAC), National Agency Check with Inquiries (NACI), or Single Scope Background Investigation (SSBI)).
(26a) Date of Investigation. Date of last investigation.
(26b) Clearance Level. The user's current security clearance level (Secret or Top Secret).
(26c) Identify the user's IT designation level. If Block 12 is designated as "Authorized" then IT Level Designation is "Level III". If Block 12 is designated as "Privileged" then IT Level Designation is "Level I or II" based on SECNAV M-5510.30 dtd June 2006.
(27) Verified By. The Security Manager or representative prints his/her name to indicate that the above clearance and investigation information has been verified.
(28) Security Manager Telephone Number. The telephone number of the Security Manager or his/her representative.
(29) Security Manager Signature. The Security Manager or his/her representative indicates that the above clearance and investigation information has been verified.
(30) Date. The date that the form was signed by the Security Manager or his/her representative.

D. PART IV: This information is site specific and can be customized by either the functional activity or the customer with approval from OPNAV. This information will specifically identify the access required by the user.

(31 - 33b). Fill in appropriate information.

E. DISPOSITION OF FORM:

TRANSMISSION: Form may be electronically transmitted, faxed or mailed. If the completed form is transmitted electronically, the e-mail must be digitally signed and encrypted.

FILING: Form is purposed to use digital signatures. Digitally signed forms must be stored electronically to retain non-repudiation of electronic signature. If pen and ink signature must be applied, original signed form must be retained. Retention of this form shall be IAW SECNAV Manual M-5210.1, Records Management Manual. Form may be maintained by the Navy, the user's IAM, and/or Security Manager. Completed forms contain Personal Identifiable Information (PII) and must be protected as such.

NAVFAC MARIANAS ICS IA Addendum

In addition to the mandated annual DoD Information Assurance training, the following requirements will apply to all NAVFAC Marianas Industrial Control Systems (ICS) Users.

1. The use of USB thumb drives, memory sticks and camera flash memory is prohibited from being connected to any NAVFAC Marianas ICS system.

2. Non-government computers are prohibited from being connected to the NAVFAC Marianas ICS network.

3. Only approved users will log in to an ICS system with credentials provided by NAVFAC Marianas CIO.

4. User account and passwords will NOT be shared.

5. Government ICS laptops/computers will NOT be moved between government installations and/or systems without prior approval.

6. Government ICS laptops/computers will NOT be connected to any other network except for NAVFAC Marianas ICS.

7. Government ICS laptops/computers will NOT be connected to the internet.

8. Government ICS laptops/computers will NOT be modified without written consent of NAVFAC Marianas CIO. This includes installation of software.

9. Control Systems security measures will NOT be bypassed or deactivated.

Note: Violation of this agreement will result in user account being deactivated and possible disciplinary actions.

_____

User Printed Name

_____ _____

User Signature Date

INFORMATION SYSTEM (IS) PRIVILEGED ACCESS AGREEMENT AND ACKNOWLEDGMENT (PAA) OF RESPONSIBILITIES

Request Date:

PRIVACY ACT STATEMENT
AUTHORITY FOR MAINTENANCE OF THE SYSTEM:
10 U.S.C. 5013, Secretary of the Navy; 10 U.S.C. 5041, Headquarters, Marine Corps; and E.O. 9397 (SSN).
PURPOSE(S):
To manage, supervise, and administer programs for all Department of the Navy civilian, military, and contractor personnel. Information is used to prepare organizational locator, recall rosters, and social rosters; notify personnel of arrival of visitors; locate individuals on routine and/or emergency matters; locate individuals during medical emergencies, facility evacuations and similar threat situations; provide mail distribution and forwarding addresses; compile a social roster for official and non-official functions; send personal greetings and invitations; track attendance at training; identify routine and special work assignments; determine clearance for access control; identify record handlers of hazardous materials; record rental of welfare and recreational equipment; track beneficial suggestions and awards; control the budget; travel claims; track manpower, grades, and personnel actions; maintain statistics for minorities; track employment; track labor costing; prepare watch bills; project retirement losses; verify employment to requesting banking activities; rental and credit organizations; name change location; checklist prior to leaving activity; safety reporting/monitoring; and, similar administrative uses requiring personnel data.
ROUTINE USES:
In addition to those disclosures generally permitted under 5 U.S.C. 552a(b) of the Privacy Act of 1974, these records contained therein may specifically be disclosed outside the DoD as a routine use pursuant to 5 U.S.C. 552a(b)(3) as follows: To arbitrators and hearing examiners for use in civilian personnel matters relating to civilian grievances and appeals. To authenticate authorization for access to services and spaces such as Morale, Welfare, and Recreation (MWR) facilities and food services. The DoD 'Blanket Routine Uses' that appear at the beginning of the Navy's compilation of systems of records notices apply to this system.
DISCLOSURE: Disclosure of this information is voluntary; however, failure to provide the requested information will result in denial of privileged access to the requested information system..
SYSTEM OF RECORDS NOTICE: http://dpcld.defense.gov/Privacy/SORNsIndex/DODwideSORNArticleView/tabid/6797/Article/570436/nm05000-2.aspx

