NAVY TACTICAL REFERENCE PUBLICATION

CONSTRUCTION QUALITY MANAGEMENT FOR SEABEES

NTRP 4-04.2.7

FINAL DRAFT
MAY 2012

DEPARTMENT OF THE NAVY
OFFICE OF THE CHIEF OF NAVAL OPERATIONS

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By direction

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PREFACE

NTRP 4-04.2.7, Construction Quality Management for Seabees is a reference providing general information describing common methods, procedures, and roles for all aspects of construction quality management required to successfully plan, schedule, and execute a construction project by Seabees. Throughout this publication, references to other publications imply the effective edition. Unless otherwise stated, masculine nouns and pronouns do not refer exclusively to men.

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WARNING, CAUTIONS, AND NOTES

The following definitions apply to warnings, cautions, and notes used in this manual:

**WARNING**

An operating procedure, practice, or condition that may result in injury or death if not carefully observed or followed.

**CAUTION**

An operating procedure, practice, or condition that may result in damage to equipment if not carefully observed or followed.

**NOTE**

An operating procedure, practice, or condition that requires emphasis.
WORDING

Word usage and intended meaning throughout this publication are as follows:

“Shall” indicates the application of a procedure is mandatory.

“Should” indicates the application of a procedure is recommended.

“May” and “need not” indicate the application of a procedure is optional.

“Will” indicates future time. It never indicates any degree of requirement for application of a procedure.
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1. The following changes are recommended for NTTP X-XX, Rev. X, Change X:

   a. CHANGE: (Page 1-1, Paragraph 1.1.1, Line 1)
      Replace “…the National Command Authority President and Secretary of Defense establishes procedures for the…”
      REASON: SECNAVINST ####, dated ####, instructing the term “National Command Authority” be replaced with “President and Secretary of Defense.”

   b. ADD: (Page 2-1, Paragraph 2.2, Line 4)
      Add sentence at end of paragraph “See Figure 2-1.”
      REASON: Sentence will refer reader to enclosed illustration.
      Add Figure 2-1 (see enclosure) where appropriate.
      REASON: Enclosed figure helps clarify text in paragraph 2.2.

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      Remove “Navy Tactical Support Activity.”
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      REASON: Activity has been deactivated.

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CHAPTER 1

Construction Quality Management

1.1 INTRODUCTION

Navy Tactical Reference Publication (NTRP) 4-04.2.7, Construction Quality Management for Seabees describes the construction quality management program used by the Naval Construction Force (NCF), also known as Seabees. Seabees perform construction across the range of military operations and are required to perform quality management as part of their mission. Quality construction is just as important as project safety or production. Although the methods and procedures used in this publication are consistent with construction industry practices, Seabees face distinct challenges when operating in contingency operations. The fundamental principles in this publication apply to general engineering construction projects; however, Seabees may adapt these principles to specific contingency situations.

1.1.1 Purpose

This publication provides comprehensive guidance on the implementation of the Department of Defense (DOD) quality management program used by Seabees for construction projects.

1.1.2 Scope

This unclassified publication provides the common principles, organizational roles, requirements, and procedures for construction quality management when performing general engineering construction projects. It covers quality considerations for the life cycle of a project; from creation through final transfer. It discusses project design coordination between Naval Facilities Engineering Command (NAVFAC) and Commander, First Naval Construction Division (COMFIRSTNCD). It describes how to implement the construction unit’s quality control (QC) management system and the quality assurance (QA) authority’s QA system.

1.1.3 Applicability/Authority

This publication is intended for use by Seabee QC Managers, QC Specialists, and personnel involved with project design and development. It is applicable to Seabee Project Managers, Project Supervisors, and crew performing construction projects. It is also useful to staff level engineers serving as liaison officers, as well as training and educational institutions. It applies to both active and reserve military and civilian Seabees of the United States Navy (USN).

The NCF’s construction quality management program is based on Commander, First Naval Construction Division instruction (COMFIRSTNCDINST) 4355.1, Construction Quality Program. NTRP 4-04.2.7 includes guidance from the Federal Acquisition Regulation, Unified Facilities Criteria (UFC) documents, Unified Facilities Guide Specifications (UFGS), and policy as set forth in NAVFAC’s Business Management System, Process B-1, Design and Construction.

NTRP 4-04.2.7 does not direct NAVFAC in the execution of its mission nor does it replace existing business practices used by NAVFAC personnel performing QA. NAVFAC accomplishes its mission based on guidance from the NAVFAC Business Management System, UFC, etc. Refer to Navy Tactics, Techniques, and Procedures (NTTP) 4-04.3, Naval Contingency Engineering Operations for NAVFAC organization and roles. Specific project plans and specifications have precedence over this document for NCF personnel.
NOTE

The Federal Acquisition Regulation, UFC, and UFGS documents are part of the Construction Criteria Base. The Construction Criteria Base is an extensive electronic library service of the Whole Building Design Guide. Published and updated continuously, the Construction Criteria Base contains United States construction criteria documents of complete unabridged, approved, current electronic equivalents from the DOD, United States Army Corps of Engineers (USACE), NAVFAC, and the Air Force Civil Engineering Support Agency (AFCESA). Refer to the Whole Building Design Guide website, http://www.wbdg.org/ccb/ccb.php, for access to documents and further information.

1.1.4 Terminology

Terminology in this publication, as much as possible, is consistent with definitions found in Joint Publication (JP) 1-02, Department of Defense Dictionary of Military and Associated Terms and NTRP 1-02, Navy Supplement to the DOD Dictionary of Military and Associated Terms. However, this publication uses some key terms with industry standard definitions, which apply specifically to construction, that are not consistent with joint and Service dictionary definitions. These terms are defined within the text. Refer to Paragraph 1.5 for definitions of key roles.

1.1.5 Forms

Forms in this publication are examples and illustrate the information required to accomplish quality management tasks. Forms may vary by command and software program. Managers use forms as directed by the supported command or unit standard operating procedure (SOP).

1.1.6 Use of Software Programs

The current software program used by the NCF for construction project management has unique requirements and applications. This publication provides the fundamental information for the process of planning and performing QC and QA actions while monitoring construction projects. Refer to the current user manual published by COMFIRSTNCD for guidance on software input procedures.

1.2 PROJECT MODEL

Construction projects performed by Seabees follow a six-phase model, as illustrated in Figure 1-1. The duration and amount of effort for each phase depends upon mission variables such as the scope and complexity of the project involved, the time available for planning, and the operational environment. Quality management is employed during each of these phases.
Actions involving the NCF with NAVFAC during Phase 0 are discussed in Chapter 2. QC and QA systems are employed in Phases 1 through 5. Refer to NTRP 4-04.2.5/Technical Manual (TM) 3-34.42/Air Force Pamphlet (AFPAM) 32-1020/Marine Corps Reference Publication (MCRP) 3-17.7F, Construction Project Management for detailed information on Project Phases 1 through 5. A brief description of each project phase and the relevance of construction quality management practices are provided below:

1. Project Phase 0, Initial Project Planning. This phase begins when a sponsoring entity originates, sponsors, and funds a construction project. This phase is a military Service-specific process for project identification/call for work process, force deployment planning, and the design period. Refer to Chapter 2 for information on Phase 0 as it applies to Seabees.

   This phase may also begin with the receipt of a construction directive in the form of an operation order (OPORD), fragmentary order (FRAGORD), or a warning order (WARNORD) for an engineering unit designated as the construction unit for a design-build project.

2. Project Phase 1, Preliminary Construction Planning. This phase begins with the receipt of a construction directive in the form of an OPORD, FRAGORD, or WARNORD for projects that have already been designed. Preliminary project planning gives the construction unit commander a quick overview of the assigned task, allows for assessment of the unit’s capacity, and provides time to develop the commander’s intent. It serves as a guide to the detailed planning that follows and includes task assignment of primary personnel, including the QC Manager and QC Specialists, as well as acquisition of plans and specifications.

3. Project Phase 2, Detailed Project Planning. This phase provides a schedule for the entire construction project and develops an accurate estimate of the tools, equipment, materials, and personnel required for each construction activity. It includes the creation or validation of a bill of materials (BOM); the completion of product and resource leveling schedules; determination of definable features of work; and preparation and distribution of QC, safety, and environmental protection plans through the chain of command for review. This phase ends when managers generate construction activity summary sheets.

4. Project Phase 3, Final Planning and Project Turnover. This phase includes project confirmation briefings, deployment/mobilization preparations, confirmation of initial material requirements availability, submittal requirements provided per the project’s submittal register, and QC plan approval. This phase ends at project turnover or when mobilization is complete for a new start project.
5. Project Phase 4, Project Execution and Monitoring. This phase includes directing, monitoring, and taking corrective actions. The QC Manager and QC Specialist use the three-phase QC system and submit daily QC reports. This phase ends upon project completion or turnover.

6. Project Phase 5, Final Project Transfer and Acceptance. This phase includes the turn-in of all tools and materials, clearance of the job site, provision of as-built records and operation and maintenance manuals, and the construction unit’s receipt of final acceptance of the project. It may include submission of Department of Defense (DD) Form 1354, Transfer and Acceptance of DOD Real Property, when specified or required by UFC 1-300-08, Criteria for Transfer and Acceptance of DOD Real Property. This phase ends after the project warranty period has expired and the project is closed out.

1.3 CONSTRUCTION QUALITY MANAGEMENT

Construction quality management includes the control and assurance activities used to achieve a quality project constructed on time and within budget. It consists of QC and QA systems instituted to achieve the quality levels defined by project plans and specifications or promulgated and enforced standards as directed by higher headquarters (HHQ). Obtaining quality construction is a combined responsibility of the construction unit and the QA authority that represents the government’s interest. All references in this publication to “QA authority” or “QA authority approval” are synonymous with “government” or “government approval.” Their mutual goal is a quality product conforming to the project’s plans and specifications.

1.3.1 Quality

Quality for a construction project is defined as work in place that conforms to requirements as established by the project’s plans and specifications. These approved plans and specifications are the basis for quality. In the absence of approved plans and specifications; HHQ, the tasking authority, or the supported unit establishes and promulgates enforceable standards and accepted construction practices to define quality. Refer to JP 3-34, Joint Engineer Operations for guidance on construction standards used by military engineers. Refer to the Construction Criteria Base library for valid publications with accepted construction practices and UFGS.

1.3.2 Quality Control

QC is the system by which the construction unit tasked with the construction project performs its responsibility to ensure the specified end product is realized. The construction unit uses this system for managing, controlling, and documenting activities to ensure compliance with the requirements of the project’s plans and specifications. QC is always performed on a construction project. The construction unit’s chain of command is inherently responsible for oversight of the construction and QC process. The ultimate responsibility for quality resides with the construction unit’s commanding officer (CO). QC verifies and maintains a desired level of quality in a project through careful planning, use of proper equipment, continued inspection, and corrective action, as required. The QC system has two levels, as described below:

1. Project QC Plan. Project Managers and Project Supervisors perform and direct activities to develop an individual project QC plan. Refer to NTRP 4-04.2.5 for information on the development of an individual project QC plan.

2. Unit QC System. The unit’s QC Manager and assigned QC Specialists perform and direct activities to execute the unit level QC system. A construction unit’s QC plan must be accepted by the approving QA authority prior to the start of construction. Refer to Chapter 3 for further information on the unit QC system.
1.3.3 Quality Assurance

QA ensures compliance with approved plans and specifications. QA is the system by which the QA authority fulfills the government’s responsibility to verify the construction unit’s QC system is functioning and the specified end product is realized. QA is not performed by the construction unit tasked with a construction project. The QA system is normally the responsibility of a contracting office that monitors the QC efforts of the construction unit. If a contracting office is not available, then another QA authority may be designated by the tasking authority (e.g., a naval construction regiment (NCR)) to perform QA tasks.

1.3.3.1 Contracting Office Available to Perform Quality Assurance

QA is normally performed by a contracting office. In the Navy, this function is accomplished by the NAVFAC public works department’s (PWD) facilities engineering and acquisition division (FEAD), if supporting a Navy installation, or an established resident officer in charge of construction (ROICC) office, if supporting a non-Navy installation. Since Seabees operate with joint forces and serve other DOD organizations, they may find a contracting office operated by AFCESA or USACE contracting offices function and perform QA similarly to NAVFAC. The fact that a contracting office or a designated representative is conducting QA does not relieve the construction unit’s CO of the responsibility to achieve the level of quality required by the project’s documents. The contracting office:

1. Determines if QA will be performed by means of a risk assessment (refer to Paragraph C.2 for information on how to perform a risk assessment)
2. Determines the level of QA effort and priority
3. Approves the construction unit’s QC plan.

1.3.3.2 Contracting Office Not Available

If a contracting office is not available, then another QA authority may be designated by the tasking authority to perform QA tasks, as outlined below:

1. The tasking authority determines if QA will be performed by means of a risk assessment (refer to Paragraph C.2 for information on how to perform a risk assessment).
2. If QA tasks are not to be performed, the tasking authority designates who will approve the construction unit’s QC plan (e.g., construction unit’s CO, HHQ, or the supported unit). In the absence of QA, the responsibility for quality fully falls on the construction unit’s CO.
3. If QA tasks are to be performed, the tasking authority designates a QA authority to perform QA tasks. The QA authority determines the level of QA effort, priority, and approves the construction unit’s QC plan.

Refer to Chapter 4 for further information concerning QA system tasks.

1.3.4 Operational Environment Considerations

The operational environment has a significant impact on the level of QC effort to be performed. Seabees perform construction across the range of military operations and are required to perform quality management as part of their mission. No matter what the situation—contingency or noncontingency, under combat conditions or in a permissive environment—the quality of the project relies on deliberate QC actions and, therefore, must always be performed.
1.4 QUALITY: ORGANIZATIONAL CULTURE AND LEADERSHIP

Quality cannot be achieved simply by following the process of QC and QA alone. It also requires an investment of time and interest on the part of leaders. A combination of leadership, ownership, and accountability is the primary force ensuring quality. No quality management system provides all the answers or totally eliminates risk, but by using the planning and management tools discussed in this publication and NTRP 4-04.2.5, a manager can gain confidence in directing crews, managing resources, and reducing risk. Leaders must not only be aware of the factors that contribute to poor construction quality but also implement the necessary steps to mitigate problems associated with the following:

1. Inadequate specifications
2. Inadequate plans
3. Inadequate supervision involving production, QC, and QA
4. Inadequate inspection and/or testing
5. Lack of proper expectations
6. Poor attitudes
7. Under qualified and/or poorly trained workers
8. Use of inferior materials and/or poorly maintained equipment
9. Improper labor/staffing
10. Competing priorities (conflicts with crew availability)
11. Acceptance of inferior work
12. Unauthorized waivers of UFC.
1.5 ORGANIZATIONAL ROLES

Key terms and their organizational roles are described in Figure 1-2.

<table>
<thead>
<tr>
<th>TERM</th>
<th>SEABEE (Traditional Use)</th>
<th>UNIFIED FACILITIES CRITERIA (NAVFAC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction Agent</td>
<td>Construction Unit</td>
<td>Contract Construction Agent</td>
</tr>
<tr>
<td>Design Agent</td>
<td>NA</td>
<td>Responsible for design development.</td>
</tr>
<tr>
<td>Project Design Engineer</td>
<td>NA</td>
<td>Individual with responsibility of design oversight and program management for the construction project.</td>
</tr>
<tr>
<td>Project Manager</td>
<td>Operations Officer; Company Commander; Detachment Officer-In-Charge</td>
<td>Individual in the NAVFAC organization that is responsible for the Administrative Contracting Office that performs the duties of contract administration and management. Pre-award lead of Project Team. The project manager is expected to provide coordination for the design between the design agent and the client, as well as attend all coordination meetings with the PWD/ROICC and NCF.</td>
</tr>
<tr>
<td>Contracting Office</td>
<td>NA</td>
<td>The Service member or DOD civilian with the legal authority to enter into, administer, modify, and/or terminate contracts.</td>
</tr>
<tr>
<td>PWD/FEAD</td>
<td>NA</td>
<td>Office having responsibility for the overall management of a field contracts office established at a Navy installation, including the execution and administration of construction, architect-engineer, engineering services, or facilities support contracts.</td>
</tr>
<tr>
<td>ROICC</td>
<td>NA</td>
<td>Officer who has responsibility for the overall management of a field contracts office established at a non-Navy installation, including the execution and administration of construction, architect-engineer, engineering services, or facilities support contracts.</td>
</tr>
</tbody>
</table>

Figure 1-2. Organizational Roles Matrix (Sheet 1 of 2)
<table>
<thead>
<tr>
<th>TERM</th>
<th>SEABEE (Traditional Use)</th>
<th>UNIFIED FACILITIES CRITERIA (NAVFAC)</th>
</tr>
</thead>
<tbody>
<tr>
<td>QA Authority</td>
<td>NCR when assigned QA responsibilities</td>
<td>Traditionally this is the PWD/FEAD or a ROICC office. Entity that exercises the interest of the government.</td>
</tr>
<tr>
<td>Construction Manager</td>
<td>NA</td>
<td>Post-award lead of PWD/FEAD or a ROICC office project team. Includes QA oversight.</td>
</tr>
<tr>
<td>QA Representative</td>
<td>NCR when assigned QA responsibilities</td>
<td>QA Authority staff member whose primary function is to perform QA on construction projects. Normally the assigned Construction Manager and/or Engineering Technician.</td>
</tr>
<tr>
<td>QC Manager</td>
<td>formally known as QC Chief (Term changed in Seabee documents to QC Manager to align with UFC guidance)</td>
<td>An employee of the construction contractor, appointed in writing, by the contractor and approved by the government, with the responsibility for administration and implementation of the contractor’s QC system at the job site(s).</td>
</tr>
<tr>
<td>QC Specialist</td>
<td>formally known as QC Inspector (Term changed in Seabee documents to QC Specialist to align with UFC guidance)</td>
<td>Individual assigned to assist the QC Manager.</td>
</tr>
<tr>
<td>Contractor</td>
<td>Military construction company/platoon or detachment</td>
<td>Refers to a civilian contractor.</td>
</tr>
<tr>
<td>Prime contractor</td>
<td>Lead element</td>
<td>Refers to a civilian contractor’s role.</td>
</tr>
<tr>
<td>Subcontractor</td>
<td>Support element</td>
<td>Refers to a civilian contractor’s role.</td>
</tr>
</tbody>
</table>

Figure 1-2. Organizational Roles Matrix (Sheet 2 of 2)
CHAPTER 2

Project Phase 0, Initial Project Planning

2.1 INTRODUCTION

The construction quality management process starts well before actual construction begins on the project. Project Phase 0 includes project selection, design, and review. HHQ in conjunction with NAVFAC conducts design reviews, constructability reviews, and initial estimates for initial employment planning. This phase occurs before the construction unit is tasked with the project. NTRP 4-04.2.7 does not direct NAVFAC in the execution of its mission nor does it replace existing business practices used by NAVFAC personnel. NAVFAC accomplishes its mission based on guidance from the NAVFAC Business Management System, UFC, etc.

2.2 PROJECT INITIATION AND PREDESIGN CONSIDERATIONS

A project is initiated when a sponsoring entity originates, sponsors, and funds a construction project. Predesign consists of identifying the requirement and developing the project documentation. These requirements may come from a variety of sources (i.e., new Navy platforms, facilities planning data, or base realignment and closure). Project documentation may involve multiple levels of approval.