PART I PRIVILEDGED USER INFORMATION

1. Name: (Last First Middle Initial):	2. Official Telephone Number:	3. Official Email Address:

4. Organization & Office Symbol/Department:	5. DoD/Component Information System Owner:
	DoD/Components

***NOTE: DoD Component collectively refers to: OSD, the Military Departments, the Office of the Chairman of the Joint Chiefs of Staff and the Joint Staff, the Combatant Commands, the Office of the Inspector General of the Department of Defense, the Defense Agencies, the DoD Field Activities, and all other organizational entities in the DoD.**

6. Information System (IS) Full Name:	7. Information System (IS) Acronym:

8. Information System (IS) Details: (Brief Description (optional))

PART II PRIVILEGED ACCESS AGREEMENT

1. I understand there are two DoD Information Systems (IS), classified (SIPRNET) and unclassified (NIPRNET), and that I have the necessary clearance for privileged access to the IS. I will not introduce or process data or software for the IS that I have not been specifically authorized to handle.

2. I understand the need to protect all passwords and other authenticators at the highest level of data they secure. I will not share any password(s), account(s), or other authenticators with other coworkers or other personnel not authorized to access the IS. As a privileged user, I understand the need to protect the root password and/or authenticators at the highest level of data it secures. I will NOT share the root password and/or authenticators with coworkers who are not authorized IS access.

3. I understand that I am responsible for all actions taken under my account(s), root, or otherwise. I will not attempt to "hack" the network or any connected information systems, or gain access to data to which I do not have authorized access.

4. I understand my responsibility to appropriately protect and label all output generated under my account (including printed materials, magnetic tapes, floppy disks, and downloaded hard disk files).

5. I will immediately report any indication of computer network intrusion, unexplained degradation or interruption of network services, or the actual or possible compromise of data or file access controls to the appropriate Information System Security Manager (ISSM). I will NOT install, modify, or remove any hardware or software (e.g., freeware/shareware and security tools) without written permission and approval from the ISSM or senior representatives.

6. I will not install any unauthorized software (e.g., games, entertainment software) or hardware (e.g., sniffers).

INFORMATION SYSTEM (IS) PRIVILEGED ACCESS AGREEMENT AND ACKNOWLEDGMENT (PAA) OF RESPONSIBILITIES	Request Date:

7. I will not add/remove any users' names to the Domain Administrators, Local Administrator, or Power Users group without the prior approval and direction of the ISSM or senior representatives.

8. I will not introduce any unauthorized code, Trojan horse programs, malicious code, or viruses into the local area networks.