Projects are classified as station-funded projects (also known as minor work), special projects, or a military construction program (also known as MILCON). Each of these classifications has its own authorization process. Refer to Chief of Naval Operations Instruction (OPNAVINST) 11010.20G, Facilities Project Instruction for information on preparing the DD Form 1391, Military Construction Project Data; funding thresholds; and project programming development. DD Form 1391 is a programming tool that is used to request and justify a user need. Its format enables the preparing official to systematically provide all of the important data required for design and/or proper review and validation of the project. Once the requirement has been identified, the Facility Planning Data has been completed, and project development has been initiated; the best alternative to fulfill the requirement is selected. Refer to UFC 1-300-09N, Design Procedures for information on preparing project designs.

2.2.1 Military Construction Projects Considerations

MILCON projects are approved, authorized, and funded by Congress. NAVFAC is responsible for design, construction, and financial management of the MILCON program regionally within an assigned geographical operational area (OA). Annually, Naval Facilities Engineering Command Atlantic (NAVFACLANT), Naval Facilities Engineering Command Pacific (NAVFACPAC), and COMFIRSTNCD review the supported commander requirements and the COMFIRSTNCD’s Employment Plan to determine the opportunity for including MILCON projects. Based on the results of this review, COMFIRSTNCD and NAVFAC propose MILCON projects to Commander, Navy Installations Command (CNIC) for Seabee construction. COMFIRSTNCD, NAVFACLANT, and NAVFACPAC also review previously nominated and approved projects to determine if they remain viable. In addition, MILCON-funded projects under construction and projects not fiscally completed are reviewed to determine their current status.
2.2.2 Special Projects Considerations

CNIC funds design and construction of NCF work for fleet activities. All special projects accepted for CNIC direct design and construction funding require DD Form 1391s and other standard project documentation per OPNAVINST 11010.20G. For stations with a mission claimant other than CNIC, project design and construction funds are provided by the cognizant mission claimant or other funding authority.

2.2.3 Station-funded Projects Considerations

For station-funded projects, the station is responsible for designing and funding construction. Once a cost estimate is completed by the NCR and continental United States (CONUS) materials are identified, the station forwards this portion of the project construction funding to COMFIRSTNCD for CONUS material procurement, as required. The station retains the local material portion of the project funding and procures locally available material with the assistance of the on-site battalion or detachment.

2.3 PROJECT SELECTION PROCESS AND PROGRAMMING CONSIDERATIONS

When a mission claimant and shore command intend to use NCF capabilities to accomplish their project, they submit, via their chain of command any time during the project submittal process, the project to the appropriate regional engineer and COMFIRSTNCD in response to COMFIRSTNCD’s annual Call for Work. Project submissions are considered for inclusion in COMFIRSTNCD’s Employment Plan. Commands that submit a prioritized list of projects in response to the annual Call for Work are required to update this list after each year. COMFIRSTNCD notifies activities regarding projects that are included in COMFIRSTNCD’s Employment Plan and provides to the responsible PWD or ROICC the final approved list of requested design projects. Refer to NTTP 4-04.2, Naval Construction Force Operations for further information on the Call for Work process.

2.4 PRE-AWARD RESPONSIBILITIES

Paragraphs 2.4.1 through 2.4.6 discuss pre-award responsibilities.

2.4.1 Naval Facilities Engineering Command Project Manager Responsibilities

The NAVFAC project manager provides coordination for the design between the design agent, the client, the NCF, and PWD or ROICC.

2.4.2 Planner Responsibilities

The NAVFAC PWD Planner is responsible for preparing all necessary and required project documentation and ensuring all endorsements are completed, prior to forwarding to COMFIRSTNCD for consideration in the annual Call for Work. The planner and subject matter expert will follow the project through the design and construction process to ensure work classification and funding are appropriately characterized. Funding for these efforts will be provided by the station. The planner is responsible for the following:

1. Coordination. The planner is expected to provide coordination for the DD Form 1391 between the design agent and the client.

2. Documentation. Project documentation includes:

   a. DD Form 1391 or information that includes detailed scope of work with site location, square footage, construction materials, required facility systems (fire protection, elevators, etc.), specialty systems, facility and site antiterrorism/force protection (AT/FP) requirements.
(hardening, glazing, controlled perimeter protection, etc.), site work (parking, fencing, utility
connections, grading, etc.), and any other important issues that will impact cost (environmental
mitigation)

b. Detailed cost summary
c. Completed site approval
d. Appropriate National Environmental Policy Act documentation
e. Appropriate approvals and signatures
f. Economic analysis
g. Basic facility requirements listing.

2.4.3 Real Property Accountability Officer Responsibilities

Upon notification that a project has been funded for design, the Real Property Accountability Officer initiates
a draft DD Form 1354. When a project is completed, the Seabees in coordination with PWD complete the
Final DD Form 1354 data information. The NAVFAC Capital Improvements Business Line collaborates with
the Real Property Accountability Officer to finalize the process upon completion of the construction.

2.4.4 Design Agent Responsibilities

Projects tasked to the NCF for accomplishment are normally designed by NAVFAC, activity public works
(PW), or an architect/engineer firm. The design agent is the Navy activity responsible for the design. Once the
design is authorized and/or funded, the design agent periodically advises the NCR on the status of the design.
Design agent responsibilities include:

1. General Design Requirements. To ease the submittal burden, construction drawing details are as
   complete as possible so that shop drawing requirements are minimized.

2. Fire Protection Systems Design. All fire protection system designs must be prepared by a Registered
   Professional Engineer regularly engaged in fire protection systems design. All fire protection
   systems installations must be accomplished by a licensed contractor regularly engaged in the
   installation of fire protection systems, including fire alarm systems. The design agent prepares a
   biddable fire protection system design package for the NCF as part of the final design package. The
   NCR determines the contracting method; either NCF, PWD, or ROICC. The NAVFAC Fire
   Protection Branch/design agent approves all shop drawings for the fire protection systems under
   NAVFAC’s cognizance. The appropriate NAVFAC Fire Protection Branch/design agent at
   Echelon III or IV, as applicable, must verify acceptance and certify these fire protection systems
   upon completion of the final installation.

3. AT/FP.


5. Low Impact Development.
2.4.5 Design Submittal Requirements

The design agent provides design submittal packages for review to the client, station PWD/ROICC, and the NCR. Design agents are responsible for keeping the NCR informed of design completion milestone dates. The NCR reviews the Design Development Submittal and Pre-Final submittal to ensure the required work does not exceed Seabee capabilities. The PWD/ROICC performs a constructability review of the 100 percent design submittal. Refer to Appendix A for a constructability review checklist.

The project’s statement of work identifies which submittal stages, from Concept to Final, are required and any additional stages. The information presented below provides a summary of information required at each submittal stage. Additional and more detailed guidance for minimum requirements of each of these design stages is found in UFC 1-300-09N. The basic requirements for design submissions are as follows:

1. The **Concept Design Submittal** is intended to convey the extent of the work in a preliminary conceptual manner. Drawings are approximately 10 to 15 percent complete at this stage. This design package submission is conveyed using electronic media and contains the following information:
   
a. Basis of design narrative

b. Drawings

c. Calculations

d. Charettes and Functional Analysis Concept Development, includes DD Form 1391 and cost estimates (parametric or assemblies).

2. The **Design Development Submittal** is intended to convey the complete extent of the work in a preliminary manner. The drawings are typically about 35 to 50 percent complete at this stage. This submittal must include requirements of the previous submittal plus additional detail to bring them to the required completion percentage. This design package submission is conveyed using electronic media and contains the following information:
   
a. Basis of design narrative

b. Drawings

c. Outline specifications (a list of specification sections)

d. Color boards

e. Calculations

f. Environmental report.

3. The **Pre-Final Submittal** is intended to provide a complete set of drawings and specifications. Drawings must be 100 percent complete, minus final signatures, and modified to reflect the responses to previous review comments. Final design packages are forwarded to the NCR upon completion. This design package submission is conveyed to the NCR using electronic media and contains the following information:
   
a. Basis of design narrative
b. Drawings (100 percent complete, minus final signatures)

c. Specifications (provide a submittal register with the specifications)

d. Project information form (available in the Construction Criteria Base on the Whole Building Design Guide website located at www.wbdg.org/ccb under the Specifications Library, NAVFAC Specifications)

e. Color boards

f. Calculations

g. Facility recognition plaque.

4. The Final Design Submittal provides a complete and final set of project documents ready for bid solicitation by the government, or in the case of Seabees, ready for construction by the construction unit. All previous review comments must have been addressed. This design package submission is conveyed to the NCR using electronic media and contains the following information:

a. Basis of design narrative

b. Drawings (100 percent complete, with final signatures and QC Review stamp)

c. Specifications (provide a submittal register with the specifications)

(1) The design agent provides a submittal register to the NCR as a compiled document to be included with the design package and/or via notations made directly on the project design drawings. The intent is to limit the items listed in the submittal register to only those items that are of a critical or technically complex nature.

(2) Submittals for standard construction materials (i.e., those not of a critical or technically complex nature) are not required and should not be included in the submittal log.

d. Project information form

e. Color documentation binders

f. Calculations

g. Statement of special instructions

h. Additional overseas submittal requirements.

NCRs are responsible for printing and distributing these project documents. It is the responsibility of the NCR to ensure that Final Design Submittal packages are provided to the cognizant PWD or ROICC for their review and use during construction, QA, and contracting as required.
2.4.6 Design Review Requirements

NAVFAC has a design review process outlined in UFC 1-300-09N. Key responsibilities for the NCF and PWD or ROICC are:

1. Projects scheduled for accomplishment by the Seabees are reviewed at the Design Development Submittal stage by COMFIRSTNCD and/or NCR representatives for construction methods and procedures.

2. The PWD or ROICC reviews the plans and specifications at the Design Development Submittal stage and at the Pre-Final Submittal. The review should be limited to project constructability (e.g., site problems, existing obstructions or proposed utilities, new construction methods, proposed contract time for construction, omissions, discrepancies, known issues that have occurred at this site or with projects of similar scope, and coordination problems that could lead to change orders or construction difficulties) and construction QC procedures.

2.5 POST-AWARD RESPONSIBILITIES

A key milestone in a construction project’s life cycle is the project award. A project is awarded when it is accepted and placed on COMFIRSTNCD’s Employment Plan in consultation with the NCR. This milestone shifts responsibility for the project from the design agent to the construction agent. Start of on-site construction is normally scheduled ten months following receipt of a final design submittal package, although it may be adjusted slightly to coincide with Seabee deployment cycles or for projects of an urgent nature.

2.5.1 Naval Construction Regiment Planning and Estimating Actions

The NCR begins the cost and material estimating process when the final design package is received. The NCR develops the following for each project:

1. Detailed cost estimate to include subcontracts
2. BOM
3. Master activity list
4. Initial labor estimate to determine man-day requirement.

2.5.2 Project Funding

The NCR requests project funds from the mission claimant for material procurement when the NCR’s BOM and cost estimate is completed. For projects located outside of CONUS, the NCR requests funding from the station for the CONUS procurement portion of the project. The station procures locally available material based on requisitions submitted by the construction unit.

When funding for a project is allocated over several categories of work (i.e., construction, repair, maintenance, or equipment installation), the cost estimates clearly state which portion of the work is charged to each category. Refer to OPNAVINST 11010.20G for information on work categories and associated funding limitations.

The NCR must account for funding to provide Supervision, Inspection, and Overhead (also known as SIOH) and Post Construction Award Services (also known as PCAS). These items need to be pointed out specifically on the BOM as a cost to be included in computing total project cost.
2.5.3 Construction Unit Actions

COs and Operations Officers of construction units tasked with construction projects are responsible for the actual construction planning. In addition, the construction unit is responsible for validating the BOM developed by the NCR. Refer to NTRP 4-04.2.3/TM 3-34.41/AFPAM 32-1000/MCRP 3-17.7M, Construction Estimating and NTRP 4-04.2.5 for further information on construction planning, estimating, and project management.
CHAPTER 3

Quality Control System

3.1 INTRODUCTION

All NCF construction projects have QC considerations requiring an approved QC plan. This chapter outlines post-award actions, procedures, requirements, and application of the construction unit’s QC system for construction projects. This publication is intended for use in conjunction with NTRP 4-04.2.5; refer specifically to Chapter 9, Quality Control Plan.

3.2 PROJECT QUALITY CONTROL REQUIREMENTS

Plans and specifications comprise the requirements of a project. These documents must be included and must clearly state what is required. Seabees must know what is expected and required to prepare a reasonable construction plan. UFGS Section 01 45 00.00 20, Quality Control describes the required QC system the construction unit must establish and maintain. The QC system covers on-site and off-site work and shall be keyed to the work sequence and the construction schedule. The QC System consists of the following program requirements, which are detailed in the remainder of this chapter. Always review each project’s specifications for additional QC requirements.

1. QC organization
2. QC plan
3. QC plan meeting(s)
4. Coordination and Mutual Understanding Meeting
5. QC meetings
6. Three phases of control (including definable features of work)
7. Submittal review and approval
8. Testing
9. QC certifications
10. Completion inspections
11. Training
12. Documentation (including QC Daily Reports)
3.3 QUALITY CONTROL ORGANIZATION

The people involved in QC range from the laborers and mechanics performing the work, through the on-site supervision, up to the top leadership of the construction unit. The key positions with specific QC responsibilities are:

1. QC Manager
2. Alternate QC Manager (Leading Petty Officer of the QC Specialist Team)
3. QC Specialist(s).

Collectively, these individuals are responsible for carrying out the requirements of the QC system. When required, some or all of these positions and their duties and responsibilities will be included in the project requirements.

3.3.1 Duties and Responsibilities of the Quality Control Manager

The QC Manager implements and manages the QC system and is directly responsible to the CO. The QC Manager must attend the QC plan meeting, attend the Coordination and Mutual Understanding Meeting, and conduct the periodic QC meetings. The QC Manager must also perform the three phases of control (except for any phases of control designated to be performed by QC Specialists), perform submittal review and approval, ensure testing is performed, and provide required QC certifications and documentation. The QC Manager manages and coordinates the three phases of control and documentation performed by the Project Supervisor and QC Specialists, designated testing laboratory personnel, and any other inspection and testing personnel required by this project. Responsibilities of the QC Manager include:

1. Accessing references called for in the project
2. Ensuring all submittals are prepared and approved in a timely manner to avoid project delays
3. Coordinating changes or substitution requests made by the construction unit to the QA Representative; however, they do not have the authority to approve them
4. Inspecting all work for compliance and maintaining a rework items list on all non-conforming work
5. Coordinating all testing required to maintain the schedule
6. Ensuring that as-built drawings and as-built record of materials are kept current and on site.

The QC Manager should focus on the preparatory and initial phases of control in order to minimize or prevent rework. For any discipline(s) where the QC Manager lacks proficiency, they are required to obtain assistance from the QC staff or an outside consultant. The QC Manager must have the authority to correct any deficiency even though it might result in stopping work on a particular segment of the project. The QC Manager works through the QA Representative assigned to the project for administrative and construction matters.

A QC Manager’s duties and responsibilities will be defined in UFGS Section 01 45 00.00.

3.3.2 Duties and Responsibilities of Quality Control Specialists

The construction unit may be required to provide a separate QC Specialist at the work site for each of the specific areas of responsibility in cases where specific portions of the work are complex or demanding. These individuals shall assist and report to the QC Manager. Dependent upon the editing of the project specifications, QC Specialists may perform production-related duties but must be allowed sufficient time to
perform their assigned QC duties. If time for QC is not adequate, then QC Specialists may be restricted to
perform only their assigned QC duties. QC Specialists are required to attend the Coordination and Mutual
Understanding Meeting and QC meetings, be present at the construction site to perform the three phases of
control, and prepare documentation for each definable feature of work in their area of responsibility at the
frequency specified in the project. They shall prepare specific sections of the construction unit QC reports to
specifically cover the work performed by the subcontractor/vendors performing the work.

3.3.3 Quality Control Assistant

The construction unit may be required to provide an administrative assistant at the work site on projects
requiring a large volume of submittals, until the work has been accepted. Their primary duty shall be to assist
the QC Manager in processing and maintaining files for submittals and preparing and publishing reports and
meeting minutes. After primary duties are accomplished, other duties may be assigned.

3.3.4 Manufacturer's Representatives, Factory Representatives

The technical specifications may also require the presence of manufacturer or factory technical
representatives to be on site prior to and during installation and/or testing of material/equipment to ensure
compliance with installation recommendations. The representatives shall be considered an extension of the
QC system during their presence on site or off site.

3.4 QUALITY CONTROL PLAN

Seabee units are required to provide the QA Authority a tailored QC plan that meets the specific project QC
requirements. A complete list of definable features of work is developed by the construction unit and
reconciled with the supported NCR. This completed list is coordinated with the construction schedule. Critical
submittals and tests are identified in the schedule as distinct actions. No construction work will be allowed at
the site prior to the approval of the QC plan. Exception may be made for mobilization work, which includes
surveying for location of construction unit offices, laydown areas and temporary utilities, and installation of
temporary utilities.

The QA Authority must approve a QC plan before the construction unit starts work. The plan outlines and
describes the people and the process that the construction unit will use to carry out the requirements of the QC
system. This plan must detail the procedures, instructions, and reports the construction unit will use during the
project. Refer to Appendix D for an outline of minimum requirements of the QC plan. A Commissioning Plan
is provided when required by the project specifications.

If the construction unit elects to make any changes to the QC plan, including any personnel, they must notify
the QA Authority a minimum of seven calendar days prior to the proposed change. The QA Authority also
reserves the right to request changes to the QC plan, including interviewing QC personnel to verify submitted
qualifications and, if necessary, request to have personnel replaced.

3.5 QUALITY CONTROL PLAN MEETING

Prior to submission of the QC Plan, the QC Manager meets with the QA Authority to develop a mutual
understanding of the project’s QC Plan requirements and agreement on the construction unit’s list of
definable features of work prior to plan completion and submission.

3.6 COORDINATION AND MUTUAL UNDERSTANDING MEETING

Also known as a Preconstruction Conference, this meeting is held after submission of the QC Plan and prior
to the start of construction. The QC Manager meets with the QA Authority to present the QC program
required by the specific project. When a new QC Manager is appointed, the coordination and mutual
understanding meeting is repeated.
The purpose of this meeting is to establish a mutual understanding of the QC and QA requirements for the project. As a minimum, the construction unit’s QC Manager, Project Manager, and Project Supervisor and the QA Representative should attend this meeting. The QA Representative sets the time and place and prepares the agenda. The agenda must require the construction unit to present the QC system in its entirety. The agenda and length of this meeting depends upon the construction unit’s familiarity with the QC requirements. The QA Representative thoroughly reviews the proposed QC plan before the meeting. The following should be discussed at the meeting:

1. The construction unit is required to explain in detail how three phases of control will be implemented for each definable feature of work (i.e., every detail of project requirements relative to QC).

2. Relationships of the QC Manager, Project Supervisor, and the QA Authority representatives.

3. The basic philosophy of the construction quality management program.

Minutes of the meeting will be prepared by the QC Manager and signed by the construction unit’s Operations Officer and the QA Representative. The construction unit provides a copy of the signed minutes to all attendees. The construction unit is required to provide a room acceptable to the QA Authority for the one-day meeting. The room may need to be equipped with video cassette recorder and monitor equipment, overhead projector, or other equipment depending upon the complexity of the presentations.

3.7 QUALITY CONTROL MEETINGS

These meetings shall be held as required by the specification or as agreed to during the coordination and mutual understanding meeting. They should be used to reinforce the philosophy of the construction quality management program. The QC Manager develops the agenda, conducts the meeting, and prepares the minutes. All problems or questions should be directed to the QC Manager. The QC Manager addresses how the construction unit intends to correct problems. As part of the documentation of the project, the QC Manager keeps minutes of the meeting and distributes them to attendees. These minutes become part of the official project file. Agendas for these meetings include items such as:

1. Review minutes of the previous meeting
2. Review the schedule and status of work and rework
3. Review status of submittals
4. Review the work to be accomplished in the next two weeks and documentation required
5. Resolve QC and production problems
6. Address items that may require revising the QC Plan
7. Review Accident Prevention Plan
8. Review environmental requirements and procedures
9. Review Waste Management Plan
10. Review Indoor Air Quality Management Plan
11. Review Environmental Management Plan
12. Review status of training completion

3.8 THREE PHASES OF CONTROL

The three phases of control include the preparatory, initial, and follow-up phases. These are the backbone of the construction unit’s QC system. The three phases of control must adequately cover both on-site and off-site work and include each definable feature of work.

3.8.1 Follow-up Phase (Performed Daily)

The follow-up phase is performed daily, or more frequently as necessary, on each activity of work identified on the schedule for on-going work until the completion of each definable feature of work. It is documented in the daily construction unit’s QC report as shown in Figure 3-1.

The follow-up phase includes checks on the following:

1. Work for each activity is in compliance with the project requirements
2. Required quality of workmanship is maintained
3. Testing is performed (by the approved laboratory)
4. Rework items are being corrected
5. Safety inspections are performed
6. Lead and support elements document follow-up phase for each activity using the construction unit’s QC report.

3.8.2 Additional Preparatory and Initial Phases

Additional preparatory and initial phases shall be conducted on the same definable feature of work if:

1. The quality of ongoing work is unacceptable
2. There are changes in the applicable QC organization
3. There are changes in the on-site production supervision or work crew
4. Work on a definable feature is resumed after a substantial period of inactivity
5. Other problems develop.

3.8.3 Notification of Three Phases of Control for Off-site Work

When the project consists of off-site work, the construction unit must notify the QA Authority at least two weeks prior to the start of the preparatory and initial phases for the off-site work.
### DAILY QUALITY CONTROL INSPECTOR’S REPORT

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<tr>
<th>Route to</th>
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**Date:**

**Time:**

**Project No.:**

**Report No.:**

**Lead:**

**Project Title:**

**Support:**

**Weather:**

**Project:**

**Inspector:**

<table>
<thead>
<tr>
<th>Activity</th>
<th>Rate</th>
<th>Description of Work Performed</th>
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</table>

**Activities Started:**

**Activities Completed:**

**QC Meetings Held:**

**Yes**

**No**

**Construction Inspection Plan Items Checked:**

**Results:**

**Delays:**

**Safety Hazards Present:**

**Remarks:**

**Materials:**

On behalf of the government I certify that all work is IAW the drawings and specifications.

**Project Supervisor**

**Quality Control Inspector**

**Quality Control Manager**

Dist: 1. FEAD/ROICC 2. QC File via S3 3. Lead 4. Project Supervisor

---

Figure 3-1. Daily Quality Control Inspector’s Report (Follow-up Phase)
3.9 SUBMITTALS

One of the most important responsibilities of the QC Manager is to ensure that the construction unit, subcontractors, and vendors submit their submittals in a timely manner to ensure the project schedule can proceed without any adverse impact. Critical submittals and long lead-time materials must be identified as separate activities on the schedule. The QC Manager must ensure that the submittal packages are complete so that valuable time is not wasted and effort lost on a re-submittal.

Submittal status should be the lead agenda item of the weekly QC meeting. The QC Manager, submittal reviewer(s), and QA Authority team must partner on this effort and look far enough ahead (two to three months) to ensure that the submittals are submitted soon enough to be approved by the QC Manager or the QA Authority. Timely submittal, review, and approval will enable the materials to be ordered and delivered to keep the project successfully proceeding on or ahead of schedule.

Delays to the project schedule due to lack of diligence on submittals is unacceptable and should be viewed as a failure of the QC Manager and the QA Authority.

The QA Authority (authorized government representative) and the QC Manager are the only two approval authorities for submittals. The QC Manager has the following specific responsibilities regarding submittals:

1. Coordinate all submittal actions
2. Maintain necessary submittal records in an organized fashion
3. Review and certify all submittals for compliance
4. Approve all submittals except those designated to be approved by the QA Authority
5. Check all material and equipment delivered to the project for compliance with the project.

The construction unit must approve and certify that all submittals, shop drawings, catalog cuts, and samples conform to the drawings and specifications, unless otherwise specifically noted. In most cases, the project documents will include UFGS 01 33 00, Submittal Procedures, which will state the proper procedures for handling submittals.

3.9.1 Quality Assurance Authority-approved

The technical sections of the specification should clearly indicate any submittal that requires QA Authority approval. Submittals for items that are extremely critical or complex, or that are considered an extension of the design, should be for QA Authority approval. These submittals still require review for conformance and certification by the QC Manager. This includes instances where the approver would require knowledge of the design assumptions and calculations. Only a minor percentage of submittals should fall in this category. When submittals are QA Authority-approved, they may be reviewed by the designer, a separate A/E, or by an in-house NAVFAC expert. The QA Authority should review which specification sections require QA Authority approval during the constructability review. This is the opportunity to tailor the specification to ensure the high-risk areas receive QA Authority approval.

3.9.2 Construction Unit-approved

The intent of having the construction unit approve submittals under the QC system is to assign maximum compliance responsibility to the construction unit. The Project Engineer, in-house engineer, or designer should spot check the approved submittals, although the construction unit is required to approve submittals under the QC system. The design A/E is not retained to review all construction unit-approved submittals. The designer must use care in preparing documents and ensure that the construction unit will have sufficient...
information for each item to properly decide what item(s) will meet the requirement. Design calculations should not be necessary to make approvals. The submittal should most likely be QA Authority-approved, as described above, in the event that such calculations are required. If the construction unit is required to submit design calculations for review, a licensed professional must prepare those calculations. An evaluation of the entire QC effort must be initiated and immediate corrective action taken if it is found the QC Manager is approving items that do not meet project requirements.

Some construction units may not have the in-house capability to approve all shop drawings and submittals. In such instances, they should retain the services of outside organizations, such as architect-engineer firms, consulting engineering firms, or independent testing laboratories to assist them. NAVFAC policy does not allow the construction unit to retain the services of the designer of record due to the potential conflict of interest.

Other construction units may expect their on-site QC Manager to review and approve all shop drawings. This is an unrealistic expectation. Very few individuals are sufficiently qualified in all the disciplines required for a particular project. Therefore, NAVFAC’s suggested procedure is for the construction unit to have reviews made by qualified contractor staff personnel, or outside consultants, and forwarded to the on-site QC Manager for approval based on their recommendations. The QA Authority should identify those specification sections during the constructability review so that the construction unit can retain outside professional service to properly review and coordinate submittals.

3.9.3 Variations (Sometimes Called Deviations)

Submittals are intended to document that materials and methods used and/or tests conducted meet the requirements of the project. A submittal is a “variation” in those cases where a construction unit proposes an item or procedure that differs in any material way from the requirements specified. Variations to project requirements must be submitted, reviewed, and approved by the QA Authority prior to the work being done. In no case is a construction unit’s QC organization allowed to approve a submittal that constitutes a variation, regardless of whether they have approval authority over the submittal for the specified item. In addition, any submittal forwarded to the QA Authority for approval that is a variation must be in writing, separate from the drawings, and clearly marked as such. Failure to call attention to the variation is generally sufficient grounds for the QA Authority to recover costs in the event that a non-conforming variation must be corrected later.

When the construction unit submits for a variation, they will include, but are not limited to, the following:

1. The reason for the variation
2. A warrant that the proposed variation is compatible with all other aspects of the project work
3. Substantiated change in cost, if applicable, either plus or minus
4. Any change in the time required to perform the work.

Under the design-build approach to design, the construction unit-A/E partnership cannot approve variations to the approved design even if the variations are technically sufficient. The QA Authority must approve these variations.

3.9.4 Submittal Status Log

The submittal status log is a key part of the construction unit’s QC system. The log shows the status of all shop drawings, certifications, and other submissions that shall be maintained at the project site. The log should be prepared on a standard computer spreadsheet or database. It shall show the specification paragraphs requiring the particular submittal, a description of the submittal, the early start date, if it is construction unit-approved or QA Authority-approved, and actual submission and approval dates on all actions. This allows the
QC Manager to track the current status as well as pending or planned actions required by the construction unit or the QA Authority. The submittal status log is generated automatically by the SPECSINTAC program (included as part of the Construction Criteria Base CD-ROM set). If SPECSINTAC is not used to generate the specification documents, the QA Authority should make a determination what submittals are required and who will generate the log.

3.10 TESTING

Tests shall be identified as specific activities on the schedule. The QA Authority identifies critical tests (e.g., fire protection, elevators, testing/adjusting/balancing, high voltage electrical, etc.) that must be included as construction schedule activities during the constructability review. The QA Authority coordinates the inclusion of this listing with the Design Manager Project Leader so the importance of these tests is clearly conveyed to the construction unit. By listing these tests, it must also be communicated that this listing is not to preclude the incorporation of other testing activities but is provided to emphasize the importance of specific tests. The construction unit is still required to perform any sampling and testing required under the project.

3.10.1 Test Results

The construction unit must cite applicable project requirements, tests, or analytical procedures used. They must provide actual results and include a statement that the item tested or analyzed conforms or fails to conform to specified requirements. The construction unit must notify the QA Authority immediately if the item fails to conform. The cover sheet for each report must be stamped in large red letters “CONFORMS” or “DOES NOT CONFORM” to the specification requirements, whichever is applicable. A testing laboratory representative authorized to sign certified test reports shall sign the test results. The construction unit must furnish the signed reports, certifications, and other documentation to the QA Authority via the QC Manager. A summary report of field tests is required at the end of each month.

3.10.2 Test Reports and Monthly Summary Report of Tests

The QC Manager is required to furnish the signed reports, certifications, and a summary report of field tests at the end of each month to the QA Authority and attach a copy of the summary report to the last daily QC report of each month.

3.10.3 Testing Plan and Log

The construction unit is required to prepare and maintain a testing plan and log as part of the QC documentation for the QC system. The plan should show the specification requirements, definable feature of work, required tests, sampling/testing by, test location, and frequency. With this information, the QC Manager and the QA Representative can monitor the planned and current status of all required testing.

3.11 QUALITY CONTROL CERTIFICATIONS

Each QC report that the construction unit submits must contain the following statement:

1. “On behalf of the construction unit, I certify that this report is complete and correct and equipment and material used and work performed during this reporting period is in compliance with the project drawings and specifications to the best of my knowledge, except as noted in this report.”

2. Upon completion of the work, or a specific portion thereof, the QC Manager shall furnish a certificate to the QA Authority attesting that “as-built drawings are current, the work has been completed, inspected, tested, and is in compliance with the project specifications.”
3.12 COMPLETION INSPECTIONS

The basic premise of the “completion inspections” required under the project is that the construction unit certifies the work as completed in accordance with the project before the finished project is presented to the QA Authority for acceptance. There should be no surprises for the construction unit during the pre-final inspection and no surprises to the client during the final walk through. Refer to NTRP 4-04.2.5/TM 3-34.42/AFPAM 32-1020/MCRP 3-17.7F for further information.

3.12.1 As-built Record of Materials Used in Buildings

The QC Manager is required to maintain an accurate record of the materials incorporated into the facility. Upon completion of construction, the records must be submitted to the QA Authority for record purposes.

3.12.2 As-built Record Drawings

Two, full-size sets of drawings must be maintained on site and updated on a daily basis, showing all deviations made from the project drawings, including buried or enclosed utilities and conditions revealed during construction. Upon completion of construction, the as-built drawings must be certified as accurate by the QC Manager and submitted to the QA Authority for record purposes. The QA Representative must check the as-built drawings each month. No progress payments should be made unless the as-built drawings are certified to be up-to-date.

3.12.3 Rework Items List

The rework items list should indicate the date identified, description of each deficiency, project requirement, action taken, resolution, and the date corrected. The QC Manager should establish an agenda item to review the progress of actions to correct the items identified on the rework items list. The QC Manager should not be required to record a deficiency that is corrected on the same day it is discovered. The QC Manager should not allow the adding to, building upon, or enclosing of non-conforming work.

3.13 NON-COMPLIANCE

Specific actions are required on the part of the QC organization in instances where non-compliance is encountered. The primary focus of the QC system is prevention. When this fails and non-compliance is encountered, the QC organization must identify, document, and correct the non-compliance.

The QA Representative must take decisive actions if the construction unit’s QC organization is not effective and an unacceptable number of non-compliance issues are identified.

The construction unit’s Project Manager, Project Supervisor, and project crew are held responsible for the quality of work on the job and are subject to removal by the QA Authority for non-compliance with quality requirements specified in the project.

3.14 QUALITY CONTROL REPORTING REQUIREMENTS

The construction unit’s reporting requirements include the construction unit’s QC report. This is the daily record of operations on the job site and must be kept current. Daily reports will be submitted the next working day after each day that work is performed and must be current. Entries on all reports must be keyed to the schedule activity identification numbers.

In accordance with UFGS Section 01 45 00.00 20, a construction unit is required to provide a Construction QC Plan to the QA Authority for acceptance. The plan is submitted in a three-ring binder and includes a table of contents with major sections identified by tabs and pages numbered sequentially. The plan must document
the proposed methods and responsibilities for accomplishing commissioning activities during the construction of the project and includes:

1. A chart showing the QC organizational structure.

2. Names and qualifications, in resume format, for each person in the QC organization, including the “Construction Quality Management for Contractors” course certifications for the QC Manager and Alternate QC Manager as required by the paragraphs entitled “Construction Quality Management Training” and “Alternate QC Manager Duties and Qualifications.”

3. Duties, responsibilities, and authorities of each person in the QC organization.

4. A listing of outside organizations, such as architectural and consulting engineering firms, which will be employed by the Contractor and a description of the services these firms will provide.

5. Appointment letters signed by an officer of the firm appointing the QC Manager and Alternate QC Manager and stating the responsibility for implementing and managing the QC program as described in the contract. The letters indicate the responsibility of the QC Manager and Alternate QC Manager to implement and manage the three phases of control and the authority to stop work that is not in compliance with the contract. Letters of direction are to be issued by the QC Manager to the Assistant QC Manager and all other QC Specialists outlining their duties, authorities, and responsibilities. Copies of the letters are included in the QC plan.

6. Procedures for reviewing, approving, and managing submittals, including the name(s) of the person(s) in the QC organization authorized to review and certify submittals prior to approval. The initial submittal of the Submittal Register is provided as specified in UFGS Section 01 33 00, Submittal Procedures.

7. Testing laboratory information required by the paragraphs entitled “Accreditation Requirements,” as applicable.

8. A Testing Plan and Log that includes the tests required, referenced by the specification paragraph number requiring the test, the frequency, and the person responsible for each test. Government forms are used to log and track tests.

9. Procedures to identify, record, track, and complete rework items. Government forms are used to record and track rework items.

10. Documentation procedures (government form).

11. A list of definable features of work, which are tasks that are separate and distinct from other tasks and have control requirements and work crews unique to that task. A definable feature of work is identified by different trades or disciplines and is an item or activity on the construction schedule. Included in the list of definable features of work, but not be limited to, are all critical path activities on the network analysis schedule and all activities for which this specification requires QC Specialists or specialty inspection personnel. Separate definable features of work in the network analysis schedule are provided for each design development stage and submittal package.

12. Procedures used to ensure the three phases of control to manage the quality on this project. For each definable feature of work, a Preparatory and Initial phase checklist will be filled out during the Preparatory and Initial phase meetings. The Preparatory and Initial Phases and meetings are conducted with a view toward obtaining quality construction by planning ahead and identifying potential problems for each definable feature of work.
13. [Not Applicable] A personnel matrix showing for each section of the specification who will review and approve submittals, perform and document the three phases of control, and perform and document the testing.

14. [Not Applicable] Procedures for identifying and documenting the completion inspection process. These procedures include the responsible party for punch out inspection, pre-final inspection, and final acceptance inspection.

15. [Not Applicable] Procedures for coordinating and documenting the training of personnel required by the contract, including a sample record of training for reporting what systems were included in the training, who provided the training, when and where the training was performed, and who attended the training.

16. An Organization and Personnel Certifications Log outlining the procedures for coordinating, tracking, and documenting all certifications on subcontractors, testing laboratories, suppliers, and personnel. The QC Manager will ensure that certifications are current, appropriate for the work being performed, and will not lapse during any period of the contract that the work is being performed.
CHAPTER 4

Quality Assurance System

4.1 INTRODUCTION

This chapter provides the information required to implement a basic QA system by a QA Authority (i.e., HHQ unit) when designated to perform QA tasks by the tasking authority. A QA Authority is designated when it is determined that QA must be done on a project and NAVFAC or another Services’ contracting office is not available to perform QA. The procedures in this chapter form an effective, systematic approach for the QA Authority to:

1. Monitor and evaluate the construction unit’s performance
2. Ensure the QC system is working effectively
3. Verify construction complies with plans and specifications
4. Address shortcomings in the system as they occur and, when necessary or required, accomplish detailed inspections on specific items of work.

4.2 THE ROLE OF THE QUALITY ASSURANCE AUTHORITY AND REPRESENTATIVE

The organization or person designated as the QA Authority performs the role usually done by the contracting office. The typical NAVFAC QA Team from a contracting office consists of a Construction Manager and an Engineering Technician. Refer to Paragraph 1.5 for further information on organizational roles.

For the purposes of this publication a person known as the QA Representative (e.g., Construction Manager or Engineering Technician level person) is designated to act on behalf of the QA Authority. The qualifications and experience of the QA Representative are commensurate with both the scope and complexity of the construction project and the risk and experience of the construction unit performing the work. The construction quality management program places responsibility on the QA Representative to be cognizant of the construction unit’s activities in order to monitor the critical work elements. The QA Authority must clarify to what extent the QA Representative can exercise authority to stop the construction unit’s operations for such things as safety violations and construction deficiencies.

4.2.1 Quality Assurance Representative’s Specific Duties

A close, professional working relationship between the QA Representative and the QC Manager is important and should be fostered by both. On most projects, the QA Representative should visit the work site each day. As a minimum, they must visit the work site once a week to maintain awareness of the project status.

A concise QA plan can help the QA Representative make the most effective use of limited field time. The duration and frequency of visits will depend on the number of projects assigned, as well as the problems being encountered on other projects. As a general rule, the QA Representative should spend more time on a project at the beginning to ensure that the construction unit’s QC system is functioning properly. Within several weeks, the QA Representative should be able to determine whether or not the QC organization is functioning in a satisfactory manner. They may then be able to devote less time to that project and use the time saved on other projects where frequent visits are more critical.
The QA Representative has the following responsibilities:

1. Function as the primary point of contact at the jobsite level between the construction unit and the QA Authority. Any communications affecting the execution of the work should always include the QA Representative. The primary point of contact for the QA Representative on items of quality, workmanship, or construction in general should be the QC Manager. However, this does not preclude the QA Representative from dealing with the Project Supervisor on the same items as the QC Manager or on items that are normally their responsibility (e.g., site safety, utility outages, the overall construction schedule, access to the site).

2. Observe enforcement of safety provisions during site visits.

3. Become familiar with the project documents, in electronic or hardcopy form, and request correction through proper channels of any conflicts, omissions, or errors found.

4. Update the QA Representative’s copy of the project plans and specifications to incorporate any modification to the scope of work.

5. Become familiar with the QC plan.

6. Review and comment on the construction schedule.

7. Check submittals for proper approval stamps.

8. Assist in obtaining gate passes and clearances for construction unit personnel.

9. Assist in arranging for the construction unit’s use of station Government utilities and government-furnished equipment (GFE).

10. Coordinate construction work between construction units working in the same area on other projects.

11. Perform inspections or arrange for inspections to be performed by the contracting office. Inspections must be made within the parameters/requirements of the project specifications to avoid “overzealous inspection.” Refer to USACE Engineer Pamphlet 415-1-261, Construction Quality Assurance Representative’s Guide, Volumes 1 through 5, for tips on inspection of construction.

12. Verify and obtain decisions on changed conditions.

13. Inspect critical items and monitor specific testing (in conjunction with the QC Manager under the QC system).

14. Make sufficient site visits to determine the adequacy of QC system performance, such as:
   a. Check certifications of materials and equipment delivered to the site.
   b. Spot-check workmanship.
   c. Observe testing procedures.
   d. Review submittal register, rework items list, testing plan and log.
   e. Evaluate construction unit’s QC system.
f. Attend the weekly or bi-weekly QC meetings. Attendance at all meetings with the construction
unit, such as the Preconstruction Conference and QC meetings, is strongly recommended. The
QA Representative is also encouraged to attend the preparatory and initial phases conducted by
the Project Supervisor and QC Manager/QC Specialist.

15. The QA Representative must obtain and review all construction unit reports daily and inform the
supervisor of any errors or omissions. Timely documentation review and appropriate follow-up
action are critical to a successful job. Reports inconsistent with the QA Representative’s personal
knowledge must be reconciled immediately with the QC Manager.

16. Prepare the QA report when required.

17. Prepare Construction Contract Non-compliance Notices.

18. Contribute to the preparation of Project Manager project modification recommendations.

19. Witness final tests and make final inspections for acceptance (in conjunction with the QC Manager).

20. Check status of as-builts maintained by the construction unit.

21. Conduct pre-final and final inspections.

22. Schedule and coordinate required utility outages.

23. Attend turnover meeting.

4.2.2 Quality Assurance Representative's Actions Concerning Deficiencies

The QC organization should be given the opportunity to detect and initiate correcting deficiencies. The QC
Manager should be given every opportunity to perform their required duties and correct any deficiencies.

The QA Representative’s responsibility is to assure the deficiency is corrected. If a deficiency is not corrected
within 24 hours, the QC Manager is required to track the deficiency on the Rework Items List. If the
deficiency is not logged on the rework items list, the QA Representative issues a Construction Contract
Non-compliance Notice. If the deficiency will significantly impact the construction schedule, the QA
Representative must immediately notify the Project Manager and other supervisory personnel. The QA
Representative should continually monitor the rework items list maintained by the QC Manager on each
project.

4.3 IMPLEMENTATION OF QUALITY ASSURANCE

4.3.1 Review of the Quality Control Plan

The QC plan establishes the procedures the construction unit will use throughout the project. The plan is
subject to review and approval by the QA Authority. A complete QC Plan is required prior to the start of
construction. As a minimum, the QA Representative considers the following:

1. Acknowledgement of the full range of QC requirements as evidenced by a complete package with all
required items identified. Items may be incomplete, or even not present, but the construction unit
should clearly indicate that they understand that the requirement for an item exists and will provide
the information or item as it becomes available. Look for quantifiable measurements recommended
in references, specifications, and print notes.
2. Basic organizational structure of the construction unit’s project team, including the appointment of the QC Manager and Alternate QC Manager, complete with requisite authorities.

3. Established procedures for the basic processes that must run from the beginning of the project, including three phases of control, submittal processing, rework procedures, and documentation forms and procedures.

4. Control procedures, including testing and inspection, for those construction activities that will be accomplished prior to submission and approval of the complete plan.

After the QC plan is reviewed and approved, the QA Representative must monitor its use to assure that the construction unit’s QC organization is functioning as planned. This is the essence of the QA system. The QA Representative must take affirmative steps to correct construction unit deficiencies in the implementation of the project’s QC provisions by discussing these deficiencies with the construction unit during periodic QC meetings.

The QC plan is likely to require updates throughout the life of the project. Changes to the approved QC plan, including personnel changes, are subject to the prior approval of the QA Authority.

Failure to comply with the QC provisions of the project should result in action by the QA Authority for any non-conforming work and any work dependent upon non-conforming work. Dismissal of the construction unit’s Project Manager, Project Supervisor, QC Manager, or other members of the construction unit’s staff should be considered if non-compliance continues.

4.3.2 Developing Project Quality Assurance Plans

A written QA plan is developed if determined necessary based on a risk determination for each construction project by the QA Authority. Refer to Appendix C for information on QA risk determination. The plan should be based on the particular design, expertise of construction personnel available, the QC effort being expended, the complexity of the job, and time for completion.

The QA plan should clearly delineate the function and responsibilities of the team members. Its purpose is to help the QA Representative organize QA activities that monitor the most critical construction activities. If changing job conditions occur, the plan should be reviewed and updated. Refer to Appendix E for a sample QA plan outline. The QA Representative may use alternate forms and work processes developed by HHQ or the tasking authority. To determine the frequency of inspections and the amount of QA time and effort required on any project, the QA Representative must consider the following:

1. Effectiveness of the construction unit’s QC system
2. Previous experience with the construction unit
3. Quality of the drawings and specifications
4. Complexity, size, urgency, and location of the job
5. Resources available.

4.4 REPORTING REQUIREMENTS

The basic reporting requirement is to provide an accurate record of the work in progress and the as-built condition. This will help minimize later misconceptions concerning methods and progress of construction. Both the QA authority and the construction unit contribute to this project record.
4.4.1 Quality Assurance Reports

Reports prepared or initiated by the QA Representatives include the following:

1. QA report (as illustrated in Figure 4-1)

2. Non-compliance notice (refer to Paragraph 4.4.3).

Generally, contracting office-initiated construction reporting will be on an exception basis; however, the QA Representative may increase the reporting requirements at any time deemed necessary.

![Quality Assurance Report](image-url)

Figure 4-1. Quality Assurance Report
4.4.1.1 Quality Assurance Representative’s Remarks Section on Construction Unit’s Quality Control Reports

The “QA Representative’s Remarks” section on the construction unit’s QC report is for remarks on routine matters and exceptions to the construction unit’s reports. Remarks should be directed at the construction unit’s various operations, job progress, adequacy of the QC system, and potential problems. The QA Representative shall note any disagreement or question regarding the accuracy and completeness of the report. A copy of any remarks must be returned to the construction unit’s QC Manager for resolution and appropriate reporting in subsequent construction unit reports or by another acceptable method.

The “QA Representative’s Remarks” section is also used to record if the QA Representative was unable to visit the project on the day represented by the report.

The optional QA report may be used when additional space is needed to supplement and continue the “QA Representative’s Remarks” section on the construction unit’s reports, or when it is necessary to document facts or conditions in detail. Refer to Paragraph 4.4.1.2 for information on the QA report.

4.4.1.2 The Quality Assurance Report

The QA report is an optional form for use on construction projects. The reporting frequency is on an as-needed basis. The following are considered general guidelines for use of the QA report and do not preclude HHQ from varying them as circumstances dictate. The QA Representative should prepare a QA report whenever:

1. Specific work is inspected for project compliance. This does not mean whenever the site is visited. “Normal” visits can be reported solely through the use of the “QA Representative’s Remarks” section on the QC report.

2. Situations are discovered which adversely affect project compliance (either time or quality). These may also be reported using the “QA Representative’s Remarks” section on the QC report.

3. A team inspection is performed.

4. Verbal instructions are given to the QC Manager or Project Supervisor. These may also be reported using the “QA Representative’s Remarks” section on the QC report.

5. The construction unit fails to apply QC requirements or fails to take corrective action on known deficiencies.

6. Uncorrected hazardous safety conditions exist.

7. A lost time accident occurs.

8. The construction unit’s own daily reports are not received and reviewed in a timely manner (i.e., the following day).

If a QA report contains disagreement, dispute, or any issue requiring further resolution, a copy is forwarded to the construction unit’s HHQ.
4.4.2 Reviewing the Construction Unit’s Reports

The QA Representative has the prime responsibility to ascertain the completeness and accuracy of the construction unit’s QC reports. These reports play an important role in settling disputes. Properly executed reports substantially reduce the volume of documentation prepared by the QA Representative. The QA Representative must review all reports immediately upon receipt to ensure accuracy and completeness, and the construction unit must correct any discrepancies. The QA Representative should use the space provided on the form to comment on, or take exception to, information indicated in those reports. Incorrect or erroneous information must be commented upon and appropriate follow-up action taken. Failure to take exception to incorrect information contained in the report constitutes constructive acceptance of the construction unit’s version of events.

The QA Representative should check the following when reviewing reports:

1. Phases of construction (preparatory, initial, and follow-up) under way on the day of the report, and the specific location of the work performed.

2. Results of QC procedures and inspections, including the nature of deficiencies observed and the corrective action proposed by the construction unit. This should include dimensional checks, validation of work elements, safety violations, and the location of inspections. Minor deficiencies corrected on the day they occur need not be included in the report. However, any deficiency that is carried over to the following day must be shown.

3. Test results, including failures and remedial action to be taken. When test results cannot be completed by the time the report is submitted, a notation should indicate the test was performed and the approximate date results will be available. Delayed test results should be submitted with the report on the date received. Make sure the testing log is kept updated.

4. Offsite inspection activities and inspection of materials and equipment at the job site.

5. Specific impacts, or lack thereof, of adverse weather conditions on the job.

4.4.3 Construction Project Non-compliance Notice

The QA Representative or other government representatives initiate a Non-compliance notice to inform the construction unit and HHQ of a deficiency requiring corrective action. The effectiveness of the notice will be lost if issued for every deficiency regardless of magnitude or importance. If the construction unit has acknowledged the deficiency and correction is forthcoming, this notice should not be used.

4.5 ENFORCEMENT OF QUALITY CONTROL

Construction units must accept QC responsibilities. When construction units fail to control their own construction processes and those of their subcontractors and suppliers, enforcement becomes a vital element. Past experience shows the QA Representative’s timely and firm action is a major factor in resolving QC issues. This includes elevating problems to appropriate levels within the construction unit’s organization, as well as use of the various enforcement mechanisms available to the QA Representative.
4.5.1 Quality Management Problems

The difficulties associated with QC vary, but most fall into the following categories:

1. Commencing work without an acceptable, approved QC plan and safety plan
2. Inadequately developed QC provisions
3. Inadequately enforced QC provisions
4. Delay in submitting an acceptable QC plan
5. Inadequate qualifications of personnel in the QC organization
6. Untimely or incomplete daily reports
7. Inadequate preparatory, initial, and follow-up controls on each definable features of work
8. Failure to take corrective action when deficiencies exist
9. Late and incomplete reporting of tests and inspections
10. Lack of interest by the construction unit’s leadership
11. Failure to verify punch-list item completion

4.5.2 Corrective Measures

The project specifications provide the means to enforce construction unit compliance. Reasonable but firm application of these provisions can be as effective in enforcing QC as it is for any other project requirement. Implementation of any enforcement action requires careful consideration, along with complete and timely documentation. Actions that should be considered are:

1. Removal and Replacement of Defective Materials or Workmanship. The QA Representative must notify the construction unit in writing of nonconforming work and of their obligation to replace material or correct workmanship as necessary. The construction unit must not be allowed to build upon defective work.

2. Removal of Incompetent/Careless/Objectionable Personnel. The contracting office may direct the construction unit to remove any personnel deemed incompetent, careless, or otherwise objectionable. Prior to removal, the QA Representative should convene a meeting with the construction unit and attempt to correct the situation. If the QC Manager or Project Supervisor is removed, work should not be allowed to proceed until the construction unit provides an acceptable replacement. Reluctance to replace an incompetent QC Manager or Project Supervisor will only lead to greater problems as the job progresses. Any removal must be supported with complete documentation showing carelessness, negligence, or other behavior detrimental to project performance.
3. Stop the Work. The QA Representative’s construction management team can direct the construction unit to stop work on any unsatisfactory item or work element pending satisfactory correction of the deficiency. The construction unit should also be directed not to install materials that lack an approved submittal. This is particularly important if the materials or defective work will be enclosed, will support further construction, or will be inaccessible if further work proceeds. These directives should not be designated as “Stop Orders,” but should cite the deficiency and state that no further work be accomplished that will interfere with correction of the deficiency.

4. Construction Unit Performance Evaluation. The Construction Unit Performance Evaluation Report includes appraisal of the construction unit’s QC effort. Failure by the construction unit to provide an adequate QC system or a marginal performance despite repeated written notification should result in an unsatisfactory rating. The QA Representative should consider interim unsatisfactory appraisals when performance has been unsatisfactory for a reasonable period of time and should explain the significance of this action to the construction unit as well as the exact reasons for such action. Conversely, when a construction unit exercises good QC and produces quality construction, it should be noted in the performance appraisal. Recognition of outstanding QC systems and quality workmanship should be given when appropriate.

4.6 HANDLING OF REQUESTS FOR INFORMATION

Timely, well-documented responses to construction unit requests for information are a necessary part of the contracting office’s project administration. The forms and procedures to be used for a specific project should be discussed and agreed upon at the pre-construction conference.

Generally, the QA Authority provides copies of the standard NTRP 4-04.2.5 or NAVFAC request for information (RFI) forms and requires the construction unit to coordinate and manage RFIs through its QC Manager. The construction unit is additionally required to maintain a RFI log and discuss the status of outstanding RFIs at each work site QC meeting.

Unless otherwise agreed upon at the pre-construction meeting, RFIs are processed and transmitted as indicated on the standard NTRP 4-04.2.5 or NAVFAC RFI form.
APPENDIX A

CONSTRUCTABILITY REVIEW CHECKLIST

A.1 INTRODUCTION

Figure A-1 illustrates a Constructability Review Checklist used by NAVFAC and maintained on NAVFAC’s Business Management System. Although some line items may not apply to Seabees (e.g., line items marked “not applicable”), this checklist is an effective tool that is used by NCRs to perform constructability reviews.

<table>
<thead>
<tr>
<th>LI</th>
<th>DESCRIPTION</th>
<th>OK</th>
<th>NEEDS CORRECTION</th>
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<tbody>
<tr>
<td><strong>GENERAL INFORMATION</strong></td>
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<tr>
<td>01</td>
<td>Project scope adequately reflects extent of work.</td>
<td></td>
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<tr>
<td>02</td>
<td>Bid items are understandable and logical.</td>
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<tr>
<td>03</td>
<td>Multiple completion times (durations or dates) specified:</td>
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<tr>
<td></td>
<td>a. Liquidated damages apply to each multiple completion time.</td>
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<tr>
<td>04</td>
<td>Supported Activity is in agreement with targeted completion time(s).</td>
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<tr>
<td>05</td>
<td>Pre-bid/Pre-solicitation Team Meeting recommended and specified.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>06</td>
<td>Category of Work for project is I □ II □ III □ IV □.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>Level A □ B □ C □ Partnering is specified and is appropriate for project.</td>
<td></td>
<td></td>
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<tr>
<td>08</td>
<td>Usably complete facility will require Navy Marine Corps Intranet, collateral equipment identified in the project documents.</td>
<td></td>
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</tr>
<tr>
<td>09</td>
<td>Project includes construction unit requirements for NAVFAC Red Zone Process.</td>
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</tbody>
</table>
### Constructability Review Checklist

**Contract/Project Number:** _____________________________________________________________

**Project Title/Location:** _______________________________________________________________

**PWD/ROICC:** ______________________________________________________________________

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<thead>
<tr>
<th>LI</th>
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<tbody>
<tr>
<td>01</td>
<td><strong>SCHEDULE AND ACCESS</strong></td>
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<tr>
<td></td>
<td>Aggressive but appropriate project duration for type of work, geographic location, material and equipment lead times, and time of year.</td>
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<tr>
<td>02</td>
<td>Work occurs on more than one site or special circumstances exist, such as building occupied during renovations.</td>
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<td></td>
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</tr>
<tr>
<td></td>
<td>a. Specifications clearly define sequence (order in which work must be completed) and is necessary (too many constraints to allow construction unit to choose) and logical.</td>
<td></td>
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<tr>
<td></td>
<td>b. Specifications clearly define phasing (chunks of work) which is necessary and logical.</td>
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<tr>
<td></td>
<td>c. Completion requirements are compatible with phasing and/or sequencing.</td>
<td></td>
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</tr>
<tr>
<td>03</td>
<td>Landscaping and planting season requirements are compatible with project duration.</td>
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<tr>
<td>04</td>
<td>Work will occur in occupied building.</td>
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<tr>
<td>05</td>
<td>Project adequately describes conditions and requirements associated with working inside occupied building.</td>
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<tr>
<td></td>
<td>a. Limited access/construction gate.</td>
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<tr>
<td></td>
<td>b. Additional security requirements/passes.</td>
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<tr>
<td></td>
<td>c. Escorts required (Activity has budgeted for this).</td>
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<tr>
<td></td>
<td>d. Project provides for additional wait-time for escorts (note that if this is included, proposal prices will include it; if not included and there are unreasonable and/or repeated delays, construction unit will incur lost time with possible entitlement).</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>Impacted Activities understand implications of construction in/near their building (blocked-off spaces, noise, dust – general inconvenience) and can remain functional.</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>a. Project does not require hazardous materials to be disturbed or removed in/near the Activity’s operation.</td>
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<tr>
<td>07</td>
<td>Hazards and precautions for work near runways, landing strips are included.</td>
<td></td>
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</tr>
<tr>
<td>08</td>
<td>Haul route is not specified and not required.</td>
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</tbody>
</table>
## CONSTRUCTABILITY REVIEW CHECKLIST

**Contract/Project Number:** __________________________________________________

**Project Title/Location:** ________________________________________________________________

**PWD/ROICC:** ______________________________________________________________________

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</table>

### SCHEDULE AND ACCESS (cont.)

09 Current Station construction unit and construction unit vehicle access/security requirements included.

10 Special base/area/building security access requirements are clearly identified for:
   a. Waterfront work.
   b. Airfield operations.
   c. Weapons storage areas.
   d. Construction unit vehicle access and parking restrictions.

11 Work hours and “Work after Normal Work Hours” clause are consistent with operational requirements, such as housing area, etc.

12 Network schedule is required and appropriate for size/complexity.

13 Requirements for network schedule are reasonable and suitable for project.

14 Cost-loaded network schedule is required. X

15 Requirement for schedule of prices is deleted because of cost-loaded schedule requirement. X

### SITE CONDITIONS AND UTILITIES

01 Existing facilities on site accurately shown on plans.

02 Fencing around designated construction area is required. Type of fencing is specified in accordance with Station requirements.

03 Designated and/or adequate area on site for construction unit office, material storage/prefab area.
   a. Construction storage area fencing is construction unit’s option.
   b. Construction storage shown at off-site location.

04 What other construction is going on or will be going on in this and adjacent areas? Does it interfere or overlap with this project work? What are current schedules for this work?

05 Temporary utilities (water, power, etc.) are available “in reasonable quantities” and specification includes cost rates for construction unit usage.
### CONSTRUCTABILITY REVIEW CHECKLIST

Contract/Project Number: _____________________________________________________________
Project Title/Location: ________________________________________________________________
PWD/ROICC: ______________________________________________________________________

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<thead>
<tr>
<th>LI</th>
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<tbody>
<tr>
<td></td>
<td><strong>SITE CONDITIONS AND UTILITIES (cont.)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>Temporary utility connection points are indicated on the plans and will remain as shown when construction begins.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>07</td>
<td>Restrictions on utility outages adequately described and realistic based on experience. Required notice and procedures for scheduling outages included.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>Requirement to and procedures for locating underground utilities and obtaining digging permits defined. Standard &quot;dig permit&quot; procedures are appropriate for work in this area.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>09</td>
<td>Existing site shows no signs of unidentified contaminated soil or other contamination not already indicated in the project documents.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>10</td>
<td>Is a storm water permit required?</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>11</td>
<td>Project includes requirements for construction unit to scan construction site with electromagnetic and sonic equipment.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 12 | Geotechnical information generally indicates expected site conditions:  
  a. Specifications are compatible with boring logs.  
  b. Based on previous projects in same area, soil conditions properly indicated.                                                                |    |                  |                |

### CONTRACT/PROJECT ADMINISTRATION

<table>
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<tr>
<th>LI</th>
<th>DESCRIPTION</th>
<th>OK</th>
<th>NEEDS CORRECTION</th>
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</thead>
<tbody>
<tr>
<td>01</td>
<td>Invoicing process does not require updated schedule and/or submittal log because they are routinely received otherwise, including electronically.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>Project allows payment for material stored off site and contains the storage and bonding requirements.</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>Salvage material and equipment requirements clearly specified.</td>
<td></td>
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<tr>
<td>04</td>
<td>Project includes GFM and GFE, which is clearly identified and described.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>05</td>
<td>Project includes first-tier subcontractor requirement for the Private Qualified Person for Engineering Control of Asbestos Containing Materials.</td>
<td></td>
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</tr>
</tbody>
</table>

Figure A-1. Constructability Review Checklist (Sheet 4 of 11)
### Constructability Review Checklist

**Contract/Project Number:** _____________________________________________________________

**Project Title/Location:** ____________________________________________________________________

**PWD/ROICC:** ______________________________________________________________________

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<tbody>
<tr>
<td><strong>CONTRACT/PROJECT ADMINISTRATION (cont.)</strong></td>
<td></td>
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<tr>
<td>06</td>
<td>Project includes first-tier subcontractor requirement for Testing/Adjusting/Balancing subcontractor.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>Project does not require extraordinary clean-up or dirt and dust-control requirements.</td>
<td></td>
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</tr>
</tbody>
</table>
| 08 | Special permits are identified (e.g., USACE, state, local, etc.) and in hand or clearly defined as construction unit requirement:  
   a. Construction unit-secured permits will not automatically delay progress through no fault of construction unit.  
   b. Non-secured permits by government will not delay progress. | | | |

| **SITE SAFETY AND HEALTH** | | | |
| 01 | Required Site Safety and Health Officer is appropriate Level for Category of Work and project specifics. | | | |
| 02 | Construction unit Site Safety Plan:  
   a. Must comply with EM-385-1-1, Safety and Health Requirements Manual (USACE)  
   b. Must comply with base requirements. | | | |
| 03 | Project includes non-routine hazardous conditions (e.g., nuclear environment, fuel tanks) and adequately addresses work in these conditions. | | | |

| **QUALITY CONTROL/CONTRACTOR ADMINISTRATION/DOCUMENTATION** | | | |
| 01 | NAVFAC Capital Improvements Engineering & Construction Bulletin, Issue No. 2006-04, Capital Improvements Categories of Work Classification:  
   b. Category III requires limited construction quality management oversight.  
   c. Category IV requires construction quality management oversight by exception.  
   Refer to Appendix B of NTRP 4-04.2.7. | | | |

---

Figure A-1. Constructability Review Checklist (Sheet 5 of 11)
## CONSTRUCTABILITY REVIEW CHECKLIST

**Contract/Project Number:** _____________________________________________________________

**Project Title/Location:** ________________________________________________________________

**PWD/ROICC:** __________________________________________

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<tbody>
<tr>
<td><strong>QUALITY CONTROL/CONTRACTOR ADMINISTRATION/DOCUMENTATION (cont.)</strong></td>
<td></td>
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</tbody>
</table>
| 02 | QC staff requirements (including specialty inspectors and submittal reviewers) are adequate and cost-effective:  
   a. QC manager may also serve as superintendent.  
   b. QC manager responsibilities are appropriate for project. | | | |
| 03 | QC Plan requirements are appropriate for Category of Work and project. | | | |
| 04 | Construction submittals are limited to those that are value-added, that is, for materials/equipment that are not routine construction materials/equipment and easily identifiable in the field (verify for each specification section). | | | |
| 05 | Technical submittal reviewers are identified for items requiring:  
   a. Designer (Architect/Engineer) approvals.  
   b. Government approvals. | | | |
| 06 | Project specifies if OMSI is required. For OMSI prepared by other than construction unit, OMSI-"(Architect/Engineer)" is identified or submittals for OMSI are identified. | | | |
| 07 | Operation and Maintenance information and training is suitable for project. | | | |
| 08 | Project includes requirements suitable for Small or Large project per NAVFAC’s Business Management System. | X | | |
| 09 | Project/contract requires LEED certification. | | | |
| 10 | Production report requirements (daily or otherwise) are appropriate for Category of Work and project. | | | |
| **ENVIRONMENTAL AND PERSONNEL PROTECTION** | | | | |
| 01 | Project adequately identifies hazardous materials to be removed and provides sufficient information to be biddable. | | | |
## CONSTRUCTABILITY REVIEW CHECKLIST

**Contract/Project Number:** _____________________________________________________________

**Project Title/Location:** ____________________________________

**PWD/ROICC:** ______________________________________________________________________

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<tbody>
<tr>
<td><strong>ENVIRONMENTAL AND PERSONNEL PROTECTION</strong> (cont.)</td>
<td></td>
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</tr>
<tr>
<td>02</td>
<td>Existing hazardous materials to be disturbed or removed:</td>
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<tr>
<td></td>
<td>a. Are identified and located on the drawings.</td>
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<tr>
<td></td>
<td>b. Levels of contamination are provided.</td>
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<tr>
<td></td>
<td>c. Existing surveys, inspection reports are included.</td>
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</tr>
<tr>
<td>03</td>
<td>Project identifies hazardous materials, such as lead paint, asbestos, polychlorinated biphenyls, etc.</td>
<td></td>
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<tr>
<td>04</td>
<td>Project adequately addresses hazardous materials control, handling, disposal, and recordkeeping.</td>
<td></td>
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<tr>
<td><strong>OTHER</strong></td>
<td></td>
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<tr>
<td>01</td>
<td>Specification or request for proposal is based on most recent guide specifications guidance.</td>
<td></td>
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<tr>
<td>02</td>
<td>Project includes adequate training of PW/activity personnel.</td>
<td></td>
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<tr>
<td>03</td>
<td>Project includes adequate provisions for start-up, testing, and turnover of mechanical and electrical equipment.</td>
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<tr>
<td>04</td>
<td>Specialized construction required:</td>
<td></td>
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<tr>
<td></td>
<td>a. Elevators or other weight handling equipment.</td>
<td></td>
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<tr>
<td></td>
<td>b. Boilers.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>c. Specialized coatings.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>05</td>
<td>Project includes testing requirements for specialized construction that meet certification requirements.</td>
<td></td>
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</tr>
<tr>
<td>06</td>
<td>Project includes/or has requirement to include safe and adequate access for equipment maintenance and repair once installed.</td>
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</tr>
<tr>
<td><strong>CROSS-REFERENCE CHECK</strong></td>
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<tr>
<td>01</td>
<td>Check major items of equipment and verify they are coordinated with project drawings. Pay particular attention to horsepower ratings and voltage requirements.</td>
<td></td>
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</tr>
<tr>
<td>02</td>
<td>Verify that items specified “as indicated” or “where indicated” are in fact indicated on drawings.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>03</td>
<td>Verify that cross-referenced specification sections exist.</td>
<td></td>
<td></td>
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<tr>
<td>04</td>
<td>Confirm no proprietary items are specified, or if they are, there is adequate justification and documentation.</td>
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</table>

Figure A-1. Constructability Review Checklist (Sheet 7 of 11)
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<tbody>
<tr>
<td><strong>PLAN CHECK – CIVIL</strong></td>
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<tr>
<td>01</td>
<td>Verify that site plans with new underground utilities (e.g., power, telephone, water, sewer, gas, storm drains, fuel lines, grease traps, fuel tanks) have been checked for interferences.</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>02</td>
<td>Verify existing telephone poles, pole guys, street signs, drainage inlets, valve boxes, manhole castings, etc., do not interfere with new driveways, sidewalks, or other site improvements on architectural site plans.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>Verify that limits of clearing, grading, sod, grass, or mulch are shown and are consistent with architectural or landscaping plans.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>Verify fire hydrant and street light pole locations against electrical and architectural plans.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>Verify profile sheets show other underground utilities and avoid conflicts.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>Verify horizontal distances between drainage structures and manholes match with respect to scaled drawings and stated dimensions on both plan and profile sheets.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>Verify provisions have been included for adjusting valve box and manhole castings (sewer, power, telephone, and drainage) to match final or finish grade of pavement, swales, or sidewalks.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>Verify existing and proposed grades are shown.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>PLAN CHECK – STRUCTURAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01</td>
<td>Verify column lines on structural and architectural.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>Verify all column locations are the same on structural and architectural.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>Verify perimeter slab on structural matches architectural.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>Verify all depressed or raised slabs are indicated.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>Verify slab elevations against architectural.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>Verify all foundation piers are identified.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>Verify all foundation beams are identified.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>Verify roof framing plan column lines against foundation plan column lines.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>09</td>
<td>Verify perimeter roofline against architectural roof plan.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CONSTRUCTABILITY REVIEW CHECKLIST

<table>
<thead>
<tr>
<th>Contract/Project Number:</th>
<th>Project Title/Location:</th>
<th>PWD/ROICC:</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>LI</th>
<th>DESCRIPTION</th>
<th>OK</th>
<th>NEEDS CORRECTION</th>
<th>NOT APPLICABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>10</td>
<td>Verify all columns and beams are listed in column and beam schedules.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Verify length of all columns in column schedule.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Verify all sections and details are properly labeled.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Verify expansion joint locations against architectural.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Verify dimensions.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Verify drawing notes do not conflict with specifications.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Ensure concrete slabs have an adequate placement schedule. If saw cutting of concrete is required, ensure “soft cut” technique is specified. Ensure that notes and/or details require re-entrant steel, outside corner steel, adequate embedment details, etc.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PLAN CHECK – ARCHITECTURAL**

<table>
<thead>
<tr>
<th>LI</th>
<th>DESCRIPTION</th>
<th>OK</th>
<th>NEEDS CORRECTION</th>
<th>NOT APPLICABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Verify property line dimensions on site survey plan against architectural.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>Verify building is behind set back lines.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>Verify all concrete columns and walls against structural.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>Verify on site plans that all existing and new work is clearly identified.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>Verify building elevations against floor plans. Check rooflines, window and door openings, and expansion joints.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>Verify building sections against elevations and plans. Check rooflines, windows, and door locations.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>Verify wall sections against architectural building sections and structural.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>Verify masonry openings for windows and doors.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>09</td>
<td>Verify expansion joints through building.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Verify partial floor plans against small-scale floor plans.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Verify reflected ceiling plan against architectural floor plan to ensure no variance with rooms. Check ceiling materials against finish schedule. Check light fixture layout against electrical. Check ceiling diffusers/registers against mechanical. Check all soffits and locations of vents.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure A-1. Constructability Review Checklist (Sheet 9 of 11)
## CONSTRUCTABILITY REVIEW CHECKLIST

**Contract/Project Number:** _____________________________________________________________

**Project Title/Location:** ______________________________________________________________

**PWD/ROICC:** ______________________________________________________________________

<table>
<thead>
<tr>
<th>LI</th>
<th>DESCRIPTION</th>
<th>OK</th>
<th>NEEDS CORRECTION</th>
<th>NOT APPLICABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PLAN CHECK – ARCHITECTURAL (cont.)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Verify all room finish schedule information including room numbers, names of rooms, finishes, and ceiling heights. Look for omissions, duplications, and inconsistencies.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Verify all door schedule information including sizes, types, labels, etc.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Verify all rated walls.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>Verify dimensions.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>Ensure that adequate details are provided for roofing. Ensure that roofing details and specifications are coordinated.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PLAN CHECK – MECHANICAL & PLUMBING**

<table>
<thead>
<tr>
<th>LI</th>
<th>DESCRIPTION</th>
<th>OK</th>
<th>NEEDS CORRECTION</th>
<th>NOT APPLICABLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>Verify all new electrical, gas, water, sewer, etc. lines connect to existing.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>Verify all plumbing fixture locations against architectural. Verify all plumbing fixtures against fixture schedule and/or specifications.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>Verify storm drain system against architectural roof plan. Verify pipes are sized and drains are connected and do not interfere with foundations. Verify wall chases are provided on architectural to conceal vertical piping.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>Verify sanitary drain system pipes are sized and fixtures are connected.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>Verify HVAC floor plans against architectural.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>Verify sections are identical to architectural/structural.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>Verify adequate ceiling height exists at worst case duct intersection.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>Verify structural supports required for mechanical equipment are indicated on structural drawings.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>09</td>
<td>Verify dampers indicated at smoke and fire walls.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Verify diffusers against architectural reflected ceiling plan.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Verify roof penetrations (ducts, fans, etc.) are indicated on roof plans.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Verify all ductwork is sized.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Verify all notes.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure A-1. Constructability Review Checklist (Sheet 10 of 11)
# Constructability Review Checklist

<table>
<thead>
<tr>
<th>LI</th>
<th>Description</th>
<th>OK</th>
<th>Needs Correction</th>
<th>Not Applicable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>Plan Check – Mechanical &amp; Plumbing (cont.)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Verify all air conditioning units, heaters, and exhaust fans against architectural roof plans and mechanical schedules.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Plan Check – Electrical</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01</td>
<td>Verify all plans are identical to architectural.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>Verify all light fixtures against architectural reflected ceiling plan.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>Verify all major pieces of equipment have electrical connections.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>Verify location of panel boards and that they are indicated on the electrical riser diagram.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>Verify all notes.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>Verify there is sufficient space for all electrical panels to fit.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>07</td>
<td>Verify electrical panels are not recessed in firewalls.</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>08</td>
<td>Verify electrical equipment locations are coordinated with site paving and grading.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>Specialty Items</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>01</td>
<td>Ensure dewatering requirements are properly specified.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>02</td>
<td>Ensure test piles are properly specified.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>Ensure raised floor systems are properly specified and drawn.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>Ensure uninterruptible power supply system is properly specified.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>Ensure energy monitoring and control system/direct digital control system is properly specified and proprietary specifications are included if required.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>Verify keying requirements.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>Ensure Legends, Abbreviations, and Notes are complete and accurate for all plans.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>Ensure handicapped access is provided unless facility does not require it.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Legend:**

- GFM: government-furnished material
- HVAC: heating, ventilation, and air conditioning
- OMSI: Operation and Maintenance Support Information
APPENDIX B

Categories of Work Classification

B.1 BACKGROUND

The information in this appendix is based on NAVFAC Capital Improvements Engineering & Construction Bulletin, Issue No. 2006-04. NAVFAC’s goal is to safely and responsibly deliver the right product with the right amount of engineering and construction oversight through either in-house or contract execution at the optimum life cycle cost. Seabees work with NAVFAC to achieve this goal.

Figure B-1 illustrates a project classification matrix. This matrix is used as part of a risk-based criteria process for classifying both in-house, contracted, and troop construction projects based on the level of NAVFAC design, engineering, and construction oversight. The work category classification is used to prioritize construction QA. Refer to Appendix C for further information on prioritizing construction QA.

<table>
<thead>
<tr>
<th>WORK CATEGORY</th>
<th>PROJECT MANAGEMENT</th>
<th>CONSTRUCTION OVERSIGHT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PROJECT DEVELOPMENT</td>
<td>DESIGN/ENGINEERING EFFORT</td>
</tr>
<tr>
<td>I</td>
<td>Programmatic</td>
<td>Multi-Discipline Design</td>
</tr>
<tr>
<td>II</td>
<td>Tailored Design</td>
<td>Limited Engineering</td>
</tr>
<tr>
<td>III</td>
<td>Scoping</td>
<td>None</td>
</tr>
<tr>
<td>IV</td>
<td>None</td>
<td></td>
</tr>
</tbody>
</table>

Figure B-1. Project Classification Matrix – Four Categories of Work

B.2 CAPITAL IMPROVEMENTS BUSINESS LINE CATEGORIES OF WORK CLASSIFICATION GUIDELINES

Figure B-2 illustrates guidelines for classifying design, engineering, and construction work. Project examples are provided for reference only. Characteristics could result in actual projects being classified differently (for example, a carpet project may not always be classified as Category IV if circumstances dictate a higher level of design/engineering or construction oversight).
<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>GUIDELINES FOR CLASSIFICATION</th>
<th>EXAMPLES</th>
</tr>
</thead>
</table>
| Category I | ● High financial, schedule, and/or life safety risk  
● Usually MILCON, base realignment and closure, family housing, large operations and maintenance, Navy  
● Local, state, federal, or national environmental or usage permits required  
● State Historic Preservation Office consultation needed  
● Building and/or site approval required  
● Primarily multi-discipline design requirements  
● New construction or major renovation/repair/restoration  
● Complex design, plans and specs, calculations, site investigation, or studies required  
● Includes installation of equipment/systems that incorporate leading-edge technology. | ● Air terminals  
● Aircraft acoustical enclosures  
● Aircraft engine test facility  
● Aircraft hangers  
● Bridges  
● Computer systems facilities  
● Controlled industrial facilities  
● Corrosion control hanger  
● Detention facilities  
● Dry-docks  
● Electronics testing facilities  
● Elevator installations or replacements  
● Energy projects requiring plans and specs  
● Exchanges/commissaries  
● Fitness centers  
● Fleet mooring  
● Flight simulator facilities  
● Galleys  
● Gas stations  
● Gymnasiums  
● High security facilities  
● Hobby shops  
● Hospitals  
● Hyperbaric facilities  
● Indoor firing ranges  
● Jet engine test cells  
● Magazines  
● Maintenance facilities  
● Major renovations/additions that include Category I, II, III, and IV work  
● Medical/dental clinics  
● Multi-story transient lodgings  
● Multi-story administrative facilities  
● Nuclear handling or support facilities  
● Offshore structures  
● Ordnance testing and evaluation facilities  
● Piers  
● Petroleum, oils, and lubricants (POL) facilities  
● Power plants  
● Research, development, test, and evaluation support facilities  
● Sea walls  
● Security engineering, planning, design, and construction  
● Sewage treatment facilities  
● Tanks, elevated water  
● Tanks, fuel  
● Technology demonstration, validation, assessment, and transfer  
● Theaters  
● Towers, communication  
● Training buildings  
● Underwater cable facilities  
● Water treatment facilities |
<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>GUIDELINES FOR CLASSIFICATION</th>
<th>EXAMPLES</th>
</tr>
</thead>
</table>
| Category II –  
Tailored Design  
Business Management System - Based, Construction Quality Management Oversight |  
- Substantial financial, schedule, and/or life safety risk  
- Usually large operations and maintenance, Navy/Special Project, but could be MILCON, base realignment and closure, family housing.  
- Local or state environmental or usage permits may be required  
- Building and/or site approval required  
- Limited number of design disciplines  
- Renovations and/or some new construction  
- Design obtained through combination of designer of record- and contractor-furnished documents: routine design, plans and limited specs (supplemented by contractor-furnished shop drawings and submittals), site investigation, or studies  
- Includes installation, replacement, or repair of equipment/systems that incorporate conventional technology. |  
- Alarms, fire protection, new installations/replacements  
- Bridges, pedestrian  
- Building structural systems, single story and/or modifications  
- Building, pre-engineered, with utilities  
- Conveying systems  
- Conversion of space  
- Dredging  
- Electrical, standby generator systems/Uninterruptible Power Supply  
- Energy projects for single Energy Monitoring and Control Systems  
- Erosion control  
- Exterior electrical distribution  
- Fences, security, AT/FP  
- Fire protection system, installation/replacement  
- Foundations, reinforced  
- HVAC system replacements/upgrades, >5 tons  
- Ocean construction  
- Plumbing, multi-story  
- Ranges, small arms  
- Renovations that include Category II, III, and IV work  
- Residential housing  
- Road construction  
- Runway/taxiway lighting  
- Signals, traffic  
- Stairs, multi-story or not pre-engineered single story  
- Storm drainage  
- Sports fields  
- Sprinklers, fire protection warehouse, general storage  
- Utility upgrades  
- Waterfront facilities, inspection, maintenance and repair |
### CATEGORY
**Limited Engineering Oversight**
- Moderate financial, schedule, and/or limited/very low life safety risk
- Local environmental or usage permits required (No state or federal)
- Building and/or site approval not required (exceptions may elevate work to Category II)
- No plans and specs; build from planner and estimator scope of work -- supplemented by professional engineering staff as needed with sketches, catalog cuts, and/or narrative descriptions
- Primarily minor renovation or repair
- Basic measurements and limited technical calculations required
- Includes (in kind) replacement or repair of fixtures, hardware, and non-technical equipment
- Limited engineering and construction oversight.

### GUIDELINES FOR CLASSIFICATION
- Alarms, fire protection, relocation <4
- Building, pre-engineered, >120 square feet, no utilities
- Carport, prefabricated
- Conveyors, replacement
- Coolers, water
- Demolition, non-structural
- Doors, overhead garage, >100 square feet
- Doors, personnel, non-load bearing wall
- Electrical, receptacles, 120/240 volt
- Equipment, food service
- Equipment, loading dock
- Equipment, security vault
- Excavation, scoping required
- Exterior insulation finish system
- Fence, chain link, >8 feet high, requires site approval
- Fence, ornamental, >6 feet high
- Housing construction/revitalization, Public Private Venture

### EXAMPLES
- HVAC package units, <5 tons, ground level
- Paving, asphalt, overlay, large repair
- Paving, concrete, replacement, large repair
- Plumbing, rough-in, single story, residential or administrative
- Renovation, including Category III and IV work
- Roof replacement, structural repair in-kind
- Sprinkler heads, fire protection, relocation/replacement, <21
- Stairs, interior or exterior, single flight, pre-engineered
- Utilities, connect to existing with provider consultation
- Walls, partition, no ingress/egress issues, no utilities
- Windows, non-load bearing wall

---

Figure B-2. Categories of Work Classification Guidelines (Sheet 3 of 4)
<table>
<thead>
<tr>
<th>CATEGORY</th>
<th>GUIDELINES FOR CLASSIFICATION</th>
<th>EXAMPLES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category IV –</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oversight</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Management Quality</td>
<td>- No Engineering Oversight</td>
<td>- Bollards, protective, not on piers or for AT/FP purposes</td>
</tr>
<tr>
<td>Oversight by Exception</td>
<td>- No permits required</td>
<td>- Fence, ornamental, &lt;6 feet high</td>
</tr>
<tr>
<td></td>
<td>- Build from client requirements</td>
<td>- Fixtures, lighting, replacement</td>
</tr>
<tr>
<td></td>
<td>- Only minor renovation or repair</td>
<td>- Fixtures, plumbing, replacement</td>
</tr>
<tr>
<td></td>
<td>- No structural, electrical (primary distribution system), mechanical, HVAC, fire protection, intrusion detection, AT/FP, environmental remediation, or hazard abatement (lead, asbestos) elements</td>
<td>- Floor, ceramic tile</td>
</tr>
<tr>
<td></td>
<td>- May include replacement or repair of fixtures, hardware, and finishes</td>
<td>- Floor, hardwood</td>
</tr>
<tr>
<td></td>
<td>- Client works directly with vendor/contractor</td>
<td>- Floor, vinyl</td>
</tr>
<tr>
<td></td>
<td>- NAVFAC construction oversight by exception.</td>
<td>- Garage door electric openers</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Ground fault circuit interrupter electrical receptacles</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Gutters and downspouts</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Handicap ramp at curbs</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Handrails/guardrails, replacement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Hardware, doors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Hardware, windows</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Heater, baseboard electric, replacement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Insulation, duct</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Insulation, pipe</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Insulation, wall</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Landscape sprinkler system</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Landscaping, &lt;5,000 square feet</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Mirrors, wall</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Motion detectors</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Painting, exterior, no lead paint removal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Parking bumpers, concrete, synthetic</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Parking lot line striping</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Pavers, landscaping</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Paving, asphalt, repair</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Paving, concrete, repair</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Roof, built-up, repairs with no structural</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Roof, fiberglass shingle, repair by replacement with no structural</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Roof, standing seam metal, repair, no structural</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Shelving, light duty</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Sidewalk, concrete</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Siding, exterior vinyl</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Signage, architectural</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Site preparation, clearing and grubbing, &lt;1 acre</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Skylight, roof</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Solar lighting</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Stairs, wood exterior, replacement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Ventilators, roof, replacement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Wainscot, interior wall</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Wall, ceramic tile</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Wall, vinyl base</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Wall, vinyl covering</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Windows, film tint</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Windows, replacement</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Windows, storm</td>
</tr>
</tbody>
</table>
APPENDIX C

Prioritizing Quality Assurance

C.1 BACKGROUND

This appendix provides guidance on prioritizing construction QA responsibilities based on a risk assessment model using the four categories of work. Refer to Appendix B for information on categories of work classification. The information in this appendix is based on NAVFAC Capital Improvements Engineering & Construction Bulletin, Issue No. 2007-02, Prioritizing Construction QA using the Four Categories of Work and modified to apply to the NCF. The QA authority is responsible for applying the appropriate level of resources to enable the most efficient execution of duties. With increasing workloads, QA staff must prioritize QA duties.

Paragraph C.2 provides construction personnel the tools to determine the overall project risk and associated QA and administrative effort required for each construction project so that a plan can be established for workload distribution and balance.

Paragraph C.3 provides illustrative examples of real project analysis.

C.2 RISK ASSESSMENT RATING PROCEDURE AND CONSTRUCTION QUALITY ASSURANCE RESPONSIBILITY ANALYSIS

Using the following procedures, QA personnel conduct a risk assessment of each construction project to establish the required level of QA oversight and document the risk assessment in the contract files. QA personnel incorporate a formal process of documenting a risk assessment approach toward QA and analyze the risk of not performing certain responsibilities.

QA responsibility is accomplished based on acceptable risk. All QA personnel review and apply this assessment process for each assigned project. Generally, the QA authority leads the risk assessment rating of the project to prioritize responsibilities and plan execution. The results will be included in the project QA plan if required by the QA Responsibilities Matrix.

This process is not considered as justification for not executing duties that are clearly needed based on project circumstances. For example, as a general rule, the QA authority should invest more effort on a contract at the beginning to ensure that the construction unit’s QC and safety systems are functioning properly.
C.2.1 Past Performance Assessment Rating

The risk assessment method utilizes the construction unit’s “Past Performance.” This rating is developed using the criteria illustrated in Figure C-1.

<table>
<thead>
<tr>
<th>INDICATORS</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction unit’s past performance history (database history)</td>
<td></td>
</tr>
<tr>
<td>Contracting office staff’s subjective rating of construction unit</td>
<td></td>
</tr>
<tr>
<td>Engineering unit’s staff:</td>
<td></td>
</tr>
<tr>
<td>*QC manager</td>
<td></td>
</tr>
<tr>
<td>*Engineering unit safety officer</td>
<td></td>
</tr>
<tr>
<td>*Construction manager (operations officer)</td>
<td></td>
</tr>
<tr>
<td>*Project manager (company level/detachment officer)</td>
<td></td>
</tr>
<tr>
<td>*Project supervisor (superintendent)</td>
<td></td>
</tr>
<tr>
<td>Construction unit’s prior safety record (database history)</td>
<td></td>
</tr>
<tr>
<td>Prior knowledge of subcontractors (civilian)</td>
<td></td>
</tr>
<tr>
<td>Previous experience with designer of record</td>
<td></td>
</tr>
<tr>
<td>Subtotal points</td>
<td></td>
</tr>
<tr>
<td>Total points</td>
<td></td>
</tr>
</tbody>
</table>

**Rating** (total points divided by the number of indicators that apply)

* Note: Rate as 3 if not familiar with personnel

Figure C-1. Past Performance Assessment Rating
1 C.2.2 Project Risk Rating

2 The next step in the risk assessment method utilizes the construction agent’s “Project Risk Rating.”

3 This rating is developed using the criteria illustrated in Figure C-2. To determine the project risk, round the calculated rating to the tenth (one decimal point).

<table>
<thead>
<tr>
<th>INDICATORS</th>
<th>RATING</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>LOW RISK</td>
</tr>
<tr>
<td></td>
<td>1</td>
</tr>
</tbody>
</table>

| Complexity/financial risk:                                                 |        |        |        |        |   |
|                                                                             |        |        |        |        |   |
| *Prototype/unique construction                                              |        |        |        |        |   |
|                                                                             |        |        |        |        |   |
| *Schedule/phasing                                                           |        |        |        |        |   |
|                                                                             |        |        |        |        |   |
| *Environmental hazard (unexploded explosive ordnance, POL, asbestos, lead, etc.) |        |        |        |        |   |
|                                                                             |        |        |        |        |   |
| *Multi-disciplined (specialized acceptance)                                 |        |        |        |        |   |
|                                                                             |        |        |        |        |   |
| *Size ($ cost)                                                              |        |        |        |        |   |
|                                                                             |        |        |        |        |   |
| *Potential interruptions to base operations                                  |        |        |        |        |   |
|                                                                             |        |        |        |        |   |
| *Critical end use of facility                                               |        |        |        |        |   |
|                                                                             |        |        |        |        |   |
| *Renovation/repair                                                           |        |        |        |        |   |
|                                                                             |        |        |        |        |   |
| *Quantity of GFM/GFE (specialized construction or systems)                  |        |        |        |        |   |
|                                                                             |        |        |        |        |   |
| *Quantity/type of sampling and testing                                      |        |        |        |        |   |
|                                                                             |        |        |        |        |   |
| Environment/site/location                                                   |        |        |        |        |   |
|                                                                             |        |        |        |        |   |
| Safety hazards                                                              |        |        |        |        |   |
|                                                                             |        |        |        |        |   |
| Warranty issue potential (specialized systems)                              |        |        |        |        |   |
|                                                                             |        |        |        |        |   |
| Subtotal points                                                             |        |        |        |        |   |
|                                                                             |        |        |        |        |   |
| Total points                                                                |        |        |        |        |   |

| Rating (total points divided by the number of indicators that apply)        |        |        |        |        |   |
|                                                                             |        |        |        |        |   |
| * Note: Rate as N/A if not applicable                                       |        |        |        |        |   |

Figure C-2. Project Risk Rating
C.2.3 Project Risk Assessment Rating

Plot the *Past Performance Assessment Rating* and *Project Risk Rating* into the matrix illustrated in Figure C-3 to determine the *Project Risk Assessment Rating*. The project risk assessment may be re-evaluated during performance if needed. Project risk assessment ratings are:

1. High risk
2. Medium risk
3. Low risk.

### PAST PERFORMANCE RATING
(From Figure C-1)

<table>
<thead>
<tr>
<th></th>
<th>Unsatisfactory</th>
<th>Excellent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0 – 1.5</td>
<td>1.6 – 2.4</td>
</tr>
<tr>
<td>Low Risk</td>
<td></td>
<td>Medium</td>
</tr>
<tr>
<td>0 – 0.7</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td>0.8 – 1.6</td>
<td>Medium</td>
<td>Medium</td>
</tr>
<tr>
<td><strong>PROJECT RISK RATING</strong></td>
<td></td>
<td>High</td>
</tr>
<tr>
<td>(From Figure C-2)</td>
<td></td>
<td>High</td>
</tr>
<tr>
<td>1.7 – 2.5</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>2.6 – 3.4</td>
<td>High</td>
<td>High</td>
</tr>
<tr>
<td>High Risk</td>
<td>High</td>
<td>High</td>
</tr>
</tbody>
</table>

**Figure C-3. Project Risk Assessment Rating**
C.2.4 Construction Quality Assurance Responsibilities

The Construction Quality Assurance Responsibilities Matrix, as shown in Figure C-4, identifies QA responsibilities based on a project’s work category and risk assessment rating as determined in Paragraph C.2.3. The responsibilities listed in the QA Responsibilities Matrix are to be performed by QA personnel; not all line items apply to the Seabees.

Under the corresponding Work Category column, a level of performance letter indicates the action to be performed as follows:

1. A – Always performed
2. B – Performed with “Medium” or “High” risk assessment rating, performed by exception only with “Low” risk rating
3. C – Performed by exception only

The Description of QA Responsibilities column indicates the construction QA responsibilities and duties that must be performed.

The QA Person Responsible column indicates the person assigned by the QA tasking authority who is responsible for doing the tasks.

Refer to Paragraph C.3 for examples and application of these procedures. An independent risk analysis would not usually be performed on a Category IV project; however, examples 10 and 11 in Paragraphs C.3.10 and C.3.11 are presented to illustrate the process.
<table>
<thead>
<tr>
<th>WORK CATEGORY</th>
<th>DESCRIPTION OF QA RESPONSIBILITIES</th>
<th>QA PERSON RESPONSIBLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I  II  III  IV</td>
<td>Tailor/edit Division 1 specification sections.</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>Participate on technical evaluation boards.</td>
<td></td>
</tr>
<tr>
<td>A  A  C  C</td>
<td>Guide construction unit on site visits.</td>
<td></td>
</tr>
<tr>
<td>A  A  B  C</td>
<td>NAVFAC Red Zone requirements:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Fragnet</td>
<td></td>
</tr>
<tr>
<td>A  A  B  C</td>
<td>● Closeout checklist and POA&amp;M</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>● NAVFAC Red Zone schedule management</td>
<td></td>
</tr>
<tr>
<td>A  A  B  C</td>
<td>● POA&amp;M milestone monitoring.</td>
<td></td>
</tr>
<tr>
<td>A  A  B  C</td>
<td>Provide technical expertise and ensure certification based upon project requirements as follows (notional list):</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● HVAC controls</td>
<td></td>
</tr>
<tr>
<td>A  A  B  C</td>
<td>● Roofing</td>
<td></td>
</tr>
<tr>
<td>A  A  B  C</td>
<td>● Concrete, masonry, stucco</td>
<td></td>
</tr>
<tr>
<td>A  A  B  C</td>
<td>● Structural steel, welding</td>
<td></td>
</tr>
<tr>
<td>A  A  A  B</td>
<td>● Underwater construction</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>● Vertical transportation equipment</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>● Cranes, boilers.</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>Perform base/construction unit coordination:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Temp utility hook-up</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>● Lay down areas</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>● Arrange telephone connections</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>● Utility/road outages</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>● Process base pass requests</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>● Digging, burn, and hot work permits.</td>
<td></td>
</tr>
<tr>
<td>A  A  B  C</td>
<td>Prepare QA plans (ensuring critical definable features of work are covered).</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Note: Each construction project can have numerous definable features of work and each one of them can have a varying degree of criticality and risk. The QA team considers this variable when determining where and when to allocate focus and effort.</td>
<td></td>
</tr>
<tr>
<td>A  B  C  C</td>
<td>Participate in design meetings on design-build projects.</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>Attend pre-construction conferences.</td>
<td></td>
</tr>
<tr>
<td>A  A  C  C</td>
<td>Attend coordination and mutual understanding meetings.</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>Participate in partnering sessions.</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>Submittal processes:</td>
<td></td>
</tr>
<tr>
<td></td>
<td>● Review, approve/accept Division 1 submittals</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>● Review variation requests and technical submittals for critical definable features of work (normally not required for QC approved submittals).</td>
<td></td>
</tr>
</tbody>
</table>

Figure C-4. Construction Quality Assurance Responsibilities Matrix (Sheet 1 of 3)
<table>
<thead>
<tr>
<th>WORK CATEGORY</th>
<th>DESCRIPTION OF QA RESPONSIBILITIES</th>
<th>QA PERSON RESPONSIBLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>I  II  III  IV</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A  B  C  C</td>
<td>Review/accept design QC plans.</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>Review/accept construction project QC plans.</td>
<td></td>
</tr>
<tr>
<td>B  B  C  C</td>
<td>Attend/perform off-site inspections.</td>
<td></td>
</tr>
<tr>
<td>A  B  B  C</td>
<td>Attend selected QC meetings.</td>
<td></td>
</tr>
<tr>
<td>B  B  C  C</td>
<td>Attend selected production meetings.</td>
<td></td>
</tr>
<tr>
<td>B  B  B  C</td>
<td>Monitor Preparatory and Initial Phases (review checklists).</td>
<td></td>
</tr>
<tr>
<td>A  B  C  C</td>
<td>Attend selected Preparatory and Initial meetings.</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>Review construction unit reports.</td>
<td></td>
</tr>
<tr>
<td>A  B  C  C</td>
<td>Prepare government QA reports.</td>
<td></td>
</tr>
<tr>
<td>A  A  B  C</td>
<td>Coordinate GFM/GFE.</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>Review/analyze construction progress schedules.</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>Assist with technical analysis:</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>- Evaluate/process RFIs</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>- Unforeseen site conditions</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>- Contract changes/request for equitable adjustments</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>- Claims</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>- Constructability reviews (includes plan-in-hand site visit).</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>Safety compliance:</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>- Review/accept Accident Prevention Plan</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>- Review/accept Activity Hazard Analysis</td>
<td></td>
</tr>
<tr>
<td>A  A  A  B</td>
<td>- Assure construction unit complies with safety requirements</td>
<td></td>
</tr>
<tr>
<td>A  A  A  B</td>
<td>- Prepare safety stand downs/construction unit self-evaluation</td>
<td></td>
</tr>
<tr>
<td>B  B  C  C</td>
<td>- Prepare work site safety assessments</td>
<td></td>
</tr>
<tr>
<td>B  B  B  C</td>
<td>- Attend tool box safety meetings</td>
<td></td>
</tr>
<tr>
<td>A  A  A  A</td>
<td>- Conduct mishap investigations and reporting.</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>Contractor construction crane compliance:</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>- Assure construction unit complies with Appendix P, Contractor Crane Requirements, of NAVFAC P-307, Management of Weight Handling Equipment</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>- Fill out Contractor Crane Operation Checklist (Figure P-2).</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>Critical crane lifts:</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>- Review/accept critical lift plan</td>
<td></td>
</tr>
<tr>
<td>A  A  A  C</td>
<td>- Witness/monitor critical lifts.</td>
<td></td>
</tr>
</tbody>
</table>

Figure C-4. Construction Quality Assurance Responsibilities Matrix (Sheet 2 of 3)
<table>
<thead>
<tr>
<th>WORK CATEGORY</th>
<th>DESCRIPTION OF QA RESPONSIBILITIES</th>
<th>QA PERSON RESPONSIBLE</th>
</tr>
</thead>
<tbody>
<tr>
<td>A A A C</td>
<td>Receive/review/prepare correspondence.</td>
<td></td>
</tr>
<tr>
<td>A B B C</td>
<td>Conduct job site visits.</td>
<td></td>
</tr>
<tr>
<td>A B B C</td>
<td>Attend/witness selected tests.</td>
<td></td>
</tr>
<tr>
<td>B B B C</td>
<td>Review test results.</td>
<td></td>
</tr>
<tr>
<td>A A A C</td>
<td>Review/validate progress payments.</td>
<td></td>
</tr>
<tr>
<td>A A B C</td>
<td>Coordinate turnover to client:</td>
<td></td>
</tr>
<tr>
<td>A A B C</td>
<td>● Equipment operation/maintenance training</td>
<td></td>
</tr>
<tr>
<td>A A B C</td>
<td>● Spare parts, special tools, and keys</td>
<td></td>
</tr>
<tr>
<td>A A B C</td>
<td>● OMSI turnover</td>
<td></td>
</tr>
<tr>
<td>A A B C</td>
<td>● List of extended warranty periods.</td>
<td></td>
</tr>
<tr>
<td>A A A C</td>
<td>Issue/track non-compliance notices.</td>
<td></td>
</tr>
<tr>
<td>A A A C</td>
<td>Environmental compliance:</td>
<td></td>
</tr>
<tr>
<td>A A A C</td>
<td>● Review/accept construction unit environmental plan</td>
<td></td>
</tr>
<tr>
<td>A A A C</td>
<td>● Assure unit complies with the environmental plan</td>
<td></td>
</tr>
<tr>
<td>A A A C</td>
<td>● Ensure compliance with and proper close-out of permits.</td>
<td></td>
</tr>
<tr>
<td>A A B C</td>
<td>Perform completion inspections:</td>
<td></td>
</tr>
<tr>
<td>A A A C</td>
<td>● Pre-Final Inspection</td>
<td></td>
</tr>
<tr>
<td>A A A C</td>
<td>● Final Acceptance Inspection.</td>
<td></td>
</tr>
<tr>
<td>A A A C</td>
<td>Prepare for construction assistance visits.</td>
<td></td>
</tr>
<tr>
<td>A B C C</td>
<td>Take/file/distribute progress photos.</td>
<td></td>
</tr>
<tr>
<td>B B B B</td>
<td>Labor compliance (as applicable):</td>
<td></td>
</tr>
<tr>
<td>B B B C</td>
<td>● Assure construction unit complies with labor laws</td>
<td></td>
</tr>
<tr>
<td>A A A A</td>
<td>● Conduct construction unit employee interviews</td>
<td></td>
</tr>
<tr>
<td>B B B C</td>
<td>● Review and compare weekly payrolls against contractor production reports</td>
<td></td>
</tr>
<tr>
<td>A A A C</td>
<td>● Assure labor law information is posted at project site.</td>
<td></td>
</tr>
<tr>
<td>A A A C</td>
<td>Coordinate access into secure areas.</td>
<td></td>
</tr>
<tr>
<td>A A A C</td>
<td>Assure projects are closed out in accordance with project requirements.</td>
<td></td>
</tr>
<tr>
<td>A A A C</td>
<td>Prepare construction unit performance evaluations.</td>
<td></td>
</tr>
<tr>
<td>A A A C</td>
<td>Coordinate warranty actions.</td>
<td></td>
</tr>
</tbody>
</table>

**LEGEND:**
- **POA&M**: plan of action and milestones
- **OMSI**: operation and maintenance support information

Figure C-4. Construction Quality Assurance Responsibilities Matrix (Sheet 3 of 3)
C.3 RISK ASSESSMENT EXAMPLES

Paragraphs C.3.1 through C.3.11 provide examples illustrating the process of validating the classification of a project, performing a risk assessment, and completing a QA responsibility analysis. These examples are based on NAVFAC projects and some aspects of them may not apply to the NCF; but overall they have value and get the point across.

C.3.1 Example 1

1. Project Location: Keesler Air Force Base, Biloxi, MS
2. Project Name and Detailed Description: Design-Build a Technical Training Facility

   Phase II is a 5-phase project as follows: (1) design-build a 23,000-square foot avionics facility for C-130 aircraft, (2) demolish Hangar 1, (3) design-build a 200,000-square foot technical training facility on site of Hangar 1, (4) provide three radar bases for GPN-20 training radars, and (5) demolish Hangar 2.

3. Actual/Estimated Cost: $22,416,336 Actual $24,322,000 Estimated
4. Acquisition Strategy: Design/Build Multiple Award Construction Contract
5. Classification Analysis: (Use existing guidelines to cite characteristics or features that impact the analysis and result in a category selection)

   Category I based on Classification Guidelines:
   - High schedule risk
   - Site approval required
   - State environmental permit required
   - Complex design

6. Risk Analysis: (Use Risk Assessment Procedure)

   - Past Performance Assessment Rating = 4.2
   - Project Risk Rating = 1.3
   - Project Risk Assessment = LOW

7. QA Responsibilities: (Use QA Responsibility Analysis)

   Full range of “A” and “B” (by exception, as determined by the project team) responsibilities as shown in the QA Responsibilities Matrix.

C.3.2 Example 2

1. Project Location: Sewells Point, Norfolk, VA
2. Project Name and Detailed Description: MILCON Project P-280, Aircraft Intermediate Maintenance Department Consolidation Facility

   140,000-square foot aircraft maintenance facility includes a 2nd story admin area for aircraft intermediate maintenance department staff and supply functions. The new facility includes cranes and hoists, HVAC and direct digital control systems, fire protection systems with a backup generator, an elevator, and frequency converters. Project includes relocation of aircraft intermediate
maintenance department equipment from the existing buildings to the new consolidated facility. Scope includes asbestos and lead abatement work and demolition of ten buildings.

3. Actual/Estimated Cost: Awarded at $23,150,000

4. Acquisition Strategy: Contract was awarded to M. A. Mortenson

5. Classification Analysis: (Use existing guidelines to cite characteristics or features that impact the analysis and result in a category selection)

   Category I based on Classification Guidelines:
   - Large $ MILCON project
   - State environmental permits required
   - New construction with multiple design discipline requirements
   - Unique building and aircraft maintenance equipment installation and certification requirements
   - Operational client with phased move into new facility

6. Risk Analysis: (Use Risk Assessment Procedure)

   Past Performance Assessment Rating = 3.7
   Project Risk Rating = 3.7
   Project Risk Assessment Rating = HIGH

7. QA Responsibilities: (Use QA Responsibility Analysis)

   In accordance with the QA Responsibilities Matrix, the PWD/ROICC office should provide all of the QA responsibilities listed in the matrix.

C.3.3 Example 3

1. Project Location: Tafuna, American Samoa

2. Project Name and Detailed Description: Fiscal Year 02 MILCON Additions and Alterations, Reserve Center, Tafuna, American Samoa

   Project includes construction of a U.S. Army Reserve Center comprised of a training facility, organizational maintenance shop, unheated storage, and parking garage.

3. Actual/Estimated Cost: Awarded at $16,757,687

4. Acquisition Strategy: Request for Proposal - Design/Bid/Build

5. Classification Analysis: (Use existing guidelines to cite characteristics or features that impact the analysis and result in a category selection)

   Category I based on Classification Guidelines:
   - Large $ MILCON project
   - New construction with multiple design discipline requirements
   - Unique building and equipment requirements
   - Full plans and specs prepared by architect/engineer firm
6. Risk Analysis: (Use Risk Assessment Procedure)
   
   Past Performance Assessment Rating = 3.75  
   Project Risk Rating = 3.54  
   Project Risk Assessment Rating = HIGH

7. QA Responsibilities: (Use QA Responsibility Analysis)
   
   In accordance with the QA Responsibilities Matrix, the PWD/ROICC office should provide all of the
   QA responsibilities listed in the matrix.

C.3.4 Example 4

1. Project Location: Naval Construction Battalion Center, Gulfport, MS
2. Project Name and Detailed Description: Replace and Improve Water System
   
   Project replaces 14,000 linear feet of water distribution pipe ranging in size from 1 to 12 inches and
   also provides a new 200,000 gallon elevated water tank.

3. Actual/Estimated Cost: $3,727,640 Actual $4,458,353 Estimated
4. Acquisition Strategy: Design/Build Multiple Award Construction Contract
5. Classification Analysis: (Use existing guidelines to cite characteristics or features that impact the
   analysis and result in a category selection)

   Category II based on Classification Guidelines:
   
   State environmental permit required
   Limited number of design disciplines
   Water system installation using conventional technology

6. Risk Analysis: (Use Risk Assessment Procedure)

   Past Performance Assessment Rating = 3.4  
   Project Risk Rating = 2.8  
   Project Risk Assessment Rating = MED

7. QA Responsibilities: (Use QA Responsibility Analysis)
   
   All items marked “A” or “B” in the QA Responsibilities Matrix.

C.3.5 Example 5

1. Project Location: Naval Magazine Lualualei, West Loch Branch, HI
2. Project Name and Detailed Description: Corrosion Repairs Ammo Wharves W4 and W5, Naval
   Magazine, West Loch

3. Actual/Estimated Cost: Awarded at $223,620
4. Acquisition Strategy: Job-Order Contract
5. Classification Analysis: (Use existing guidelines to cite characteristics or features that impact the analysis and result in a category selection)

Category II based on Classification Guidelines:

- Constructed from discipline-specific engineered drawings and limited specifications
- High security area

6. Risk Analysis: (Use Risk Assessment Procedure)

- Past Performance Assessment Rating = 2.625
- Project Risk Rating = 3.55
- Project Risk Assessment Rating = HIGH

7. QA Responsibilities: (Use QA Responsibility Analysis)

In accordance with the QA Responsibilities Matrix, the PWD/ROICC office should provide all of the QA responsibilities listed in the matrix.

C.3.6 Example 6

1. Project Location: Sewells Point, Norfolk, VA

2. Project Name and Detailed Description: Station Funded Hurricane Repair Project, Replace Roof, LF-18

   Project replaces a 200,000-square foot built-up roof system with a new modified bitumen roof system. Work includes asbestos and lead abatement. Building LF-18 is a fleet operational support facility with classified spaces and antennas on the roof that must be shut down during the roof work.

3. Actual/Estimated Cost: Awarded at $2,999,668

4. Acquisition Strategy: Contract was awarded by negotiated procurement with an 8(A) contractor; a design/bid/build project

5. Classification Analysis: (Use existing guidelines to cite characteristics or features that impact the analysis and result in a category selection)

Category II based on Classification Guidelines:

- Large $ operations and maintenance, Navy (funding)
- State environmental coordination required for abatement work
- Limited number of design disciplines
- Substantial life safety risk for roofers and occupants inside the building

6. Risk Analysis: (Use Risk Assessment Procedure)

- Past Performance Assessment Rating = 3.0
- Project Risk Rating = 2.9
- Project Risk Assessment Rating = HIGH
7. QA Responsibilities: (Use QA Responsibility Analysis)

In accordance with the QA Responsibilities Matrix, the PWD/ROICC office should provide all of the QA responsibilities listed in the matrix.

C.3.7 Example 7

1. Project Location: Naval Station, Pascagoula, MS
2. Project Name and Detailed Description: Renovate Weapons Department Admin Spaces

This contract involves repair of minor roof leaks, removal and replacement of shower stalls and fixtures, removal and replacement of carpet and vinyl composition tile, and preparation and painting of interior spaces.

3. Actual/Estimated Cost: $30,000 Actual $28,943 Estimated
4. Acquisition Strategy: 8(a) negotiated
5. Classification Analysis: (Use existing guidelines to cite characteristics or features that impact the analysis and result in a category selection)

Category III based on Classification Guidelines:

- Build from scope of work
- Minor renovation job
- Replacement of fixtures
- Hardware and non-technical equipment

6. Risk Analysis: (Use Risk Assessment Procedure)

- Past Performance Assessment Rating = 3.0
- Project Risk Rating = 3.6
- Project Risk Assessment Rating = HIGH

7. QA Responsibilities: (Use QA Responsibility Analysis)

In accordance with the QA Responsibilities Matrix, the PWD/ROICC office should provide all of the QA responsibilities listed in the matrix except perform “C” responsibility items by exception, as determined by the project team.

C.3.8 Example 8

1. Project Location: Naval Station Pearl Harbor, HI
2. Project Name and Detailed Description: Replace Carpet W.E.B. Shop, Building 352, Joint Intelligence Center, Pacific, Makalapa

3. Actual/Estimated Cost: $63,924 Actual
4. Acquisition Strategy: Indefinite delivery/indefinite quantity (contracting/procurement)
5. Classification Analysis: (Use existing guidelines to cite characteristics or features that impact the analysis and result in a category selection)

Category III based on Classification Guidelines:
- Executed using services of an established PWD/ROICC contracting vehicle with a statement of work
- Verification of scope and quality of work is required
- Site access issues complex – cannot be executed as Category IV

6. Risk Analysis (Use Risk Assessment Procedure)
- Past Performance Assessment Rating = 3.0
- Project Risk Rating = 2.667
- Project Risk Assessment Rating = HIGH

7. QA Responsibilities: (Use QA Responsibility Analysis)
- In accordance with the QA Responsibilities Matrix, the PWD/ROICC office should provide all of the QA responsibilities listed in the matrix except perform “C” responsibility items by exception, as determined by the project team.

C.3.9 Example 9

1. Project Location: Sewells Point, Norfolk, VA

2. Project Name and Detailed Description: Station Funded Repair Project, Install GFM Cooling Tower, SP-367
   - Project demolishes an existing failing cooling tower and installs a new GFM cooling tower for a Reserve Training facility. System outage required for demo and installation work needs to be coordinated with Reserve Unit.

3. Actual/Estimated Cost: Awarded at $18,655

4. Acquisition Strategy: Contract was awarded by negotiated procurement with an 8(a) contractor. No plans and specs, engineering technician scope of work provided to accomplish work.

5. Classification Analysis: (Use existing guidelines to cite characteristics or features that impact the analysis and result in a category selection)

Category III based on Classification Guidelines:
- Moderate financial, schedule, and life safety risk
- No plans and specs, build from engineering technician scope of work
- No local environmental permits required

6. Risk Analysis: (Use Risk Assessment Procedure)
- Past Performance Assessment Rating = 3.0
- Project Risk Rating = 2.7
- Project Risk Assessment Rating = HIGH
7. QA Responsibilities: (Use QA Responsibility Analysis)

In accordance with the QA Responsibilities Matrix, the PWD/ROICC office should provide all of the QA responsibilities listed in the matrix except perform “C” responsibility items by exception, as determined by the project team.

C.3.10 Example 10

1. Project Location: Keesler Air Force Base, Biloxi, MS

2. Project Name and Detailed Description: Replace Epoxy Floor Coating in Section A of Supply Warehouse

Project entails shot blasting or chemical cleaning approximately 15,000 square feet of existing two-part epoxy floor system and replacing with new two-part epoxy floor system.

3. Actual/Estimated Cost: Estimated $80,000  Actual $81,000

4. Acquisition Strategy: 8(a) negotiated procurement

5. Classification Analysis: (Use existing guidelines to cite characteristics or features that impact the analysis and result in a category selection)

   Category IV based on Classification Guidelines:
   
   Very low risk
   Build from client requirements
   Minor repair

   An independent Risk Analysis would not usually be performed on a Category IV project; however, this example illustrates that risk may vary even within Category IV work.

6. Risk Analysis: (Use Risk Assessment Procedure)

   Past Performance Assessment Rating = 1.8
   Project Risk Rating = 1.6
   Project Risk Assessment Rating = MED

7. QA Responsibilities: (Use QA Responsibility Analysis)

   In accordance with the QA Responsibilities Matrix, the PWD/ROICC office should perform QA only by exception due to classification of the project as Category IV. Since the overall Project Risk Assessment Rating is Medium, the client performing the QA should be advised that special attention should be directed to this work during the execution phase.
C.3.11  Example 11

1. Project Location: Sewells Point, Norfolk, VA

2. Project Name and Detailed Description: Station Funded Repair Project, Replace 5-Ton condenser, SP-77
   Project replaces an existing condenser with a smaller unit better sized to handle the reduced heat load in building SP-77. Building SP-77 houses flight line radar equipment.

3. Actual/Estimated Cost: Awarded at $7,000

4. Acquisition Strategy: Contract was awarded by negotiated procurement with an 8(a) contractor. No plans and specs, engineering technician scope of work provided to accomplish work.

5. Classification Analysis: (Use existing guidelines to cite characteristics or features that impact the analysis and result in a category selection)

   Category IV based on Classification Guidelines:
   - Low financial, schedule, and life safety risk
   - No plans and specs, build from engineering technician scope of work
   - No local environmental permits required

6. Risk Analysis: (Use Risk Assessment Procedure)

   - Past Performance Assessment Rating = 3.0
   - Project Risk Rating = 1.6
   - Project Risk Assessment Rating = LOW

   An independent Risk Analysis would not usually be performed on a Category IV project; however, this example is presented to illustrate the process.

7. QA Responsibilities: (Use QA Responsibility Analysis)

   In accordance with the QA Responsibilities Matrix, the PWD/ROICC office should perform QA items only by exception (as determined by the project team) due to classification of the project as Category IV.
APPENDIX D

Sample Quality Control Plan Outline

D.1 SAMPLE QUALITY CONTROL PLAN OUTLINE

This appendix provides a sample QC plan outline as shown in Figure D-1. It is the intention that construction unit personnel prepare the QC plan in conjunction with the project crew’s project planning effort to ensure early identification of essential project information and high risk QC events/activities. The QC plan, in conjunction with the QA authority’s QA plan, provides a comprehensive project-specific construction quality management plan utilized throughout the life of the project. Refer to Paragraph 3.4 for information on developing a project QC plan.
<table>
<thead>
<tr>
<th>ITEM</th>
<th>DESCRIPTION</th>
<th>RESPONSIBILITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cover Sheet</td>
<td>The cover sheet includes a table of contents with tabs for each required item in the plan.</td>
<td>QC Manager</td>
</tr>
<tr>
<td>QC Organization</td>
<td>The QC organization is depicted in chart form, showing the relationship of the QC organization to other elements of the construction unit, suppliers, and other outside organizations.</td>
<td>QC Manager</td>
</tr>
<tr>
<td>Names and Qualifications</td>
<td>The qualifications for the QC Manager and staff are required.</td>
<td>QC Manager</td>
</tr>
<tr>
<td>QC Staff Duties and Responsibilities</td>
<td>Area of responsibility and authority of each individual in the QC organization is outlined in detail.</td>
<td>QC Manager</td>
</tr>
<tr>
<td>Outside Organizations</td>
<td>Outside organizations include design agents, consultants, and subcontractors that will perform work or services for the construction unit under this project. The list should also indicate the general scope of the work or services to be performed.</td>
<td>QC Manager</td>
</tr>
<tr>
<td>Appointment Letter(s)</td>
<td>A copy of the letter appointing the QC Manager.</td>
<td>QC Manager</td>
</tr>
<tr>
<td>Submittal Procedures and Submittal Status Log</td>
<td>Procedures for reviewing all shop drawings, samples, certificates, or other submittals for contract compliance, including the name of the person(s) authorized to sign the submittals for the construction unit as complying with the contract. Includes procedures for processing submittals and responsibility for approving each submittal.</td>
<td>QC Manager</td>
</tr>
<tr>
<td>Testing Lab Information</td>
<td>A listing of testing laboratories that will be used by the construction unit and a description of the services these firms will provide, including statements of their accreditation as required by the contract.</td>
<td>QC Manager</td>
</tr>
<tr>
<td>Testing Plan and Log</td>
<td>Includes the tests required, referenced by the specification paragraph number requiring the test, the frequency, and the person responsible for each test.</td>
<td>Project Manager and Project Supervisor</td>
</tr>
<tr>
<td>Rework Items Procedure</td>
<td>Include the construction unit’s internal procedures to identify, document, track, and sign off completion of deficiencies in the construction.</td>
<td>QC Manager</td>
</tr>
<tr>
<td>Documentation Procedures</td>
<td>Procedures for documenting QC operation, inspection, and testing must be addressed and a copy of all forms and reports to be used included.</td>
<td>QC Manager</td>
</tr>
<tr>
<td>List of Definable Features of Work</td>
<td>The listing of definable features of work initiated by Project Supervisors and assigned crew leaders is validated by the QC Manager/QC Specialist during the initial creation of the Projects Level III schedule process.</td>
<td>Project Manager and Project Supervisor</td>
</tr>
<tr>
<td>Validation of the Three Phase Control Process</td>
<td>Procedures for Preparatory and Initial Phase Checklists initiated by Project Supervisors to be signed and maintained by the QC Manager are completed for each definable feature of work.</td>
<td>QC Manager</td>
</tr>
<tr>
<td>Completion Inspection Procedures</td>
<td>Outline the turnover process including assignment of responsibility for various phases of turnover.</td>
<td>QC Manager</td>
</tr>
</tbody>
</table>

Figure D-1. Unit Quality Control Plan Outline
APPENDIX E

Sample Quality Assurance Plan Outline

E.1 SAMPLE QUALITY ASSURANCE PLAN OUTLINE

This appendix provides a sample QA plan outline used by NAVFAC. The QA authority prepares the QA plan immediately after project assignment to ensure early identification of essential project information and high risk QA events/activities. The QA plan, in conjunction with the construction unit’s QC plan, provides a comprehensive project-specific construction quality management plan utilized throughout the life of the project. Refer to Paragraph 4.3.2 for information on developing project QA plans.

The following is an example of a QA plan outline:

1. Brief description of the contract
2. List of the definable features of work
3. Critical construction events
4. Design events (i.e., critical design features and/or visits that are important to the function of the contract and facility)
5. Client events (i.e., critical operational or appearance features that are imperative to the mission of the facility)
6. Supplemental QA expertise requirements
7. Critical utility outages, road closures, etc.
8. Operation and maintenance manuals listing
9. Client/PWD training
10. Field test log
References

1 GENERAL
2 DD Form 1354, Transfer and Acceptance of DOD Real Property
3 DD Form 1391, Military Construction Project Data
4 UFC 1-300-08, Criteria for Transfer and Acceptance of DOD Real Property
5 UFC 1-300-09N, Design Procedures
6 Unified Facilities Guide Specifications (UFGS)

8 JOINT PUBLICATIONS
9 JP 1-02, Department of Defense Dictionary of Military and Associated Terms
10 JP 3-34, Joint Engineer Operations

11 NAVY PUBLICATIONS
12 COMFIRSTNCDINST 4355.1, Construction Quality Program
13 NAVFAC's Business Management System, Process B-1, Design and Construction
14 NAVFAC P-307, Management of Weight Handling Equipment
16 NAVFAC Capital Improvements Engineering & Construction Bulletin, Issue No. 2007-02, Prioritizing Construction QA using the Four Categories of Work
17 NTRP 1-02, Navy Supplement to the DOD Dictionary of Military and Associated Terms
18 NTRP 4-04.2.3/TM 3-34.41/AFPAM 32-1000/MCRP 3-17.7M, Construction Estimating
19 NTRP 4-04.2.5/TM 3-34.42/AFPAM 32-1020/MCRP 3-17.7F, Construction Project Management
20 NTTP 4-04.2, Naval Construction Force Operations
21 NTTP 4-04.3, Naval Contingency Engineering Operations
22 OPNAVINST 11010.20G, Facilities Project Instruction
NTRP 4-04.2.7

1 OTHER SERVICE PUBLICATIONS

2 Army

3 EM-385-1-1, Safety and Health Requirements Manual (USACE)


6 Other

Glossary

activity (ACT). 1. A unit, organization, or installation performing a function or mission. 2. A function, mission, action, or collection of actions. (JP 1-02. Source: JP 3-0)

allocation. Distribution of limited forces and resources among competing requirements. [Specific allocations (e.g., air sorties, nuclear weapons, forces, and transportation) are described as allocation of air sorties, nuclear weapons, etc.] (JP 1-02. Source: JP 5-0)

area of responsibility (AOR). The geographical area associated with a combatant command within which a geographic combatant commander has authority to plan and conduct operations. (JP 1-02. Source: JP 1)

assign. To place units or personnel in an organization where such placement is relatively permanent, and/or where such organization controls and administers the units or personnel for the primary function, or greater portion of the functions, of the unit or personnel. (JP 1-02. Source: JP 3-0)

base. 1. A locality from which operations are projected or supported. 2. An area or locality containing installations which provide logistic or other support. 3. Home airfield or home carrier. (JP 1-02. Source: JP 4-0)

chain of command. The succession of commanding officers from a superior to a subordinate through which command is exercised. (JP 1-02. Source: 3-0)

civil engineering. Those combat support and combat service support activities that identify, design, construct, lease, or provide facilities, and that operate, maintain, and perform war damage repair and other engineering functions in support of military operations. (NTRP 1-02. Source: N/A)

component. One of the subordinate organizations that constitute a joint force. Normally, a joint force is organized with a combination of Service and functional components. (JP 1-02. Source: JP 1)

construction. 1. Any planned physical change to the existing physical environment for a positive purpose. New construction, alterations, repairs, demolition, removal, replacement of component parts, excavation, dredging, and painting are all forms of construction. 2. The erection, installation, or assembly of a new facility; the addition, expansion, extension, alteration, conversion, or replacement of an existing facility; or the relocation of a facility from one installation to another. Construction includes equipment installed in and made a part of such facilities, and related site preparation, excavation, filling, and landscaping, or other land improvements. (NTRP 1-02. Source: N/A)

continental United States (CONUS). United States territory, including the adjacent territorial waters, located within North America between Canada and Mexico. (JP 1-02. Source: N/A)

contingency. A situation requiring military operations in response to natural disasters, terrorists, subversives, or as otherwise directed by appropriate authority to protect US interests. (JP 1-02. Source: JP 5-0)

contingency operation. A military operation that is either designated by the Secretary of Defense as a contingency operation or becomes a contingency operation as a matter of law (Title 10, United States Code, Section 101(a)(13)). It is a military operation that: a. is designated by the Secretary of Defense as an operation in which members of the Armed Forces are or may become involved in military actions, operations, or hostilities against an enemy of the United States or against an opposing force; or b. is created by definition of law. Under Title 10, United States Code, Section 101 (a)(13)(B), a contingency operation exists if a military
operation results in the (1) call-up to (or retention on) active duty of members of the uniformed Services under certain enumerated statutes (Title 10, United States Code, Sections 688, 12301[a], 12302, 12304, 12305, 12406, or 331-335); and (2) the call-up to (or retention on) active duty of members of the uniformed Services under other (non-enumerated) statutes during war or national emergency declared by the President or Congress. (JP 1-02. Source: JP 1)

contacting officer. The Service member or Department of Defense civilian with the legal authority to enter into, administer, modify, and/or terminate contracts. (JP 1-02. Source: JP 4-10)

control. Authority that may be less than full command exercised by a commander over part of the activities of subordinate or other organizations. (JP 1-02. Source: JP 1)

deployment. The relocation of forces and materiel to desired operational areas. Deployment encompasses all activities from origin or home station through destination, specifically including intra-continental United States, intertheater, and intratheater movement legs, staging, and holding areas. (JP 1-02. Source: JP 4-0)

employment. The strategic, operational, or tactical use of forces. (JP 1-02. Source: JP 5-0)

facility. A real property entity consisting of one or more of the following: a building, a structure, a utility system, pavement, and underlying land. (JP 1-02. Source: 3-34)

fragmentary order (FRAGORD). An abbreviated form of an operation order issued as needed after an operation order to change or modify that order or to execute a branch or sequel to that order. (JP 1-02. Source: JP 5-0)

general engineering (GE). Those engineering capabilities and activities, other than combat engineering, that modify, maintain, or protect the physical environment. (JP 1-02. Source: JP 3-34)

hazardous material. Any material that because of its quantity, concentration, or physical or chemical characteristics may pose a substantial hazard to human health or to the environment when released. (NTRP 1-02. Source: N/A)

inspection. Examinations for compliance with applicable laws and regulations. (NTRP 1-02. Source: N/A)

joint force. A general term applied to a force composed of significant elements, assigned or attached, of two or more Military Departments operating under a single joint force commander. (JP 1-02. Source: JP 3-0)

joint publication (JP). A publication containing joint doctrine that is prepared under the direction and authority of the Chairman of the Joint Chiefs of Staff and applies to all Armed Forces of the United States. (JP 1-02. Source: CJCSI 5120.02)

liaison. That contact or intercommunication maintained between elements of military forces or other agencies to ensure mutual understanding and unity of purpose and action. (JP 1-02. Source: JP 3-08)

military construction (MILCON). Any construction, alteration, development, conversion, or extension of any kind carried out with respect to a military installation. (JP 1-02. Source: JP 3-34)

mission. 1. The task, together with the purpose, that clearly indicates the action to be taken and the reason therefore. 2. In common usage, especially when applied to lower military units, a duty assigned to an individual or unit; a task. (JP 1-02. Source: JP 3-0)
mobilization (MOB). 1. The act of assembling and organizing national resources to support national objectives in time of war or other emergencies. 2. The process by which the Armed Forces or part of them are brought to a state of readiness for war or other national emergency. This includes activating all or part of the Reserve Component as well as assembling and organizing personnel, supplies, and matériel. Mobilization of the Armed Forces includes but is not limited to the following categories: a. selective mobilization - Expansion of the active Armed Forces resulting from action by Congress and/or the President to mobilize Reserve Component units, Individual Ready Reservists, and the resources needed for their support to meet the requirements of a domestic emergency that is not the result of an enemy attack. b. partial mobilization - Expansion of the active Armed Forces resulting from action by Congress (up to full mobilization) or by the President (not more than 1,000,000 for not more than 24 consecutive months) to mobilize Ready Reserve Component units, individual reservists, and the resources needed for their support to meet the requirements of a war or other national emergency involving an external threat to the national security. c. full mobilization - Expansion of the active Armed Forces resulting from action by Congress and the President to mobilize all Reserve Component units and individuals in the existing approved force structure, as well as all retired military personnel, and the resources needed for their support to meet the requirements of a war or other national emergency involving an external threat to the national security. Reserve personnel can be placed on active duty for the duration of the emergency plus six months. d. total mobilization - Expansion of the active Armed Forces resulting from action by Congress and the President to organize and/or generate additional units or personnel beyond the existing force structure, and the resources needed for their support, to meet the total requirements of a war or other national emergency involving an external threat to the national security. (JP 1-02. Source: JP 4-05)

naval construction force (NCF). The combined construction units of the Navy that are part of the operating forces and represent the Navy’s capability for advanced base construction. (JP 1-02. Source: JP 3-34)

operation. 1. A series of tactical actions with a common purpose or unifying theme. 2. A military action or the carrying out of a strategic, operational, tactical, service, training, or administrative military mission. (JP 1-02. Source: JP 3-0)

operation and maintenance (O&M). Maintenance and repair of real property, operation of utilities, and provision of other services such as refuse collection and disposal, entomology, snow removal, and ice alleviation. (JP 1-02. Source: JP 3-34)

operational area (OA). An overarching term encompassing more descriptive terms (such as area of responsibility and joint operations area) for geographic areas in which military operations are conducted. See also area of responsibility. (JP 1-02. Source: 3-0)

operation order (OPORD). A directive issued by a commander to subordinate commanders for the purpose of effecting the coordinated execution of an operation. (JP 1-02. Source: JP 5-0)

operational environment (OE). A composite of the conditions, circumstances, and influences that affect the employment of capabilities and bear on the decisions of the commander. (JP 1-02. Source: JP 3-0)

personnel. Those individuals required in either a military or civilian capacity to accomplish the assigned mission. (JP 1-02. Source: N/A)

petroleum, oils, and lubricants (POL). A broad term that includes all petroleum and associated products used by the Armed Forces. (JP 1-02. Source: JP 4-01.6)

quality assurance (QA). A planned and systematic pattern of all actions necessary to provide confidence that adequate technical requirements are established, that products and services conform to those requirements, and that satisfactory performance is achieved. (NTRP 1-02. Source: N/A)
real property. Lands, buildings, structures, utilities systems, improvements, and appurtenances, thereto that includes equipment attached to and made part of buildings and structures, but not movable equipment. (JP 1-02. Source: JP 3-34)

redeployment. The transfer of forces and materiel to support another joint force commander’s operational requirements, or to return personnel, equipment, and materiel to the home and/or demobilization stations for reintegration and/or out-processing. See also deployment. (JP 1-02. Source: JP 3-35)

request for information (RFI). 1. Any specific time-sensitive ad hoc requirement for intelligence information or products to support an ongoing crisis or operation not necessarily related to standing requirements or scheduled intelligence production. A request for information can be initiated to respond to operational requirements and will be validated in accordance with the combatant command's procedures. 2. The National Security Agency/Central Security Service uses this term to state ad hoc signals intelligence requirements. (JP 1-02. Source: JP 2-0)

resources. The forces, materiel, and other assets or capabilities apportioned or allocated to the commander of a unified or specified command. (JP 1-02. Source: N/A)

standard operating procedure (SOP). A set of instructions covering those features of operations which lend themselves to a definite or standardized procedure without loss of effectiveness. The procedure is applicable unless ordered otherwise. (JP 1-02. Source: JP 3-31)

support. 1. The action of a force that aids, protects, complements, or sustains another force in accordance with a directive requiring such action. 2. A unit that helps another unit in battle. 3. An element of a command that assists, protects, or supplies other forces in combat. (JP 1-02. Source: JP 1)

supported unit. As related to contracted support, a supported unit is the organization that is the recipient, but not necessarily the requester of, contractor-provided support. (JP 1-02. Source: JP 4-10)

theater. The geographical area for which a commander of a geographic combatant command has been assigned responsibility. (JP 1-02. Source: JP 1)

United States (US). Includes the land area, internal waters, territorial sea, and airspace of the United States, including the following: a. US territories, possessions, and commonwealths; and b. Other areas over which the US Government has complete jurisdiction and control or has exclusive authority or defense responsibility. (JP 1-02. Source: N/A)

warning order (WARNORD). 1. A preliminary notice of an order or action that is to follow. 2. A planning directive that initiates the development and evaluation of military courses of action by a supported commander and requests that the supported commander submit a commander's estimate. 3. A planning directive that describes the situation, allocates forces and resources, establishes command relationships, provides other initial planning guidance, and initiates subordinate unit mission planning. (JP 1-02. Source: JP 5-0)
# List of Acronyms and Abbreviations

<table>
<thead>
<tr>
<th></th>
<th><strong>Acronym</strong></th>
<th><strong>Description</strong></th>
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<tbody>
<tr>
<td>1</td>
<td>AFCESA</td>
<td>Air Force Civil Engineering Support Agency</td>
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<td>2</td>
<td>AFPAM</td>
<td>Air Force pamphlet</td>
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<td>3</td>
<td>AT/FP</td>
<td>antiterrorism/force protection</td>
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<td>4</td>
<td>BOM</td>
<td>bill of materials</td>
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<td>5</td>
<td>CNIC</td>
<td>Commander, Navy Installations Command</td>
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<tr>
<td>6</td>
<td>CO</td>
<td>commanding officer</td>
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<tr>
<td>7</td>
<td>COMFIRSTNCD</td>
<td>Commander, First Naval Construction Division</td>
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<tr>
<td>8</td>
<td>COMFIRSTNCDINST</td>
<td>Commander, First Naval Construction Division instruction</td>
</tr>
<tr>
<td>9</td>
<td>CONUS</td>
<td>continental United States</td>
</tr>
<tr>
<td>10</td>
<td>DD</td>
<td>Department of Defense (form)</td>
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<tr>
<td>11</td>
<td>DOD</td>
<td>Department of Defense</td>
</tr>
<tr>
<td>12</td>
<td>FEAD</td>
<td>facilities engineering and acquisition division</td>
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<tr>
<td>13</td>
<td>FRAGORD</td>
<td>fragmentary order</td>
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<tr>
<td>14</td>
<td>GFE</td>
<td>government-furnished equipment</td>
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<tr>
<td>15</td>
<td>GFM</td>
<td>government-furnished material</td>
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<tr>
<td>16</td>
<td>HHQ</td>
<td>higher headquarters</td>
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<tr>
<td>17</td>
<td>HVAC</td>
<td>heating, ventilation, and air conditioning</td>
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<tr>
<td>18</td>
<td>JP</td>
<td>joint publication</td>
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<tr>
<td>19</td>
<td>LEED</td>
<td>Leadership in Energy and Environmental Design</td>
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<td>20</td>
<td>MCRP</td>
<td>Marine Corps reference publication</td>
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<tr>
<td>21</td>
<td>MILCON</td>
<td>military construction</td>
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<tr>
<td>22</td>
<td>NAVFAC</td>
<td>Naval Facilities Engineering Command</td>
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<tr>
<td>23</td>
<td>NAVFACLANT</td>
<td>Naval Facilities Engineering Command, Atlantic</td>
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<tr>
<td>24</td>
<td>NAVFACPAC</td>
<td>Naval Facilities Engineering Command, Pacific</td>
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<tr>
<td>Acronym</td>
<td>Definition</td>
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<tr>
<td>NCF</td>
<td>naval construction force</td>
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<td>NCR</td>
<td>naval construction regiment</td>
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<tr>
<td>NTRP</td>
<td>Navy tactical reference publication</td>
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<tr>
<td>NTTP</td>
<td>Navy tactics, techniques, and procedures</td>
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<tr>
<td>OA</td>
<td>operational area</td>
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<tr>
<td>OMSI</td>
<td>Operation and Maintenance Support Information</td>
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<td>OPNAVINST</td>
<td>Chief of Naval Operations instruction</td>
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<tr>
<td>OPORD</td>
<td>operation order</td>
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<tr>
<td>POA&amp;M</td>
<td>plan of action and milestones</td>
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<tr>
<td>POL</td>
<td>petroleum, oils, and lubricants</td>
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<td>PW</td>
<td>public works</td>
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<tr>
<td>PWD</td>
<td>public works department</td>
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<td>PWO</td>
<td>public works officer</td>
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<td>QA</td>
<td>quality assurance</td>
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<td>QC</td>
<td>quality control</td>
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<tr>
<td>RFI</td>
<td>request for information</td>
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<td>ROICC</td>
<td>resident officer in charge of construction</td>
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<tr>
<td>SOP</td>
<td>standard operating procedure</td>
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<tr>
<td>TM</td>
<td>technical manual</td>
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<tr>
<td>UFC</td>
<td>Unified Facilities Criteria</td>
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<tr>
<td>UFGS</td>
<td>unified facilities guide specifications</td>
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<tr>
<td>US</td>
<td>United States</td>
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<tr>
<td>USACE</td>
<td>United States Army Corps of Engineers</td>
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<tr>
<td>USN</td>
<td>United States Navy</td>
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</tr>
<tr>
<td>WARNORD</td>
<td>warning order</td>
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