9. I understand that I am prohibited from the following while using the DoD IS:
   a. Introducing Classified and/or Controlled Unclassified Information (CUI) into a NIPRNET environment.
   b. Accessing, storing, processing, displaying, distributing, transmitting, or viewing material that is abusive, harassing, defamatory, vulgar, pornographic, profane, or racist; that promotes hate crimes, or is subversive or objectionable by nature, including material encouraging criminal activity, or violation of local, state, federal, national, or international law.
   c. Storing, accessing, processing, or distributing Classified, Proprietary, CUI, For Official Use Only (FOUO), or Privacy Act protected information in violation of established security and information release policies.
   d. Obtaining, installing, copying, pasting, transferring, or using software or other materials obtained in violation of the appropriate vendor's patent, copyright, trade secret, or license agreement.
   e. Knowingly writing, coding, compiling, storing, transmitting, or transferring malicious software code, to include viruses, logic bombs, worms, and macro viruses.
   f. Engaging in prohibited political activity.
   g. Using the system for personal financial gain such as advertising or solicitation of services or sale of personal property (e.g., eBay), or stock trading (i.e., issuing buy, hold, and/or sell directions to an online broker).
   h. Fundraising activities, either for profit or non-profit, unless the activity is specifically approved by the organization (e.g., organization social event fund raisers and charitable fund raisers, without approval).
   i. Gambling, wagering, or placing of any bets.
   j. Writing, forwarding, or participating in chain letters.
   k. Posting personal home pages.
   l. Any other actions prohibited by DoD Directive 5500.7-R or any other DoD issuances.

10. Personal encryption of electronic communications is strictly prohibited and can result in the immediate termination of access.

11. I understand that if I am in doubt as to any of my roles or responsibilities I will contact the ISSM or Cyber IT/CSWF-PM for clarification.

12. I understand that all information processed on the is subject to monitoring. This includes email and browsing the web.

13. I will not allow any user who is not cleared access to the network or any other connected system without prior approval or specific guidance from the ISSM.

14. I will use the special access or privileges granted to me ONLY to perform authorized tasks or mission related functions.

15. I will not use any DoD/Components IS to violate software copyright by making illegal copies of software.

16. I will ONLY use my PRIVILEGED USER account for official administrative actions. This account will NOT be used for day to day network communications.

17. I will obtain and maintain required qualification(s), according to SECNAV M-5239 and maintain certification(s) (if applicable) according to the certification provider, to retain privileged system access.

18. I understand that failure to comply with the above requirements will be reported and may result in the following actions:
   a. Revocation of IS privileged access.
   b. Counseling.
   c. Adverse actions pursuant to the Uniform Code of Military Justice and/or criminal prosecution.
   d. Disciplinary action, discharge or loss of employment.
   e. Revocation of Security Clearance.

INFORMATION SYSTEM (IS) PRIVILEGED ACCESS AGREEMENT AND ACKNOWLEDGMENT (PAA) OF RESPONSIBILITIES	Request Date:

PART III CERTIFICATION OF DOD COMPONENT OPR AND/OR ACTION OFFICER, APPROVING OFFICIAL

PRIVILEGED USER CERTIFICATION OF INFORMATION

9. Privileged User Name:	10. Official Email Address:	11. Official Phone Number:

12. Organization & Office Symbol/Department:	13. Date signed:	14. Privileged User Signature:

COMMAND ISSM APPROVAL

15. Command ISSM Name:	16. Official Email Address:	17. Official Phone Number:

18. Organization & Office Symbol/Department:	19. Date signed:	20. Command ISSM Signature:

COMMAND CYBER IT/CSWF-PM APPROVAL

21. Command Cyber IT/CSWF-PM:	22. Official Email Address:	23. Official Phone Number:

24. Organization & Office Symbol/Department:	25. Date signed:	26. Command Cyber IT/CSWF-PM Signature:

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Appendix 7

FORM –
INFORMATION SYSTEM (IS) PRIVILEGED ACCESS AGREEMENT & ACKNOWLEDGEMENT (PAA) OF RESPONSIBILITIES

INFORMATION SYSTEM (IS) PRIVILEGED ACCESS AGREEMENT AND ACKNOWLEDGMENT (PAA) OF RESPONSIBILITIES

Request Date:

PRIVACY ACT STATEMENT
AUTHORITY FOR MAINTENANCE OF THE SYSTEM:
10 U.S.C. 5013, Secretary of the Navy; 10 U.S.C. 5041, Headquarters, Marine Corps; and E.O. 9397 (SSN).
PURPOSE(S):
To manage, supervise, and administer programs for all Department of the Navy civilian, military, and contractor personnel. Information is used to prepare organizational locator, recall rosters, and social rosters; notify personnel of arrival of visitors; locate individuals on routine and/or emergency matters; locate individuals during medical emergencies, facility evacuations and similar threat situations; provide mail distribution and forwarding addresses; compile a social roster for official and non-official functions; send personal greetings and invitations; track attendance at training; identify routine and special work assignments; determine clearance for access control; identify record handlers of hazardous materials; record rental of welfare and recreational equipment; track beneficial suggestions and awards; control the budget; travel claims; track manpower, grades, and personnel actions; maintain statistics for minorities; track employment; track labor costing; prepare watch bills; project retirement losses; verify employment to requesting banking activities; rental and credit organizations; name change location; checklist prior to leaving activity; safety reporting/monitoring; and, similar administrative uses requiring personnel data.
ROUTINE USES:
In addition to those disclosures generally permitted under 5 U.S.C. 552a(b) of the Privacy Act of 1974, these records contained therein may specifically be disclosed outside the DoD as a routine use pursuant to 5 U.S.C. 552a(b)(3) as follows: To arbitrators and hearing examiners for use in civilian personnel matters relating to civilian grievances and appeals. To authenticate authorization for access to services and spaces such as Morale, Welfare, and Recreation (MWR) facilities and food services. The DoD 'Blanket Routine Uses' that appear at the beginning of the Navy's compilation of systems of records notices apply to this system.
DISCLOSURE: Disclosure of this information is voluntary; however, failure to provide the requested information will result in denial of privileged access to the requested information system..
SYSTEM OF RECORDS NOTICE: http://dpcld.defense.gov/Privacy/SORNsIndex/DODwideSORNArticleView/tabid/6797/Article/570436/nm05000-2.aspx

PART I PRIVILEDGED USER INFORMATION

1. Name: (Last First Middle Initial):	2. Official Telephone Number:	3. Official Email Address:

4. Organization & Office Symbol/Department:	5. DoD/Component Information System Owner:
	DoD/Components

***NOTE: DoD Component collectively refers to: OSD, the Military Departments, the Office of the Chairman of the Joint Chiefs of Staff and the Joint Staff, the Combatant Commands, the Office of the Inspector General of the Department of Defense, the Defense Agencies, the DoD Field Activities, and all other organizational entities in the DoD.**

6. Information System (IS) Full Name:	7. Information System (IS) Acronym:

8. Information System (IS) Details: (Brief Description (optional))

PART II PRIVILEGED ACCESS AGREEMENT

1. I understand there are two DoD Information Systems (IS), classified (SIPRNET) and unclassified (NIPRNET), and that I have the necessary clearance for privileged access to the IS. I will not introduce or process data or software for the IS that I have not been specifically authorized to handle.

2. I understand the need to protect all passwords and other authenticators at the highest level of data they secure. I will not share any password(s), account(s), or other authenticators with other coworkers or other personnel not authorized to access the IS. As a privileged user, I understand the need to protect the root password and/or authenticators at the highest level of data it secures. I will NOT share the root password and/or authenticators with coworkers who are not authorized IS access.

3. I understand that I am responsible for all actions taken under my account(s), root, or otherwise. I will not attempt to "hack" the network or any connected information systems, or gain access to data to which I do not have authorized access.

4. I understand my responsibility to appropriately protect and label all output generated under my account (including printed materials, magnetic tapes, floppy disks, and downloaded hard disk files).

5. I will immediately report any indication of computer network intrusion, unexplained degradation or interruption of network services, or the actual or possible compromise of data or file access controls to the appropriate Information System Security Manager (ISSM). I will NOT install, modify, or remove any hardware or software (e.g., freeware/shareware and security tools) without written permission and approval from the ISSM or senior representatives.

6. I will not install any unauthorized software (e.g., games, entertainment software) or hardware (e.g., sniffers).

INFORMATION SYSTEM (IS) PRIVILEGED ACCESS AGREEMENT AND ACKNOWLEDGMENT (PAA) OF RESPONSIBILITIES	Request Date:

7. I will not add/remove any users' names to the Domain Administrators, Local Administrator, or Power Users group without the prior approval and direction of the ISSM or senior representatives.

8. I will not introduce any unauthorized code, Trojan horse programs, malicious code, or viruses into the local area networks.

9. I understand that I am prohibited from the following while using the DoD IS:
   a. Introducing Classified and/or Controlled Unclassified Information (CUI) into a NIPRNET environment.
   b. Accessing, storing, processing, displaying, distributing, transmitting, or viewing material that is abusive, harassing, defamatory, vulgar, pornographic, profane, or racist; that promotes hate crimes, or is subversive or objectionable by nature, including material encouraging criminal activity, or violation of local, state, federal, national, or international law.
   c. Storing, accessing, processing, or distributing Classified, Proprietary, CUI, For Official Use Only (FOUO), or Privacy Act protected information in violation of established security and information release policies.
   d. Obtaining, installing, copying, pasting, transferring, or using software or other materials obtained in violation of the appropriate vendor's patent, copyright, trade secret, or license agreement.
   e. Knowingly writing, coding, compiling, storing, transmitting, or transferring malicious software code, to include viruses, logic bombs, worms, and macro viruses.
   f. Engaging in prohibited political activity.
   g. Using the system for personal financial gain such as advertising or solicitation of services or sale of personal property (e.g., eBay), or stock trading (i.e., issuing buy, hold, and/or sell directions to an online broker).
   h. Fundraising activities, either for profit or non-profit, unless the activity is specifically approved by the organization (e.g., organization social event fund raisers and charitable fund raisers, without approval).
   i. Gambling, wagering, or placing of any bets.
   j. Writing, forwarding, or participating in chain letters.
   k. Posting personal home pages.
   l. Any other actions prohibited by DoD Directive 5500.7-R or any other DoD issuances.

10. Personal encryption of electronic communications is strictly prohibited and can result in the immediate termination of access.

11. I understand that if I am in doubt as to any of my roles or responsibilities I will contact the ISSM or Cyber IT/CSWF-PM for clarification.

12. I understand that all information processed on the is subject to monitoring. This includes email and browsing the web.

13. I will not allow any user who is not cleared access to the network or any other connected system without prior approval or specific guidance from the ISSM.

14. I will use the special access or privileges granted to me ONLY to perform authorized tasks or mission related functions.

15. I will not use any DoD/Components IS to violate software copyright by making illegal copies of software.

16. I will ONLY use my PRIVILEGED USER account for official administrative actions. This account will NOT be used for day to day network communications.

17. I will obtain and maintain required qualification(s), according to SECNAV M-5239 and maintain certification(s) (if applicable) according to the certification provider, to retain privileged system access.

18. I understand that failure to comply with the above requirements will be reported and may result in the following actions:
   a. Revocation of IS privileged access.
   b. Counseling.
   c. Adverse actions pursuant to the Uniform Code of Military Justice and/or criminal prosecution.
   d. Disciplinary action, discharge or loss of employment.
   e. Revocation of Security Clearance.

INFORMATION SYSTEM (IS) PRIVILEGED ACCESS AGREEMENT AND ACKNOWLEDGMENT (PAA) OF RESPONSIBILITIES	Request Date:

PART III CERTIFICATION OF DOD COMPONENT OPR AND/OR ACTION OFFICER, APPROVING OFFICIAL

PRIVILEGED USER CERTIFICATION OF INFORMATION

9. Privileged User Name:	10. Official Email Address:	11. Official Phone Number:

12. Organization & Office Symbol/Department:	13. Date signed:	14. Privileged User Signature:

COMMAND ISSM APPROVAL

15. Command ISSM Name:	16. Official Email Address:	17. Official Phone Number:

18. Organization & Office Symbol/Department:	19. Date signed:	20. Command ISSM Signature:

COMMAND CYBER IT/CSWF-PM APPROVAL

21. Command Cyber IT/CSWF-PM:	22. Official Email Address:	23. Official Phone Number:

24. Organization & Office Symbol/Department:	25. Date signed:	26. Command Cyber IT/CSWF-PM Signature: