# PREPARING THE U.S. ARMY CORPS OF ENGINEERS FOR FUTURE PANDEMIC RESPONSE OPERATIONS: A CASE STUDY OF ALTERNATE CARE FACILITY SUPPORT DURING THE COVID-19 PANDEMIC

A thesis presented to the Faculty of the U.S. Army Command and General Staff College in partial fulfillment of the requirements for the degree

MASTER OF MILITARY ART AND SCIENCE
General Studies

by

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In March 2020, the U.S. Army Corps of Engineers (USACE) was tasked to support national COVID-19 response efforts, with a primary focus on implementation of Alternate Care Facilities (ACFs). Despite USACE receiving overwhelmingly positive public response for its efforts, several states discontinued services with USACE in favor of working with private firms. Acknowledging that some states may have perceived issues with USACE services, the purpose of this study was to provide a rich description of the organization's performance of ACF tasks to identify capability gaps and generate solutions to prepare for future pandemic response operations. Employing the Applied Professional Case Study methodology and analyzing nearly 7,000 pages of USACE After Actions Reports, this study developed an expansive assessment of USACE enterprise performance of ACF site assessment, engineering and design, and contracting tasks, while identifying capability gaps and generating solution approaches to prepare USACE for effective ACF operations in a future pandemic event.

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The opinions and conclusions expressed herein are those of the student author and do not necessarily represent the views of the U.S. Army Command and General Staff College or any other governmental agency. (References to this study should include the foregoing statement.)

ABSTRACT

PREPARING THE U.S. ARMY CORPS OF ENGINEERS FOR FUTURE PANDEMIC RESPONSE OPERATIONS: A CASE STUDY OF ALTERNATE CARE FACILITY SUPPORT DURING THE COVID-19 PANDEMIC, by MAJ Henry G. Harpen, 264 pages.

In March 2020, the U.S. Army Corps of Engineers (USACE) was tasked to support national COVID-19 response efforts, with a primary focus on implementation of Alternate Care Facilities (ACFs). Despite USACE receiving overwhelmingly positive public responses from elected officials and media for the unprecedented work performed, several states—most notably, New York State with its New York City operations—discontinued services with USACE in favor of constructing ACFs directly with private firms. Acknowledging that some states may have perceived issues or challenges with the performance of tasks by USACE, the purpose of this study was to provide the Chief of Engineers, as the Chief Decision Maker within the U.S. Army Corps of Engineers, with a rich description of the organization's performance of ACF tasks during the COVID-19 pandemic in order to identify capability gaps and generate solutions to prepare for future pandemic response operations.

This research employed the Applied Professional Case Study methodology, leveraging the U.S. Army's Capabilities-Based Assessment as its governing process and the associated DOTMLPF-P domains as its primary model. The primary data collection method was document analysis of nearly 7,000 pages of USACE After Actions Reports, reflecting the observations of USACE Headquarters and each of its nine subordinate divisions.

Ultimately, this study developed an expansive assessment of USACE enterprise performance of ACF site assessment, engineering and design, and contracting tasks during COVID-19 emergency response operations, while concurrently identifying capability gaps in USACE's ability to respond to a future pandemic event. Generating solutions to these identified capability gaps across the DOTMLPF-P domains, this study formulated a comprehensive response to the question of how USACE should prepare itself for effective support to ACF operations in future pandemic events.

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To the members of USACE, serving in and out of uniform, who responded to my constant stream of e-mails searching for documents to inform this research, thank you for your support to ensuring that USACE—a phenomenal, world-class organization—continues to provide phenomenal, world-class engineering support in the service of the United States of America.

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ACRONYMS

| | |
|---|---|
| ACF | Alternate Care Facility |
| DFA | Direct Federal Assistance |
| EOC | Emergency Operations Center |
| ESF | Emergency Support Function |
| FEMA | Federal Emergency Management Agency |
| HHS | Department of Health and Human Services |
| HQ | Headquarters |
| LRD | Great Lakes & Ohio River Division |
| MA | Mission Assignment |
| MVD | Mississippi Valley Division |
| NAD | North Atlantic Division |
| NWD | Northwestern Division |
| POD | Pacific Ocean Division |
| PWS | Performance Work Statement |
| PRT | Planning and Response Team |
| ROM | Rough Order of Magnitude |
| SAD | South Atlantic Division |
| SPD | South Pacific Division |
| SWD | Southwestern Division |
| UCA | Undefinitized Contract Action |
| USACE | U.S. Army Corps of Engineers |

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# CHAPTER 1

# INTRODUCTION

## Overview

Introducing the study, this chapter describes the nature of the U.S. Army Corps of Engineers (USACE) problem under investigation, justifies the significance of the problem and the corresponding research process, and frames the organization and intent of the overall research study. This chapter is organized into background, problem statement, purpose of the study, and statement of research questions. Subsequently, this chapter outlines the scope, assumptions, literature review, methodology, limitations and delimitations, and definition of terms. This chapter ends with treatment of the significance of the study and a summary of the provided information.

## Background

In March 2020, USACE was tasked to support national COVID-19 response efforts, with a primary focus on implementation of Alternate Care Facilities (ACFs). These facilities are defined by the U.S. Department of Health and Human Services (HHS) as non-medical facilities such as convention centers, hotels, or college dormitories that are temporarily converted into medical facilities during public health emergencies.[1] Operating through Mission Assignments (MAs) issued by the Federal Emergency Management Agency (FEMA) and coordinating directly with state governments, USACE provided the following engineering services:

1. Site Assessments. USACE provided site assessment services to investigate facilities potentially suitable for conversion into ACFs.

2. Engineering and Design. USACE provided standardized Engineering and Design products for ACFs through its Medical Facilities Center of Expertise. USACE also provided site-specific Engineering and Design products (i.e., Plans and Specifications) through individual districts supporting regionally aligned localities.

3. Contracting. USACE provided contracting services for construction of ACFs, employing contractors meeting federal and USACE qualifications.

Beginning in March 2020 and concluding in June 2020, USACE executed these engineering services in support of ACF operations across 50 states and 5 territories, with over 500 personnel deployed and 500 additional personnel supporting remotely.[2] Ultimately, USACE completed over 1,100 site assessments, drafted engineering and design documents for over 60 proposed facilities, awarded 38 facilities contracts, and managed the construction of the 38 awarded facilities contracts.[3]

Despite overwhelmingly positive public responses from elected officials and media for the unprecedented work performed, USACE documented challenges in maintaining state support for the conduct of continued engineering tasks. After receiving the full range of USACE services early in the COVID-19 response efforts, several states—most notably, New York State with its New York City operations—discontinued services with USACE in favor of constructing ACFs directly with private firms.

When conducting large-scale engineering and construction projects, this competitive disadvantage to another company can be described in terms of the "Triple Constraint" of time, cost, and scope.[4] If customers perceive challenges or issues with the conduct of services, the underlying justification is generally rooted in the services not being performed quickly enough (or services not being started early enough), the cost of

services being too expensive, and/or the scope of work provided not meeting the requirements of the customer. In the case of USACE's performance during the COVID-19 pandemic, the discontinuation of services by states in favor of working with other firms suggests that states perceived challenges or issues with some or all of these time, cost, and scope considerations in regard to some or all of the engineering tasks performed.

When operations costs are shared between federal and state governments, states have significant latitude to choose whether to work with USACE on emergency engineering tasks. While USACE possesses outstanding engineering capabilities and proven emergency operations prowess, in order to support the nation effectively in future pandemic events the organization must identify and address any shortfalls related to states discontinuing USACE support during COVID-19 emergency response operations.

With this contextual background, a problem statement was developed to bound and describe the problem addressed within this study.

## Problem Statement

Over the course of COVID-19 emergency response operations, states discontinued or reduced the scope of USACE engineering efforts in support of ACF operations. As states continued to request these engineering efforts from other firms, the nature of the situation implies that states may have perceived challenges or issues with the USACE performance of some or all of the engineering tasks in terms of time, cost, and/or scope factors. These challenges or issues may impact the ability of USACE to support states in future pandemic events. Therefore, considering the factors of cost, time

and scope, what changes should USACE make to enable support for states in ACF operations during future pandemic events?

## Purpose of the Research

The purpose of this study is to provide the Chief of Engineers, as the Chief Decision Maker within the U.S. Army Corps of Engineers, with a rich description of the organization's performance of Alternate Care Facilities tasks during the COVID-19 pandemic in order to identify capability gaps and subsequently generate solutions to bridge these gaps. This study recognizes that the primary concern of the Chief of Engineers is the accomplishment of USACE's mission to "Deliver vital public and military engineering services; partnering in peace and war to strengthen our Nation's security, energize the economy, and reduce risks from disasters."[5] Within the scope of this study, the primary concern of the Chief of Engineers translates into accomplishing the mission to "Deliver public engineering services; partnering to reduce risks from disasters." Further reinforcing this message, during a White House Press Briefing in April 2020, the Chief of Engineers LTG Todd Semonite stated, of the Alternate Care Facilities, "You got to be able to get the mission essential done. Lives are on the line here, and we've got to be able to get everything done to be able to save those lives."[6] With consideration for the primary concern of the Chief Decision Maker, this study makes recommendations—based on the solutions generated to identified capability gaps—to the Chief of Engineers to assist with preparing the U.S. Army Corps of Engineers for effective Alternate Care Facilities operations in a future pandemic event. With these objectives at the forefront and in consideration of the problem statement, the primary research question and supporting secondary research questions were developed.

## Research Questions

### Primary Research Question

To address the purpose of this study, the following Primary Research Question was investigated:

How should the U.S. Army Corps of Engineers prepare itself for effective support to Alternate Care Facility operations in future pandemic events, with consideration for the factors of time, cost, and scope, in order to provide state governments with necessary services and facilities?

### Secondary Research Questions

To support the development of solutions for the Primary Research Question, the following Secondary Research Questions were explored:

1. During COVID-19 emergency response operations, how successfully did USACE provide states with site assessment services, in consideration of time, cost, and scope factors?
2. During COVID-19 emergency response operations, how successfully did USACE provide states with Engineering and Design services, in consideration of time, cost, and scope factors?
3. During COVID-19 emergency response operations, how successfully did USACE provide states with Contracting services, in consideration of time, cost, and scope factors?

## Scope

To define the boundaries of the investigation used to address the problem and stated research questions, the scope of the study is defined as follows:

Period of Time Included in Study: The study concerns itself with the four-month period of time between 01 March 2020 and 30 June 2020, which encompasses the time period in which USACE conducted significant support to ACF operations.

Groups or Institutions Whose Experiences Were Investigated: To determine the performance of key tasks during the COVID-19 pandemic, the experiences of USACE Headquarters and eight of the nine USACE subordinate divisions (the Transatlantic Division excluded) were investigated in detail.

## Assumptions

The following assumptions were identified and justified during the conduct of this research study:

1. Cost-sharing of emergency operations will remain a federal policy and, correspondingly, cost of services will remain a concern for states in future pandemic response operations. This assumption is justified for the purposes of this research because the cost-sharing system during national emergencies is well-established, with no expected termination.

2. After Action Reports, conducted USACE Headquarters and subordinate divisions, accurately reflect the successes and challenges/issues experienced by USACE. This assumption is justified because USACE, as an Army organization, employs the After Actions Report process as a learning tool to sustain positive performance and honestly assess areas requiring improvement.

3. Alternate Care Facilities will remain necessary in future pandemic response operations. This assumption is justified because a future pandemic event, of the COVID-19 variety, will once again overburden state hospital systems, and the construction and operation of additional permanent hospital facilities is not feasible. Currently converted Alternate Care Facilities cannot remain in converted status indefinitely due to cost, as these facilities are convention centers, hotels, and college dormitories. Even site assessments at sites previously assessed will require new site assessments to verify the actual condition of the sites at the time of necessity. Contracting services are always an on-order need.

## Literature Review

To inform the study's research methodology, literature review was conducted into the following topic areas:

1. Background and Context, to increase breadth and depth of understanding.
2. USACE role in emergency operations.
3. State responsibilities and requirements in Alternate Care Facilities operations.
4. USACE support to Alternate Care Facilities operations.
5. USACE capabilities and considerations, across the DOTMLPF-P domains, as related to the conduct of site assessments, engineering and design, and contracting.

Informed by the information gained through literature review, the research methodology was developed.

## Methodology

The specific research methodology employed by this study is the Applied Professional Case Study (APCS) methodology. The APCS methodology is a variant of the Case Study qualitative research methodology that integrates a specific field's professional body of knowledge (i.e., professional) with the specific goal of informing and recommending practical improvements in the field (i.e., applied).[7] With reference to the professional body of knowledge, APCS methodology employs a professional field's concepts, models, and processes in order to be systematic, deliberate, and persuasive to the Chief Decision Makers within that professional field.[8]

This application of the APCS methodology employed a Capabilities-Based Assessment as its governing process, the DOTMLPF-P domains as its primary model, and both Green-Amber-Red-Black and Feasible-Acceptable-Suitable evaluation criteria to inform and make recommendations to the U.S. Army Chief of Engineers as Chief Decision Maker for USACE. The primary data collection method was document analysis of USACE-internal documents regarding COVID-19 operations, requested from USACE and received by the researcher. These primary source documents consist of nearly 7,000 pages of After Action Reports, produced by USACE Headquarters, each of the 9 subordinate divisions, and 22 subordinate districts. The Qualitative Research tradition's primary data analysis techniques of summarizing, categorizing, and interpreting were applied to determine significant successes and challenges/issues related to ACF key tasks—in consideration of time, cost, and scope factors—as documented by USACE Headquarters and each of the eight subordinate divisions. The researcher then identified recurring themes and significant generalizable observations to generate an enterprise-

level assessment. With this enterprise-level assessment, the researcher determined enterprise-level capability gaps. Ultimately, the researcher generated solutions to address these capability gaps, through consideration of the DOTMLPF-P domains.

## Limitations

The following limitations were identified and justified during the conduct of this research study:

1. Approximately 10-month time period in which to conduct and finalize the research study.

2. Qualitative Research results and outcomes cannot be generalized to the population at large due to the non-statistical methods of analysis employed.

## Delimitations

The following delimitations were developed and justified during the conduct of this research study:

1. Data collection will be limited to files already on-hand with USACE Headquarters and subordinate units. This delimitation makes data collection and subsequent analysis feasible within the available research timeframe. As USACE systematically conducted and documented its After Action Reports from COVID-19 response operations, this data should provide a meaningful basis for conclusions and recommendations.

2. Document analysis will exclude information provided by the Transatlantic Division. As this division's area of operations is external to the United States, it did

not conduct any site assessments, engineering and design, or contracting services relevant to this study.

3. DOTLP (i.e., Doctrine-Organization-Training-Leadership-Personnel) will be specifically applied as opposed to the full DOTMLPF-P because the researcher, being familiar with USACE and emergency response operations, has determined that MF-P (i.e., Materiel-Facilities-Policy) solutions are not likely to be appropriate for this problem. Eliminating these from the onset narrows the focus, saving valuable time for more meaningful analysis.

## Definition of Terms

The following definitions are provided to ensure uniformity and understanding of the terms throughout the study. The researcher developed all definitions not accompanied by a citation.

Chief of Engineers: The Chief of Engineers of the U.S. Army. This position is held by a Lieutenant General who simultaneously serves as the chief engineer advisor to the Chief of Staff of the Army and the commander of the U.S. Army Corps of Engineers organization.

Alternate Care Facilities: Non-medical facilities such as convention centers, hotels, or college dormitories that are temporarily converted into medical facilities during public health emergencies.[9] These facilities are also known as "Alternate Care Sites." These facilities are also occasionally referred to as "field hospitals," although this term is not supported by HHS or USACE because of its technical inaccuracy.

Time: All duration-related criteria for a given engineering task; this includes total duration of the task, duration of actual work, and the date a task can begin. This is frequently used interchangeably with the term "schedule" during the study.

Cost: All costs associated with performance of a given engineering task. This includes the direct costs of the task and also the impact on overall costs for ACF operations (e.g., if the performance of a task results in higher or lower costs during conduct of a later task).

Scope: For the purposes of this research study, the concept of scope encompasses the details, plans, and specifications of work (i.e., classical concept of scope) and also the quality of work performed.

Site Assessment: For the purposes of this research study, this term encompasses (in addition to the general description provided above) the work to plan and execute site assessments until final submission of a site assessment report to the requesting stakeholder. This term includes, for example, cost engineer work to generate cost estimates for inclusion with the site assessment report.

Engineering and Design: For the purposes of this research study, this term encompasses (in addition to the general description provided above) the engineering tasks performed after submittal of a site assessment report and before award of a construction contract. This term includes, for example, development of the engineering Plans and Specifications, Performance Work Statement (PWS), and working cost estimates. Of note, this term does not include development of the Independent Government Estimate (IGE) for cost, which—although prior to contract award—is generated specifically to inform the award of a construction contract.

Contracting: For the purposes of this research study, this term encompasses (in addition to the general description provided above) all tasks performed after contract award, including any engineering design occurring during construction and the management and oversight of construction being performed by contractors.

States: For the purposes of word economy, the term "states" is used to refer to U.S. states, Washington, D.C., and the five U.S. territories of American Samoa, Guam, the Northern Mariana Islands, Puerto Rico, and the U.S. Virgin Islands.

## Significance of the Study

USACE can provide significant capability to the Nation in future pandemic response operations, but state requests for USACE support rely on the organization understanding its capabilities, communicating these capabilities appropriately, and managing expectations of time, cost, and scope. The analysis, conclusions, and corresponding recommendations of this research will allow USACE to prepare for and serve the nation effectively in future pandemics, with the result being American lives saved. If USACE does not learn from its experiences during the early months of COVID-19 response operations, the organization risks the following:

1. States choosing not to request USACE support in a future pandemic event, despite the capability of USACE to provide superior outcomes reliably in emergency response operations, particularly when compared with private companies that have not previously conducted emergency response operations of any kind.

2. States experiencing challenges and issues in a future pandemic event with USACE conduct of ACF tasks in terms of time, cost, or scope.

## Summary

This chapter presented contextual background and defined the study's problem statement. This chapter defined the purpose of the study to inform and make recommendations to the Chief of Engineers. The study's Primary Research Question is "How should the U.S. Army Corps of Engineers prepare itself for effective support to Alternate Care Facility operations in future pandemic events, with consideration for the factors of time, cost, and scope, in order to provide state governments with necessary services and facilities?" The study's Secondary Research Questions investigate how successfully USACE performed its tasks during COVID-19 pandemic response operations, in consideration of the factors of time, cost, and scope. This chapter additionally outlined the scope, assumptions, literature review, methodology, limitations and delimitations, and definition of terms before reinforcing the significance of the study. Chapter 2 presents the review of literature related to the problem being investigated.

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[1] U.S. Army Corps of Engineers (USACE), "Alternate Care Sites Retrofitting Guidance," USACE Headquarters, last modified 2020, accessed September 14, 2020, https://www.usace.army.mil/coronavirus/alternate-care-sites/.

[2] U.S. Army Corps of Engineers (USACE), "USACE COVID-19 Response Efforts," USACE Headquarters, last modified 2020, accessed September 22, 2020, https://www.usace.army.mil/coronavirus/.

[3] Ibid.

[4] Project Management Institute, *A Guide to the Project Management Body of Knowledge (PMBOK® Guide)*, 4th ed. (Newtown Square, PA: Project Management Institute, 2008).

[5] U.S. Army Corps of Engineers (USACE), "Mission and Vision," USACE Headquarters, last modified 2020, accessed September 28, 2020, https://www.usace.army.mil/About/Mission-and-Vision/.

[6] Donald J. Trump, "Remarks by President Trump, Vice President Pence, and Members of the Coronavirus Task Force in Press Briefing," Press Briefing, The White House, April 7, 2020. Accessed September 28, 2020. https://www.whitehouse.gov/briefings-statements/remarks-president-trump-vice-president-pence-members-coronavirus-task-force-press-briefing-29/.

[7] Dr. Kenneth E. Long, "Emerging Best Practices from Applied Professional Case Study Research," (PowerPoint presentation, U.S. Army Command and General Staff College, Fort Leavenworth, KS, n.d.).

[8] Ibid.

[9] USACE, "Alternate Care Sites Retrofitting Guidance."

# CHAPTER 2

# LITERATURE REVIEW

## Chapter Introduction

### Overview

With the problem statement and research purpose provided in chapter 1, this chapter seeks to summarize and evaluate existing relevant literature related to the research topic. As this study concerns itself with an unprecedented—and currently ongoing—pandemic, however, meaningful literature of the analytical variety in regard to this specific topic is currently scarce. With that said, valuable factual information is available to generate breadth and depth towards a deep understanding of the case's background and context. Additionally, the information specifically required to understand USACE's role in emergency operations, state requirements during the COVID-19 pandemic, and USACE's role during the COVID-19 pandemic is also available through reputable federal government sources. This literature review seeks to compile and evaluate this existing information in order to support the study's research methodology.

### Purpose of the Research

The purpose of this study is to provide the Chief of Engineers, as the Chief Decision Maker within the U.S. Army Corps of Engineers, with a rich description of the organization's performance of Alternate Care Facilities tasks during the COVID-19 pandemic in order to identify capability gaps and subsequently generate solutions to bridge these gaps. This study makes recommendations—based on the solutions generated to identified capability gaps—to the Chief of Engineers to assist with preparing the U.S.

Army Corps of Engineers for effective Alternate Care Facilities operations in a future pandemic event. With these objectives at the forefront and in consideration of the problem statement, the primary research question and supporting secondary research questions were developed.

## Primary Research Question

How should the U.S. Army Corps of Engineers prepare itself for effective support to Alternate Care Facility operations in future pandemic events, with consideration for the factors of time, cost, and scope, in order to provide state governments with necessary services and facilities?

## Secondary Research Questions

To support the development of solutions for the Primary Research Question, the following Secondary Research Questions were explored:

1. During COVID-19 emergency response operations, how successfully did USACE provide states with site assessment services, in consideration of time, cost, and scope factors?
2. During COVID-19 emergency response operations, how successfully did USACE provide states with Engineering and Design services, in consideration of time, cost, and scope factors?
3. During COVID-19 emergency response operations, how successfully did USACE provide states with Contracting services, in consideration of time, cost, and scope factors?

Orienting toward these stated research questions, comprehensive literature review was conducted.

## Background and Contextual Literature

Review of background and contextual literature provided breadth and depth of understanding for the researcher, and the synthesis and communication of these findings also serves the purpose of facilitating education for the reader who may be unfamiliar with the role of USACE in the COVID-19 emergency response operations.

The U.S. Department of Defense (DoD) published a detailed timeline of the department's activities in regard to the COVID-19 pandemic.[1] To provide contextual background over the duration of the research study's scope (i.e., the beginning of March 2020 through the end of June 2020), the researcher identified key events in the timeline that are relevant to USACE's role specifically during COVID-19 emergency response operations.[2] See table 1 below.

Table 1. Key Events Timeline, USACE COVID-19 Response

| Date | Event |
|---|---|
| March 13, 2020 | POTUS declares a national emergency related to the COVID-19 pandemic. |
| March 18, 2020 | POTUS activates FEMA National Response Coordination Center. |
| March 23, 2020 | DoD approves FEMA request for USACE assistance. USACE immediately establishes a fusion cell. |
| March 24, 2020 | DoD approves FEMA request for USACE assistance in establishing an ACF in Washington state. |
| March 27, 2020 | As of this date, USACE has completed site assessments for 114 facilities across 50 states and 5 territories as possible ACFs. |
| March 28, 2020 | FEMA requests assistance for USACE to establish an ACF in New Jersey. |
| March 30, 2020 | As of this date, USACE is actively conducting 8 FEMA MAs at a total cost of over $1.0 billion, with over 1,100 personnel deployed or supporting remotely. |
| | As of this date, USACE has activated 44 emergency operations centers (EOCs) across the country to command and control COVID-19 response operations. |
| | As of this date, USACE has conducted 218 site assessments of possible ACFs. |
| | As of this date, USACE has awarded 3 contracts for ACFs. |
| March 31, 2020 | As of this date, the Javits Center ACF in New York City began receiving patients. |
| April 2, 2020 | As of this date, USACE has conducted site assessments at 308 hotels and 365 arenas/convention centers. |
| April 3, 2020 | As of this date, USACE is actively conducting 15 FEMA MAs at a total cost of $1.2 billion, with over 1,500 personnel deployed or supporting remotely. |
| April 6, 2020 | As of this date, USACE establishes ACFs in Seattle, WA and New Orleans, LA |
| May 1, 2020 | As of this date, the Javits Center ACF discharged its last patients as the number of patients in New York City hospitals decreased. |

*Source:* Created by author.

Congruent with the event timeline above, USACE was tasked in March 2020 to support national COVID-19 response efforts, with a primary focus on implementation of ACFs. These facilities are defined by the U.S. Department of Health and Human Services as non-medical facilities such as convention centers, hotels, or college dormitories that are temporarily converted into medical facilities during public health emergencies.[3] Operating through MAs issued by FEMA and coordinating directly with state governments, USACE provided the following engineering services:

1. Site Assessments. USACE provided site assessment services to investigate facilities potentially suitable for conversion into ACFs.

2. Engineering and Design. USACE provided standardized Engineering and Design products for ACFs through its Medical Facilities Center of Expertise. USACE

also provided site-specific Engineering and Design products (i.e., Plans and Specifications) through individual districts supporting regionally aligned localities.

3. Contracting. USACE provided contracting services for construction of ACFs, using Department of Defense approved contractors. The Congressional Research Service documented that USACE "awarded some contracts using full and open competition, whereas others were not competed due to the urgency for the [ACF]."[4]

Reviewing USACE's documentation of its completed work between 01 March 2020 and 30 June 2020, USACE executed these engineering services in support of ACF operations across 50 states and 5 territories, with over 500 personnel deployed and 500 additional personnel supporting remotely.[5] Ultimately, USACE completed over 1,100 site assessments, drafted engineering and design documents for over 60 proposed facilities, awarded 38 facilities contracts, and conducted oversight for the construction of the 38 awarded facilities contracts.[6]

With that said, the Congressional Research Service noted that, while USACE played a major role in ACF operations during this time period, "Some governors have acted independently, using USACE's site assessments and designs but contracting directly for [ACF] conversions."[7]

## USACE Role in Emergency Operations

Re-orienting towards specific literature review requirements after conducting background and contextual literature review in the previous section, this section of the literature review is intended to establish what roles and tasks USACE performs in emergency operations. FEMA—as the U.S. federal government's primary emergency management agency—notes that USACE is the only organization within the DoD that

can perform emergency response in a primary role.[8] Operating under the authority of Public Law 84-99, USACE has its own authority to respond directly to flooding or coastal emergencies in support of state or local governments.[9] While flood control emergency management is not directly applicable to ACF operations in pandemic response efforts, this primary emergency management role results in USACE being an organization that is highly experienced and extremely competent at the management of emergency operations. Also relevant to the discussion of USACE in emergency operations, USACE enterprise comprises eight subordinate divisions (excepting the Transatlantic Division, the ninth division, which operates outside the United States), themselves sub-divided into 38 districts (excepting the four districts operating outside the United States), that maintain responsibility for the entirety of the United States, including all 50 states, Washington, DC, and the 5 territories. Figure 1 below depicts the geographic distribution of USACE divisions and districts, along with their associated areas of responsibility.

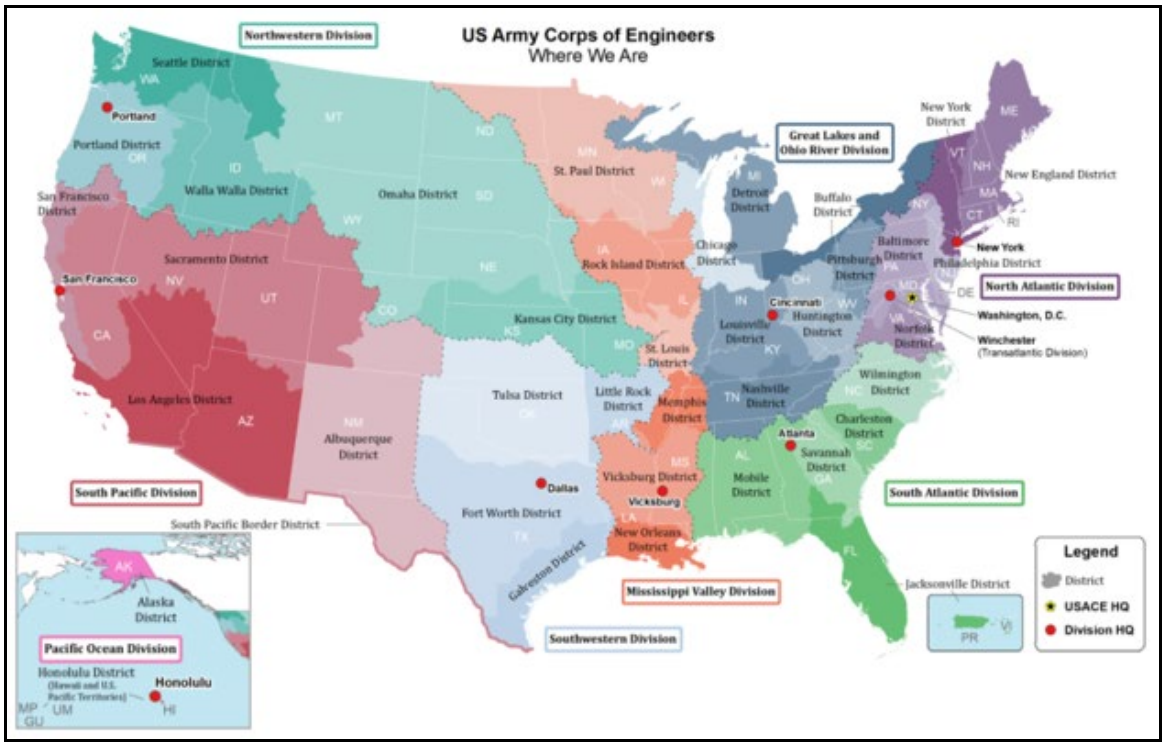


Figure 1. USACE Locations and Areas of Responsibility

*Source:* U.S. Army Corps of Engineers (USACE), "USACE Locations," (Washington, DC: Department of the Army, USACE, 2020).

In a subordinate role, under the National Response Framework and the authorities of the Stafford Act, USACE acts as a member of a federal team under the direction of FEMA to support other major disasters.[10] To demonstrate the relationship between FEMA, with its ten subordinate regions, and USACE, with its eight subordinate divisions, figure 2 below depicts the FEMA regions overlaid on the USACE divisions and districts.

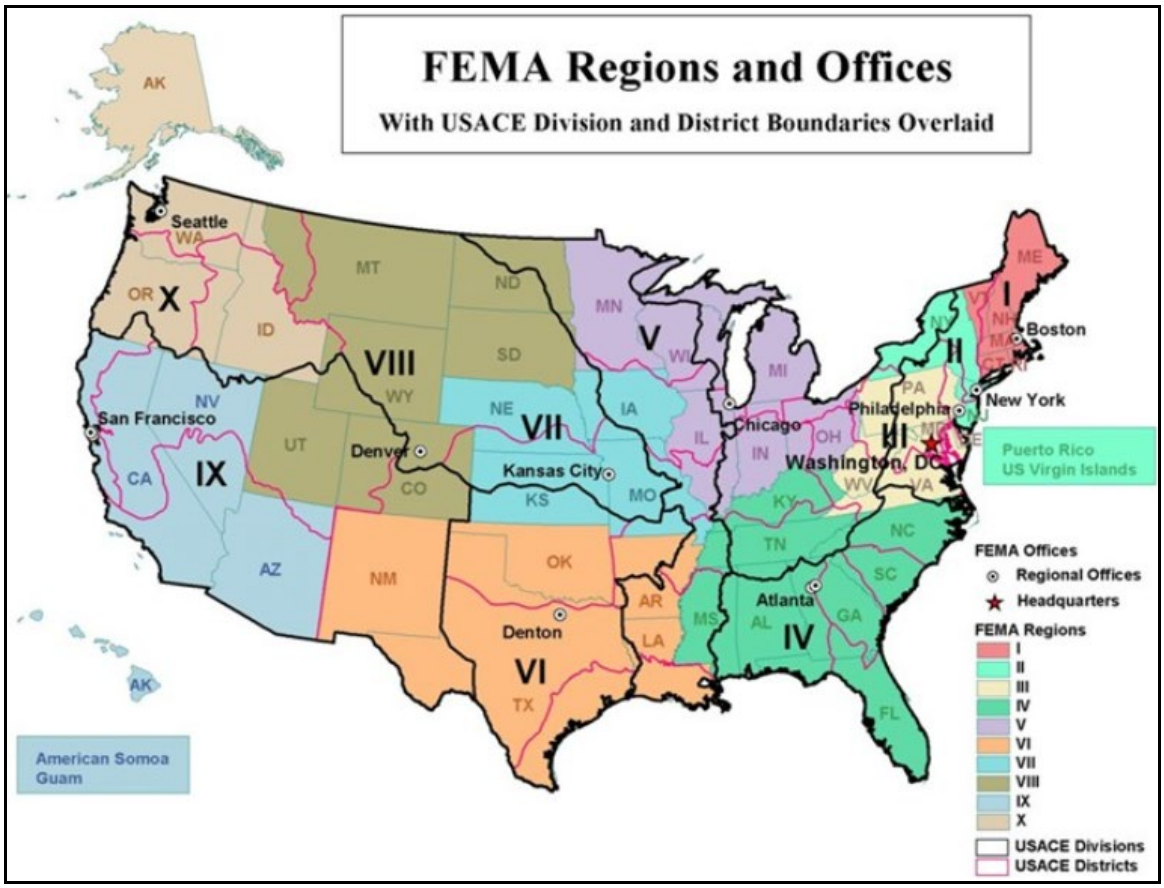


Figure 2. FEMA Regions Overlaid on USACE Divisions and Districts

*Source:* Mark Clark, "USACE Disaster Response Missions, Roles, and Readiness," 2015.

Of the 15 Emergency Support Functions (ESFs) of the National Response Framework, USACE is designated as the Coordinator and primary agency for ESF #3 Public Works and Engineering.[11] Through this authority, under the direction of FEMA during a declared national emergency, USACE is responsible for executing the following emergency operations: temporary emergency power, debris management, temporary housing and critical public facilities, temporary roofing, and infrastructure assessment.[12] USACE executes these missions upon receipt of MAs, which are orders issued by FEMA for another federal agency to perform work in support of emergency operations.[13] Each

year, USACE conducts emergency operations upon issuance of MAs under ESF #3 authority—in order to provide emergency relief during major hurricane and tropical storm events. On 27 March 2020, while discussing the Javits Center ACF, the Chief of Engineers LTG Todd Semonite highlighted the unprecedented nature of COVID-19 emergency response operations by stating bluntly, "We've never done a pandemic before."[14]

State Responsibilities and Requirements in Alternate Care Facilities Operations

After review of literature establishing the roles and activities of USACE in emergency response operations, this section of the literature review examines the roles, responsibilities, and requirements of U.S. states in ACF Operations during the COVID-19 pandemic specifically.

ACF operations, while supported with funding and technical support from federal entities, are fundamentally functions led by the individual states conducting the operations. Corroborating this, USACE published guidance that notes, "Implementation of Alternate Care Sites is a State-led and managed process."[15] Additionally, referring to the fact that ACFs should be located and developed based on specific local needs, USACE noted that, "States should tailor all materials based on local requirements."[16]

HHS published an "Alternate Care Site Toolkit" with the goal of providing medical guidance and technical assistance to states attempting to establish ACFs.[17] Within this publication, HHS outlined the basic framework by which states should conduct ACF operations.[18] This framework is an 8-step process from identification of potential sites through operation of the completed facility, as follows:

1. Identify Potential Sites.

2. Conduct Site Assessment.

3. Secure Funding.

4. Secure Property.

5. Convert Site for Health Care Use.

6. Secure Wraparound Services.

7. Staff, Equip, and Supply Site.

8. Operate Site.

Of note, each individual state bears responsibility for the decision to execute ACF operations and, subsequently, for completing this 8-step process. As stated before, however, federal agency support does exist to provide funding, technical support, or actual execution (at the expense of the state, although this cost may be shared or reimbursed through federal funding support channels) to the state-led process of establishing ACFs. Of significance, Step 3 "Secure Funding" above is a recognition of the fact that states are ultimately responsible for securing funding—whether through state resources or application for federal emergency funds—for all aspects of ACF operations. With the national emergency declaration by the President of the United States in mid-March 2020 (refer to the COVID-19 pandemic event timeline in the "Background and Contextual Literature" section), states were aware that some portion of ACF operations would be funded through federal emergency funding, but states were also aware that they would be responsible for a cost-share percentage of the total cost.[19] While some initial planning support by USACE was 100% federally funded under the umbrella of Federal Operations Support (FOS), most ACF operations costs were shared through one of the two following programs: The Direct Federal Assistance (DFA) umbrella was operated as

75% federal cost-share, 25% non-federal share, and this represented support in which states requested that FEMA provide other federal assistance to support their emergency requirements.[20] The Public Assistance (PA) grant program was also operated as 75% federal cost-share, 25% non-federal share, and this represented support in which states requested that FEMA provide financial reimbursement for state-executed or state-contracted operations in support of their emergency requirements.[21] In consideration of these cost-share requirements, states were highly concerned with the cost of ACF operations during the COVID-19 pandemic, and states will likely remain concerned with the costs of any ACFs constructed in future pandemic events.

## USACE Support to Alternate Care Facilities Operations

Following examination of the responsibilities and requirements of states in ACF operations, this section of the literature review establishes how USACE views its role in ACF operations.

Nesting within the terminology of states conducting ACF operations, USACE states that, "the steps that USACE may support . . . are assessing the sites (Step 2) and converting sites for healthcare use (Step 5)."[22] With the understanding that "converting sites for healthcare use" comprises Engineering and Design and Contracting services, USACE views its responsibilities in regard to ACF operations as the following:

1. Conduct Site Assessments.
2. Engineering and Design.
3. Contracting

Regarding site assessments specifically, USACE notes that "States may ask USACE to support their site assessments," at which point USACE will "assess suitability

and prioritize the list of potential sites."[23] Regarding Contracting specifically, USACE notes that—if selected to perform Contracting services—it "will use emergency contracting authorities utilizing large or small business in the region which are capable to quickly do the work."[24] In the event that contractors cannot perform the work required, USACE notes that "USACE or other prepositioned contracts will be utilized."[25] Discussing restrictions on types of work, USACE notes the following prohibitions: USACE will not lease or manage ACF sites, and it will not perform equipment or supply services.[26]

### USACE Capabilities and Considerations, across the DOTMLPF-P Domains

Following examination of how USACE defined its support during the COVID-19 pandemic, this section of the literature review establishes USACE capabilities and considerations, across the DOTMLPF-P domains, as related to the key tasks performed in support of ACF operations. In keeping with the stated delimitations of the study, these DOTMLPF-P domains will focus on the DOTLP domains specifically.

#### ACF Site Assessment

Regarding ACF Site Assessment capabilities and considerations, across the DOTLP domains, the researcher determined the following:

Doctrine: While no specific USACE doctrine is published regarding ACF Site Assessments, the following Engineer Regulation is relevant to the study: Engineer Regulation 500-1-28 (Emergency Employment of Army and Other Resources: Natural Response Planning Guide) "establishes policy, provides planning guidance and assigns responsibilities to ensure timely execution of Emergency Support Function (ESF) #3,

Public Works and Engineering, in support of the National Response Framework (NRF), and for high impact, low probability catastrophic events, as determined by Headquarters, USACE (HQUSACE)."[27] This regulation also establishes the alignment of USACE Divisions and subordinate Districts with specific States for "response and recovery planning activities."[28] Also relevant, this regulation establishes the framework of the USACE Planning and Response Teams (PRTs), stating that, "The mission of the Planning and Response Teams (PRTs) is to provide planning and project management for contingency missions that USACE may likely be called upon to execute."[29] Furthermore, this regulation establishes the formation of 49 mission PRTs within USACE, which are "staffed and trained to respond to the pre-scripted missions assigned to USACE under the National Response Framework."[30] These pre-scripted missions include the following, with brief descriptions in parentheses: Emergency Temporary Power PRT ("assess requirements for emergency power of critical facilities"), Debris PRT ("collect, remove, and properly dispose of debris"), Temporary Roofing PRT ("conduct minor roof repairs and temporarily cover damaged roofs with FEMA supplied plastic sheeting"), Temporary Housing PRT ("provide temporary housing for disaster victims"), and Infrastructure Assessment PRT ("triage style of rapid inspections of primarily residential structures in a post-earthquake/flood environment").[31]

Also relevant within USACE doctrine are "business processes" documented within the USACE Quality Management System (QMS). The QMS's stated purpose is "To execute the U.S. Army Corps of Engineers' mission through standard business processes that increase efficiency, effectiveness, and product quality."[32] Furthermore, the QMS is intended to allow USACE to, "respond virtually and seamlessly in support of the

Nation's Civil Works priorities and the Armed Forces' call for expeditionary technical teams in real-time, anywhere across the globe with minimal onsite training."[33] Currently, however, no QMS business processes are established in regard to ACF Site Assessment operations.

Organization: In regard to USACE organizations relevant to the ACF Site Assessment mission set, the widespread geographic distribution of USACE Divisions and subordinate Districts facilitates rapid response of engineers to assess sites in any area of the United States. Additionally, although currently no ESF #3 PRT exists with the pre-scripted mission of "ACF Site Assessment," the ESF #3 PRT organizational structure is relevant. USACE states that, "When a disaster event might result in FEMA mission assignments or when a threat is imminent, PRTs are placed on alert. Once on alert, PRTs must be ready to deploy within six hours."[34] Additionally, "Each PRT is divided into two elements: management and support. The management element is that PRT initial cell typically required to scope and develop the mission requirements. Additional support elements are requested as required."[35]

Training: In terms of USACE training, although no specific training exists in regard to the ACF Site Assessment mission, general emergency management training is required for all USACE personnel supporting emergency operations. The mandatory training courses are the FEMA IS-100.C course (Introduction to the Incident Command System), FEMA IS-700 (Introduction to the National Incident Command System), and USACE Civil Level 1.[36] The first two courses provide familiarization with operating under FEMA MAs, and the third course provides an overview of USACE authorities and roles for emergency operations. Additionally, ESF #3 PRTs receive additional training

specific to their pre-scripted mission (e.g., "Temporary Emergency Power" course, "Infrastructure Assessment" course, etc.). As no ESF #3 PRT exists with the pre-scripted mission of "ACF Site Assessment," no such additional training exists specific to the ACF Site Assessment mission.

Leadership: Excepting the COVID-19 operations orders and USACE Public Affairs themes and messages (each of which were specific to the COVID-19 event and not formalized guidance for future work), no specific guidance is published for leaders for a future ACF Site Assessment mission.

Personnel: There are no personnel considerations specific to the ACF Site Assessment mission set, although this does not likely represent a capabilities gap as no personnel—including ESF #3 PRT members—are specifically hired for emergency response operations. These personnel are trained to conduct these tasks as duties additional to their primary USACE responsibilities.

### ACF Engineering and Design

Regarding ACF Engineering and Design capabilities and considerations, across the DOTLP domains, the researcher determined the following:

Doctrine: The USACE Engineering Directorate notes the following as doctrinal vehicles for Engineering and Design guidance: Engineering and Construction Bulletins (ECBs), Design Guides (DGs), Engineer Pamphlets (EPs), Engineer Manuals (EMs), Engineer Circulars (ECs), Engineer Forms (ENGs), and United Facilities Guide Specifications (UFGSs).[37] Currently, however, no specific doctrine is published regarding ACF Engineering and Design.

Although not specific to ACF Engineering and Design, the following Engineer Regulation are relevant to the study: Engineer Regulation 500-1-20 (Emergency Employment of Army and Other Resources: USACE Research and Development Support to Preparedness, Response, and Recovery for Emergencies and Disasters) establishes "guidance and procedures for utilization of U.S. Army Corps of Engineers research and Development (R & D) activities . . . in support of emergency preparedness for and operations due to natural and/or man-made disasters."[38] Engineer Regulation 1110-345-721 (U.S. Army Corps of Engineers Medical Facilities Mandatory Center of Expertise and Standardization) establishes the Medical Facilities Mandatory Center of Expertise and Standardization (MX) within the USACE Huntsville National Engineering and Support Center (HNC). This organization's stated purpose is to "provide worldwide expertise to deliver the highest quality medical and medical research facilities for the DoD and other Federal agencies and foreign governments, in partnership with other USACE commands."[39] Furthermore, the MX is "the enterprise mandatory center of expertise and standardization for medical facilities, including, but not limited to hospitals, medical and dental clinics, and medical research laboratories."[40]

In terms of USACE business processes, currently no QMS business processes are established in regard to ACF Engineering and Design.

Organization: In terms of organizations relevant to the ACF Engineering and Design mission set, the MX is significant to the discussion, as it conducts enterprise-wide engineering processes, and it establishes the engineering standards that all USACE Divisions and subordinate Districts must follow. Also relevant given the cost engineering required he Civil Works Cost Engineering and Agency Technical Review Mandatory

Center of Expertise, operating from the Walla Wall District Cost Engineering Branch, establishes cost engineering standards.[41] Also relevant, each USACE district maintains its own Engineering and Design department.

Training: No specific Engineering and Design training is established in regard to the ACF Engineering and Design mission set.

Leadership: No specific guidance for USACE leadership exists in regard to the ACF Engineering and Design mission set.

Personnel: No specific personnel considerations exist in regard to the ACF Engineering and Design mission set.

## ACF Contracting

Regarding Contracting capabilities and considerations, across the DOTLP domains, the researcher determined the following:

Doctrine: While no specific USACE doctrine is published regarding ACF Contracting, the following USACE references are relevant to the study: The USACE Acquisition Instruction is the doctrinal guide that "implements the Federal Acquisition Regulation Supplement (DFARS), and Army Federal Acquisition Regulation Supplement (AFARS) to establish standard processes for USACE acquisition."[42] Engineer Pamphlet 715-1-8 (USACE Contract Specialist Proficiency Guide) provides specific guidance on "acquisition of Construction and Architect-Engineer services."[43]

Also relevant within USACE doctrinal considerations, the USACE Directorate of Contracting notes that, "To facilitate rapid engagement with the industrial base, USACE maintains an inventory of already awarded contract tools, pre-positioned to support major emergency response missions."[44] These contract tools are, "part of the USACE

Advanced Contracting Initiative (ACI), a program developed and implemented specifically for emergency disaster scenarios."[45] Notably, however, these tools are generally oriented towards the pre-scripted ESF #3 PRT mission sets, including debris removal and temporary roofing.[46]

As an additional relevant consideration, USACE "leverages the national Disaster Response Registry (DRR), which is part of the General Services Administration's System for Award Management (SAM)."[47] The DRR "includes a database of contractors willing to perform debris removal, distribution of supplies, reconstruction, and other disaster or emergency relief activities."[48] As with the ACI, however, the DRR—as related to USACE emergency contracting—is specifically oriented towards ESF #3 PRT mission sets. Currently, the DRR does not include contractors willing to perform ACF construction during a pandemic.

In terms of USACE business processes, currently no QMS business processes are established in regard to ACF Contracting.

Organization: Relevant to the ACF Contracting Mission set, the USACE Directorate of Contracting is the USACE enterprise organization that provides guidance and oversight of USACE contracting activities.[49] Also relevant, each USACE district maintains its own Contracting department.

Training: No specific Contracting training is established in regard to the ACF Contracting mission set, although USACE mandates comprehensive and formal contracting training (both Defense Acquisition Workforce Improvement Act Certification and USACE-specific training).[50] Relevant to the ACF discussion, however, is that some Contracting Officers (KOs) and Contracting Officer Representatives (CORs) receive

emergency management training and experience. Not all, however, receive this training or experience (as it may not be expected with their particular role). Also relevant, USACE real estate personnel do not all receive training or experience with tasks and requirements for real estate during emergency operations.

Leadership: No specific guidance for USACE leadership exists in regard to the ACF Contracting mission set.

Personnel: CORs are key personnel in a national-level event requiring construction oversight, and—depending on the size of the supporting USACE district—CORs may be a limitation if numerous ACFs are constructed simultaneously within a district's area of responsibility.

## Summary

This chapter presented valuable background and contextual information regarding the COVID-19 case study. Subsequently, this chapter reviewed existing literature related to the USACE role in emergency operations, state responsibilities and requirements in ACF operations, USACE support to ACF operations, and USACE capabilities and considerations across the DOTMLPF-P domains.

While sources providing detailed information on this very recent pandemic event are not plentiful, the sources employed for this literature review were highly reputable, with the researcher selecting U.S. federal government agencies and respected news agencies and think-tanks. Ultimately, through review of the state's roles and responsibilities, this literature review established states as key stakeholders in ACF operations, as opposed to merely recipients of emergency response operations dictated, funded, and executed by the federal government.

This literature review also established that states are concerned with all aspects of ACF operations, including cost—because they are responsible for securing funding. Even with federal funding available due to the national emergency declaration, states are responsible for a cost-share of the total costs, which means that states care about the total costs of ACF operations. States were concerned with these costs during COVID-19 response operations, and they will be concerned with costs in the event of future pandemic response operations.

In terms of the study's problem statement, although the Congressional Research Service stated that some state governors had "acted independently" by choosing to contract ACF construction without the support of USACE, no literature currently exists that examines whether the performance of USACE tasks may have impacted these decisions. In order to generate understanding in this space and ultimately address the stated research questions, the researcher required additional data on the USACE performance of these key tasks. Chapter 3 presents the means by which the researcher collected, analyzed, and generated conclusions from this additional data.

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[20] USACE, *USACE Civil Emergency Response Overview*, 14.

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[22] USACE, "Alternate Care Sites Retrofitting Guidance."

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[48] Ibid.

[49] U.S. Army Corps of Engineers (USACE), "USACE - Directorate of Contracting," USACE Headquarters, accessed May 10, 2021, https://www.usace.army.mil/Business-With-Us/Contracting/.

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# CHAPTER 3

# RESEARCH METHODOLOGY

## Chapter Introduction

### Overview

Building upon the foundation of relevant literature reviewed in chapter 2, this chapter describes the research design framework and approach, the process of data collection and analysis, the presentation of results and conclusions, and the treatment of ethical considerations. Fundamentally, this chapter describes the methodology employed to address the purpose of the research and answer the stated research questions, which are reproduced below in abridged format to reinforce the study's intent and contextualize the research process.

### Purpose of the Research

The purpose of this study is to provide the Chief of Engineers, as the Chief Decision Maker within the U.S. Army Corps of Engineers, with a rich description of the organization's performance of Alternate Care Facilities tasks during the COVID-19 pandemic in order to identify capability gaps and subsequently generate solutions to bridge these gaps. This study makes recommendations—based on the solutions generated to identified capability gaps—to the Chief of Engineers to assist with preparing the U.S. Army Corps of Engineers for effective Alternate Care Facilities operations in a future pandemic event. With these objectives at the forefront and in consideration of the problem statement, the primary research question and supporting secondary research questions were developed.

## Primary Research Question

How should the U.S. Army Corps of Engineers prepare itself for effective support to Alternate Care Facility operations in future pandemic events, with consideration for the factors of time, cost, and scope, in order to provide state governments with necessary services and facilities?

## Secondary Research Questions

To support the development of solutions for the Primary Research Question, the following Secondary Research Questions were explored:

1. During COVID-19 emergency response operations, how successfully did USACE provide states with site assessment services, in consideration of time, cost, and scope factors?
2. During COVID-19 emergency response operations, how successfully did USACE provide states with Engineering and Design services, in consideration of time, cost, and scope factors?
3. During COVID-19 emergency response operations, how successfully did USACE provide states with Contracting services, in consideration of time, cost, and scope factors?

Orienting toward these stated research questions, the following methodological assumptions, limitations, and delimitations were considered.

## Methodological Assumptions, Limitations, and Delimitations

The following assumptions, limitations, and delimitations were identified and justified during the conduct of this research study:

Assumptions

1. Cost-sharing of emergency operations will remain a federal policy and, correspondingly, cost of services will remain a concern for states in future pandemic response operations. This assumption is justified for the purposes of this research because the cost-sharing system during national emergencies is well-established, with no expected termination.

2. After Action Reports, conducted USACE Headquarters and subordinate divisions, accurately reflect the successes and challenges/issues experienced by USACE. This assumption is justified because USACE, as an Army organization, employs the After Actions Report process as a learning tool to sustain positive performance and honestly assess areas requiring improvement.

3. Alternate Care Facilities will remain necessary in future pandemic response operations. This assumption is justified because a future pandemic event, of the COVID-19 variety, will once again overburden state hospital systems, and the construction and operation of additional permanent hospital facilities is not feasible. Currently converted Alternate Care Facilities cannot remain in converted status indefinitely due to cost, as these facilities are convention centers, hotels, and college dormitories. Even site assessments at sites previously assessed will require new site assessments to verify the actual condition of the sites at the time of necessity. Contracting services are always an on-order need.

Limitations

1. Approximately 10-month time period in which to conduct and finalize the research study.

2. Qualitative Research results and outcomes cannot be generalized to the population at large due to the non-statistical methods of analysis employed.

Delimitations

1. Data collection will be limited to files already on-hand with USACE Headquarters and subordinate units. This delimitation makes data collection and subsequent analysis feasible within the available research timeframe. As USACE systematically conducted and documented its After Action Reports from COVID-19 response operations, this data should provide a meaningful basis for conclusions and recommendations.

2. Document analysis will exclude information provided by the Transatlantic Division. As this division's area of operations is external to the United States, it did not conduct any site assessments, engineering and design, or contracting services relevant to this study.

3. DOTLP (i.e., Doctrine-Organization-Training-Leadership-Personnel) will be specifically applied as opposed to the full DOTMLPF-P because the researcher, being familiar with USACE and emergency response operations, has determined that MF-P (i.e., Materiel-Facilities-Policy) solutions are not likely to be appropriate for this problem. Eliminating these from the onset narrows the focus, saving valuable time for more meaningful analysis.

Having considered and validated these methodological assumptions, limitations, and delimitations, the following research methodology was employed.

## Methodology

### Overview

Research methodology is the system or framework by which a researcher investigates a topic to address problems or gaps in knowledge with the goal of advancing scholarship in a field of study.[1] This study's research methodology is organized by the philosophical approach to the research, the research design framework and specific research approach, the data collection and analysis methods including evaluation criteria, the presentation of data and findings, the evaluation of outputs, and the treatment of ethical considerations.

### Philosophical Approach to Research: Qualitative Research Methodology

The philosophical approach to this research is Qualitative Research methodology. Qualitative Research methodology is the deliberate and systematic investigation of social phenomena as occurring in natural settings.[2] Qualitative Research methodology seeks to make conclusions or generate deeper understanding through application of inductive reasoning to the study of human-centric events and experiences.[3] This philosophical approach is justified for this study because its purpose is to make conclusions and generate deeper understanding of USACE's ACF operations during the COVID-19 pandemic through application of inductive reasoning to the study of USACE subordinate unit perceptions during and immediately after operations. Also of note, Qualitative Research methodology is characterized by its application to open-ended questions.[4] This methodology is therefore highly applicable to this study's open-ended Primary Research Question of "how" USACE should prepare itself for effective support to ACF operations in future pandemic events. Furthermore, Qualitative Research methodology is most

applicable to research in which the researcher must understand the perceptions of people, generate theories based on the perceptions of people, or investigate a process conducted over time.[5] Congruent with this characterization, this study seeks to understand the perceptions of USACE subordinate units, generate theories about areas in which USACE was successful and/or experienced challenges, and investigate USACE processes during the response operations time period to determine recommended actions to address the problem.

Addressing the strengths and weaknesses of this philosophical approach, the primary strength of Qualitative Research methodology is its ability to address the complexities of human-centric topics. The primary weakness of Qualitative Research methodology is that research results are not generalizable.[6] Instead, the results are more narrowly defined as transferable to similar events or circumstances, with the level of applicability subject to reader assessment.[7] Although generalizability is highly desirable, transferable results also provide valuable contributions to the body of knowledge in a specific field. Of paramount importance to this study, however, the human-centric complexities of this USACE problem fundamentally require the Qualitative Research approach for proper treatment of the topic area.

When employing a Qualitative Research approach, the primary research design frameworks include Grounded Theory, Phenomenology, Ethnography, Causal-Comparative, Content Analysis, and Case Study.[8] This study employs the research design framework of Case Study methodology.

## Research Design Framework: Case Study Methodology

The research design framework for this study is Case Study methodology. Case Study methodology applies the Qualitative Research methodology to the study of a single case (or several related cases) in order to develop comprehensive analysis and deep understanding of the events and circumstances of the subject case.[9] Case Study methodology is particularly applicable to the investigation of human-centric topics with a mix of stakeholders and interests requiring deep contextual understanding to assess accurately.[10] This research design framework is justified for this study because its central focus is the unique and complex case of USACE ACF operations during the COVID-19 pandemic. This case requires comprehensive analysis and deep understanding of the events and stakeholders in order to generate meaningful conclusions and recommendations in regard to the stated problem. Furthermore, this case study of USACE ACF operations is highly human-centric with key stakeholders both within the USACE organization and within state government. Also of note, Case Study methodology is useful for research studies in which deep contextual understanding of a specific event or circumstance is compelling and persuasive to policymakers being confronted with a similar event or circumstance.[11] This methodology is therefore highly applicable to this study, as its primary purpose is to provide a rich description of USACE's situation to inform and present recommendations to the Chief of Engineers as USACE prepares for future operations.

Addressing the strengths and weaknesses of this research design framework, the primary strength of Case Study methodology is its ability to generate conclusions and deep understanding from a specific case (or cases) with complex variables too closely

interrelated to be removed from the context of the case.[12] Being nested within the Qualitative Research methodology, the corresponding primary weakness of Case Study methodology is that research results are not generalizable and, therefore, can only be prudently applied to similar events and circumstances. As previously discussed when considering the strengths and weaknesses of Qualitative Research methodology, although generalizability is highly desirable, the transferability of results derived from Case Study methodology nonetheless provides valuable contributions to the body of knowledge in a specific field. Most importantly, the interrelated nature of the variables within the case study of USACE ACF operations effectively requires Case Study methodology as the research design framework.

Within the research design framework of Case Study methodology, this study employs a specific variant of the methodology designated as Applied Professional Case Study methodology.

## Specific Approach to Research: Applied Professional Case Study Methodology

The specific approach to research in this study is the Applied Professional Case Study (APCS) methodology. The APCS methodology is a variant of the Case Study methodology that integrates a specific field's professional body of knowledge (i.e., professional) with the specific goal of informing and recommending practical improvements in the field (i.e., applied).[13] With reference to the professional body of knowledge, APCS methodology employs a professional field's concepts, models, and processes in order to be systematic, deliberate, and persuasive to the Chief Decision Makers within that professional field.[14] This specific approach to research is justified for this study because its purpose of informing and recommending solutions to the Chief of

Engineers aligns directly with the APCS goal to inform and recommend practical improvements in a field. By employing U.S. Army and U.S. Army Corps of Engineers concepts, models, and processes, this study most effectively achieves its purpose of informing and recommending solutions to the Chief of Engineers.

Addressing the strengths and weaknesses of this specific approach, the primary strength of APCS methodology is that its professional framework generates credibility and facilitates ease of understanding with the field's Chief Decision Makers through application of recognized and accepted models.[15] The primary weakness of APCS methodology is that the integration of a specific professional framework limits the effectiveness of conclusions and recommendations outside of the specific professional field. As the primary purpose of this study is to inform the decision-making of the Chief of Engineers, however, this limitation is greatly outweighed by the significant benefits of employing professional models and concepts accepted within the U.S. Army and U.S. Army Corps of Engineers.

With the APCS methodology selected as the study's specific approach to research, the detailed application of the methodology is outlined below.

## Employment of Applied Professional Case Study Methodology

Employing the APCS methodology for this research process, the researcher first reiterates that the case undergoing study is defined as USACE ACF operations during the COVID-19 pandemic, as bounded by the Scope communicated in chapter 1. This case is both suitable and relevant for study because it is the only example in modern U.S. history of pandemic emergency operations on a truly national scale with significant impacts. To

prepare for a future pandemic, this is the only suitable case for study to gain information and make recommendations to prepare USACE appropriately.

To integrate the professional body of knowledge into this case study, as described in APCS methodology, the following key criteria were identified, with definitions provided in context as the criteria are applied to the conduct of the research process:

Chief Decision Maker: Chief of Engineers, U.S. Army

Processes: Capabilities-Based Assessment

Models: DOTMLPF-P Domains

Evaluation Criteria: Green-Amber-Red-Black, Feasible-Acceptable-Suitable

Stakeholders: USACE, as the organization seeking continuous improvement to performance (particularly commanders and leaders, from Headquarters level to District level); FEMA, as the effective "hiring authority" for USACE during COVID-19 response and in any future pandemic response (particularly regional executives); States, as the "end user" ultimately requiring support (particularly governors' offices and emergency management executives); and HHS, as the federal government lead agency during COVID-19 response and in any future pandemic response (particularly department executives).

With the above key criteria identified, in order to address the stated research questions, this study employed the Capabilities-Based Assessment (CBA) process. The CBA process is the U.S. Army's framework for identifying and defining requirements, assessing capabilities gaps, and generating solutions in consideration of the DOTMLPF-P domains.[16] The DOTMLPF-P domains are a model with which the U.S. Army assesses capabilities and potential changes to capabilities.[17] The model is detailed below, with

each letter representing an element that could be changed in order to achieve the required capabilities:

D – Doctrine

O – Organization

T – Training

M – Materiel

L – Leadership and Education

P – Personnel

F – Facilities

P – Policy

The CBA process consists of three phases: Functional Area Analysis (FAA), Functional Needs Analysis (FNA), and Functional Solutions Analysis (FSA).[18] The step-by-step process by which this study executed these phases is detailed below:

1. Functional Area Analysis (FAA): By U.S. Army doctrine, the FAA phase identifies and defines current and future requirements.[19] Within our case study, these are the tasks identified as being required for the U.S. Army Corps of Engineers to support states effectively with ACF operations. To identify and define these tasks, the FAA phase began with the framing of the USACE problem, resulting in the early formulation of the problem statement. Next, the study's literature review informed the researcher's understanding of USACE requirements for ACF operations. From the literature review described in chapter 2, the identified USACE requirements for ACF operations are Site Assessment, Engineering and Design, and Contracting with consideration for the key factors of time, cost, and scope. With these requirements

identified, the researcher developed a well-defined Primary Research Question and supporting Secondary Research Questions to address the refined problem statement. Subsequently, the researcher formulated the detailed research methodology with which to conduct data collection and analysis to address the stated research questions.

2. Functional Needs Analysis (FNA): By U.S. Army doctrine, the FNA phase identifies current capabilities in order to compare with current and future requirements, thereby identifying capability gaps.[20] Within our case study, these current capabilities are defined by the USACE performance of required tasks during COVID-19 pandemic response operations. To characterize the USACE performance of required tasks, the researcher collected data in the form of unpublished primary source documents, collected and maintained by USACE Headquarters and subordinate divisions that were created during and immediately after the COVID-19 response operations. These documents consist of After Action Reports (AARs) conducted by USACE Headquarters, each subordinate USACE division, and numerous USACE subordinate districts. Employing qualitative data analysis techniques (expounded upon in the succeeding Data Analysis section), the researcher identified capability gaps relevant to the study's purpose, as defined in chapter 1. Building on this analysis, the researcher applied individual assessment of the body of capability gap information to inform a Green-Amber-Red-Black evaluation standard (expounded upon in the succeeding Evaluation Criteria section) to facilitate communication of the capability gaps and prioritize them by relative degree of gap.

3. Functional Solutions Analysis (FSA): By U.S. Army doctrine, the FSA phase generates solutions to capability gaps in consideration of the DOTMLPF-P

domains.[21] As applied within our case study, the researcher—informed by the deep contextual understanding gained through both literature review and analysis of collected data from USACE Headquarters and subordinate units—developed proposed solution approaches across the Doctrine, Organization, Training, Leadership, and Personnel domains. The researcher then applied Feasible-Acceptable-Suitable evaluation criteria (expounded upon in the succeeding Evaluation Criteria section) to these proposed solution approaches to test the validity of the approaches, ultimately generating recommended solution approaches to address the identified capability gaps and provide meaningful answers to the stated research questions.

In the succeeding sections, data collection and analysis methods, evaluation criteria, presentation of data and findings, and output evaluation—described only superficially in the step-by-step CBA process outline to avoid encumbering the reader—are provided in detail.

## Data Collection Methods

With a Qualitative Research approach, the primary data collection methods are interviews, surveys, observation, or document analysis.[22] This study employs document analysis as the primary data collection method. Document analysis is defined as the inspection and assessment of previously written documents to collect data relevant to the research topic.[23] A strength of this data collection method is that it leverages existing documents.[24] A weakness of this data collection method is that the researcher is limited to the content of the existing documents.[25] Specifically, this study employed analysis of unpublished primary source documents, collected and maintained by USACE

Headquarters and subordinate divisions that were created during and immediately after COVID-19 response operations. The researcher contacted USACE Headquarters in Washington, D.C. along with each of the subordinate eight divisions requesting any After Action Reports that were relevant to ACF operations during the COVID-19 pandemic. Ultimately, the researcher received useful documentation from USACE Headquarters, each of the eight subordinate divisions, and 20 of the subordinate districts. Table 2 below enumerates these source documents, representing nearly 7,000 pages of source material relevant to ACF operations.

Table 2. Source Documents for Data Collection

| USACE Organization | Source Document | Pages |
|---|---|---|
| USACE - Headquarters | "COVID-19 Pandemic: Final After Action report, 31 July 2020" | 473 |
| Great Lakes and Ohio River Division - Headquarters | "COVID-19 Pandemic: After Action Report, 07 July 2020" | 61 |
| Mississippi Valley Division - Headquarters | "COVID-19 Emergency Response Final After Action Report, 23 June 2020" | 37 |
| Mississippi Valley Division – Memphis District | "COVID-19 Pandemic: After Action Report, 23 June 2020" | 96 |
| Mississippi Valley Division – New Orleans District | "COVID-19 Pandemic: After Action Report, 26 June 2020" | 90 |
| Mississippi Valley Division – Rock Island District | "COVID-19 MVR Regional AAR Comments, 23 April 2020" | 11 |
| Mississippi Valley Division – St. Louis District | "COVID-19 Pandemic: After Action Report, 23 June 2020" | 393 |
| Mississippi Valley Division – St. Paul District | "COVID-19 Pandemic: Hotwash Comments, 09 April 2020" | 2 |
| Mississippi Valley Division – Vicksburg District | "COVID-19 Emergency Response: After Action Report Presentation, 23 June 2020" | 3 |
| North Atlantic Division – Headquarters | "COVID-19 Pandemic: After Action Report, 07 July 2020" | 186 |
| North Atlantic Division – Baltimore District | "COVID-19 Pandemic: After Action Report, 15 June 2020" | 254 |
| North Atlantic Division – New England District | "COVID-19 Pandemic: After Action Report, 23 June 2020" | 264 |
| North Atlantic Division – New York District | "COVID-19 Pandemic: After Action Report, 23 June 2020" | 391 |
| North Atlantic Division – Norfolk District | "COVID-19 Pandemic: After Action Report, 23 June 2020" | 356 |
| Northwestern Division – Headquarters | "COVID-19 Pandemic: After Action Report, 17 July 2020" | 59 |
| Northwestern Division – Omaha District | "COVID-19 Pandemic: After Action Report Presentation, 17 July 2020" | 11 |
| Northwestern Division – Seattle District | "COVID-19 Pandemic: After Action Report, 07 July 2020" | 311 |
| Pacific Ocean Division – Headquarters | "COVID-19 Pandemic: After Action Report, 29 June 2020" | 38 |
| South Atlantic Division – Headquarters | "COVID-19 After Action Report, 06 July 2020" | 84 |
| South Atlantic Division – Mobile District | "COVID-19 Pandemic: After Action Report, 10 July 2020" | 69 |
| South Atlantic Division – Savannah District | "COVID-19 Pandemic: After Action Report, 06 July 2020" | 64 |
| South Atlantic Division – Wilmington District | "COVID-19 Pandemic: After Action Report, 30 April 2020" | 63 |
| South Pacific Division – Headquarters | "COVID-19 Pandemic: After Action Report, 20 June 2020" | 927 |
| South Pacific Division – Albuquerque District | "COVID-19 Pandemic: After Action Report, 20 June 2020" | 502 |
| South Pacific Division – Los Angeles District | "COVID-19 Pandemic: After Action Report, 04 July 2020" | 512 |
| South Pacific Division – Sacramento District | "COVID-19 Pandemic: After Action Report, 20 June 2020" | 571 |
| South Pacific Division – San Francisco District | "COVID-19 Pandemic: After Action Report, 01 July 2020" | 69 |
| Southwestern Division – Headquarters | "COVID-19 Pandemic: After Action report, 07 July 2020" | 754 |
| | "COVID-19 Pandemic: Hotwash Presentation, 07 July 2020" | 32 |
| Southwestern Division – Little Rock District | "COVID-19 Pandemic: After Action Report Comments, 10 July 2020" | 4 |

*Source:* Created by author.

In terms of the specific conduct of the document analysis supporting data collection, this study employed indexing (i.e., identification of specific terms), by way of coding source material for key words and phrases related to the USACE key tasks (i.e., Site Assessment, Engineering and Design, and Contracting) and key factors (i.e., scope, schedule, cost).[26] The researcher determined the specific terms for coding as follows, with the corresponding terms in parentheses: Site Assessment (assessment, site, inspection), Engineering and Design (engineering, design, plans, specifications), Contracting (contracting, contract, contractor, procurement, acquisition, COR), scope (scope, standard, performance, PWS), schedule (time, schedule, early, late), and cost (cost, low-cost, costly, money, fund, expense, expensive, cheap, price, magnitude, estimate). The researcher coded with the use of Microsoft Excel, with relevant passages excerpted from source documents entered into the left-most cell of a row and the following cells extending to the right: USACE Headquarters ("HQ" entered, if USACE Headquarters source material), Division (name of division entered, if applicable), District (name of district entered, if applicable), Site Assessment ("success" or "challenge"), Engineering and Design ("success" or "challenge"), Contracting ("success" or "challenge"), Scope ("success" or "challenge"), Schedule ("success" or "challenge"), Cost ("success" or "challenge"), and Reference/Source (citation, with page number). The spreadsheet column headers were formatted as "filters" to enable identification of any combination of indexed terms (e.g., excerpted passages related to "Site Assessment" as related to "Cost" for the "Pacific Ocean Division," specifically). Ultimately, the researcher's collected data comprised nearly 600 excerpted passages, specifically relevant to the aforementioned key tasks and key factors as observed by USACE units.

## Data Analysis Methods

With a Qualitative Research approach, the primary data analysis methods include categorizing, summarizing, and interpreting data.[27] This study employed each of these methods to develop individual subordinate unit performance assessments by key task with respect to each key factor, consolidated enterprise performance assessments by key task with respect to each key factor, overall performance assessments (screened through evaluation criteria) and Functional Needs Analysis by key task with respect to each key factor, Functional Solutions Analysis by key task with respect to each key factor, and consolidated solutions by key task.

Leveraging the collected data within the coding spreadsheet, the researcher categorized the observations of USACE Headquarters and each subordinate division individually for each of the key tasks with respect to each of the key factors, corresponding to each Secondary Research Question. The researcher summarized these observations into "successes" and "challenges" for each key task in consideration of each key factor (e.g., Site Assessment, in consideration of "Scope" factors, for the Southwestern Division). This analysis was ultimately presented as "Individual Performance Assessment" within the treatment of each Secondary Research Question.

With the analysis of each subordinate division individually, the researcher then employed thematic analysis (i.e., identification of recurring themes or concepts) to identify recurring themes across the enterprise.[28] Combined with the identification of significant generalizable observations (i.e., experienced by only one division, but could reasonably have occurred in other divisions), this analysis established the "Consolidated Performance Assessment" (e.g., Site Assessment, in consideration of Scope factors, for

the entire USACE enterprise) presented within the treatment of each Secondary Research Question.

Building upon this analysis, the researcher then screened these consolidated performance assessments against the Green-Amber-Red-Black evaluation criteria to generate the "Overall Performance Assessment" for each key task, which also served as Functional Needs Analysis. Due to the unprecedented nature of the ACF mission and based on the literature review Functional Area Analysis, nearly every "success" and "challenge" enumerated represented a capability gap requiring assessment against possible solution approaches. Observed successes require USACE to implement changes to sustain the positive performance in future pandemic events, and observed challenges require USACE to implement solutions to improve performance in future pandemic events.

After this identification of capability gaps through Functional Needs Analysis, the researcher then generated solutions across the DOTLP domains for each key task, in consideration of each key factor. The researcher then screened these solutions against the Feasible-Acceptable-Suitable evaluation criteria to test the validity of the approaches and, ultimately, determine the recommended solutions for each key task, in consideration of each key factor. Finally, the researcher established "Consolidated Solutions" for each key task, aggregating the solutions approaches for all three key factors.

## Evaluation Criteria

During the conduct of the study, Green-Amber-Red-Black evaluation criteria were applied to capability gaps, and Feasible-Acceptable-Suitable evaluation criteria were applied to proposed solution approaches.

Green-Amber-Red-Black evaluation criteria were employed during the FNA phase. Within U.S. Army doctrine, these evaluation criteria are employed to signify combat effectiveness or operational condition.[29] The following are the most commonly accepted standards:

1. "Green" indicates fully operational, or 85 percent or greater of full effectiveness.[30]

2. "Amber" indicates substantially operational, or 70 to 84 percent of full effectiveness.[31]

3. "Red" indicates marginally operational, or 50 to 69 percent of full effectiveness.[32]

4. "Black" indicates not operational, or less than 50 percent of full effectiveness.[33]

Modifying these standards to characterize the capability gaps of USACE for executing ACF operations, the researcher developed the following:

1. "Green" indicates a challenge or issue that represents a minor capability gap. It is negative but with no direct impact to mission (e.g., inefficiencies).

2. "Amber" indicates a challenge or issue that represents a moderate capability gap. It directly impacts mission negatively but does not cause failure to mission (e.g., short schedule delays, minor cost concerns).

3. "Red" indicates a challenge or issue that represents either 1) a major capability gap that causes failure to mission, or 2) a major capability gap that causes states to discontinue future services.

4. “Black” indicates a challenge or issue that represents an extreme capability gap that causes enduring reputational harm with states, key stakeholders, or the American public (e.g., gross negligence, ethical issues). [Category Not Found in this Research]

These criteria were applied to the successes and challenges/issues captured in the consolidated assessments of USACE performance. A category (e.g., Site Assessment Cost, Engineering and Design Schedule, Contracting Scope) was assessed at the level of the most negative challenge/issue. Successes did not offset challenges/issues, but they were still considered in FNA because they represented potential capability gaps overcome through the application of “on-the-fly” lessons learned and best practices.

Of note, the following mitigators impacted the final Green-Amber-Red-Black assessment of a category:

1. If a challenge or issue was experienced in early operations but later rectified, the assessment of that challenge or issue was mitigated by one category. This is justified because the identified capability gap (although not necessarily impact) was so minor that it was resolved, even with no prior experience, over a relatively short time period. This rectified observation was retained in the “Challenges/Issues” category in order to capture/document a potential capability gap that was likely corrected through the application of “on-the-fly” lessons learned and best practices.

2. If a challenge or issue was experienced by a division (or divisions) but another division (or divisions) recorded successful best practices to rectify this issue, the assessment of that challenge or issue was mitigated by one category. This is justified because an actionable solution was validated by real-world experience, and this solution has been documented by USACE. Both the documented success and the

documented challenge/issue were retained in their respective categories in order to capture/document a potential capability gap (even if mitigated to "Green," as this category does not necessarily represent 100% performance).

The resulting color-coded assessments, in table format, facilitated communication of the capability gaps and allowed for prioritizing them by significance of gap (i.e., a "Red" category being higher priority for improvement than an "Amber" category).

Feasible-Acceptable-Suitable evaluation criteria were employed during the FSA phase. Within U.S. Army doctrine, these evaluation criteria are employed to determine acceptable solutions to solving a given problem.[34] The "feasible" standard indicates if the solution is within the limits of available resources.[35] The "acceptable" standard indicates if the solution is worth the cost or risk.[36] The "suitable" standard indicates if the solution actually solves the given problem within the limits of ethics and the law.[37] The researcher applied all three of these evaluation criteria to each proposed solution approach to test the validity of the approach. This exercise ultimately generated recommended solution approaches to address the identified capability gaps and provide meaningful answers to the stated research questions. These recommended solution approaches, prioritized by their predicted effectiveness and the significance of the specific capability gap being addressed, were then documented in formats for presentation to the Chief Decision Maker.

## Presentation of Data and Findings

This study presents results in both narrative and table format. The narrative format, corresponding most effectively with the thematic analysis employed for data collection and subsequent interpretation of that data for analysis, provides the rich

description of the USACE performance of key tasks. The table format provides a visually effective means to summarize themes, significant observations, and findings such as the outputs of Functional Needs Analysis and Functional Solutions Analysis.

## Output Evaluation

Addressing the quality of the research outputs, this study generates valid and reliable conclusions and recommendations by employing multiple perspectives in data collection. First, the study incorporates assessment of the USACE performance of required tasks through the perspective of USACE Headquarters, overseeing the execution of operations by its eight subordinate divisions. Subsequently and perhaps most significantly, the study incorporates assessment of the performance of required tasks through the perspectives of each of the eight subordinate divisions in USACE—providing insight into the conduct of operations in eight separate geographic regions, encompassing the 50 U.S. states and 5 territories. By employing these varied perspectives, the researcher corroborates information and ultimately triangulates meaningful interpretation of USACE's performance at required tasks during the COVID-19 pandemic response.

Additionally, the study generates valid and reliable conclusions and recommendations by employing committee review. Committee review, including the review of a Doctor of Philosophy, ensured the highest standards of academic rigor were applied to the study.

Addressing the potential for politicization influencing the delivery of the outputs, this study recognizes that deep reflection on USACE's capability gaps during the COVID-19 pandemic has the potential to be politicized—particularly considering the highly political nature of the pandemic response for national and state elected officials.

Reflection on these capability gaps may also detract from the relatively widespread media adulation USACE has received for its ACF operations. Still, however, the study's value through informing and recommending necessary improvements outweighs this potential for politicization. To this end, politicization should be accepted as a worthwhile risk for a learning organization such as USACE to prepare itself most effectively to support the United States in a future pandemic event.

## Ethical Assurances

Although this research process did not engage with human subjects directly, the study did examine surveys conducted by another organization (i.e., USACE). Although none of these surveys were ultimately referenced, in consideration of the human subjects involved during these previously conducted surveys, this study employed all appropriate protections for human subjects. Nested within the Command and General Staff College's commitment to protection of human subjects, the researcher was "committed to assuring that all research activities involving human subjects are conducted in a way that promotes their rights and welfare."[38] Furthermore, the researcher coordinated with and conducted research in compliance with the Command and General Staff College Human Protections Director (HPD) and the Collaborative Academic Institutional Review Board (IRB).[39] In compliance with ethical principles and standards derived from the Belmont Report, the researcher ensured compliance with the three Human Subjects Research principles of Ethical Research: respect for persons, beneficence, and justice.[40] Critically, confidentiality of these human subjects was treated with paramount importance during the conduct of research.

## Summary

This chapter presented the research philosophy (i.e., Qualitative), design framework (i.e., Case Study), and specific approach (i.e., Applied Professional Case Study). Subsequently, this chapter provided the step-by-step process by which the researcher conducted data collection and analysis, the presentation of results and conclusions, and the treatment of ethical considerations. In accordance with the research methodology outlined in this chapter, chapter 4 presents the study's analysis of the collected data.

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[1] U.S. Army Command and General Staff College (CGSC), "Lesson 6 - Research Philosophy," (PowerPoint presentation, *A211 Research Methods,* CGSC, Fort Leavenworth, KS, 2020), slide 10.

[2] Arianne Teherani, Tina Martimianakis, Terese Stenfors-Hayes, Anupma Wadhwa, and Lara Varpio. "Choosing a Qualitative Research Approach," *Journal of Graduate Medical Education* 7, no. 4 (1 December 2015): 669-670.

[3] U.S. Army Command and General Staff College (CGSC), "Lesson 8 - Qualitative Research," (PowerPoint presentation, *A211 Research Methods,* CGSC, Fort Leavenworth, KS, 2020), slide 21.

[4] U.S. Army Command and General Staff College (CGSC), "Lesson 7 - Quantitative Research," (PowerPoint presentation, *A211 Research Methods,* CGSC, Fort Leavenworth, KS, 2020), slide 4.

[5] CGSC, Lesson 8, slide 16.

[6] CGSC, Lesson 6, slide 15.

[7] Ibid.

[8] Ibid., slide 12.

[9] CGSC, Lesson 8, slide 25.

[10] Dr. Kenneth E. Long, "Emerging Best Practices from Applied Professional Case Study Research," (Lecture, U.S. Army Command and General Staff College, Fort Leavenworth, KS, 2016).

[11] Ibid.

[12] Sharan. B Merriam, *Qualitative Research: A Guide to Design and Implementation. Revised and Expanded from Qualitative Research and Case Study Application in Education* (San Francisco: Jossey-Bass, 2009).

[13] Long, "Emerging Best Practices from Applied Professional Case Study Research," (PowerPoint).

[14] Ibid.

[15] Long, "Emerging Best Practices from Applied Professional Case Study Research," (Lecture).

[16] U.S. Army Command and General Staff College (CGSC), "Lesson 2 - Capability Requirements, Gaps, and Solutions," (PowerPoint presentation, *F100 Force Management,* CGSC, Fort Leavenworth, KS, 2020), slide 5.

[17] Ibid., slide 6.

[18] Ibid., slide 12.

[19] Ibid.

[20] Ibid.

[21] Ibid.

[22] CGSC, Lesson 6, slide 12.

[23] U.S. Army Command and General Staff College (CGSC), "Lesson 9 - Mixed Methods Research and Data Collection," (PowerPoint presentation, *A211 Research Methods,* CGSC, Fort Leavenworth, KS, 2020), 8.

[24] Ibid.

[25] Ibid.

[26] Ibid., 9.

[27] CGSC, Lesson 7, slide 4.

[28] CGSC, Lesson 9, 9.

[29] Headquarters, Department of the Army (HQDA), Army Doctrine Publication (ADP) 1-02, *Terms and Military Symbols* (Washington, DC: Army Publishing Directorate, 2018), 59.

[30] Ibid.

[31] Ibid.

[32] Ibid.

[33] Ibid.

[34] Headquarters, Department of the Army (HQDA), Field Manual (FM) 6-0, *Commander and Staff Organization and Operations* (Washington, DC: Army Publishing Directorate, 2014), 78.

[35] Ibid.

[36] Ibid.

[37] Ibid.

[38] U.S. Army Command and General Staff College (CGSC), "Lesson 10 - Research Ethics," (PowerPoint presentation, *A211 Research Methods,* CGSC, Fort Leavenworth, KS, 2020), 14.

[39] Ibid.

[40] Ibid., 21.

# CHAPTER 4

# ANALYSIS

## Chapter Introduction

### Overview

Employing the research methodology presented in chapter 3, this chapter presents, explains, analyzes, and interprets the evidence relevant to addressing the stated primary and secondary research questions. To this end, the chapter is organized into detailed discussions of each of the three secondary research questions. The resulting three sections each provide a rich description of the performance of USACE during COVID-19 response operations, with the perspectives of USACE headquarters and each of the eight subordinate USACE divisions considered. After referencing the individual performance assessments conducted for each subordinate unit independently, each section presents a consolidated enterprise performance assessment—based on recurring themes and significant generalizable observations from the referenced individual performance assessments—that directly responds to its respective secondary research question. Each consolidated performance assessment then informs Functional Needs Analysis as described in chapter 3, which allows for conduct of Functional Solutions Analysis. This Functional Solutions Analysis generates potential changes for USACE to implement in order to prepare for future pandemic response operations. Consolidating the solutions generated in each section, the chapter then responds directly to the primary research question.

To provide context for the findings and analysis, the chapter begins with a restatement of the purpose of the research and research questions.

## Purpose of the Research

The purpose of this study is to provide the Chief of Engineers, as the Chief Decision Maker within the U.S. Army Corps of Engineers, with a rich description of the organization's performance of Alternate Care Facilities tasks during the COVID-19 pandemic in order to identify capability gaps and subsequently generate solutions to bridge these gaps. This study makes recommendations—based on the solutions generated to identified capability gaps—to the Chief of Engineers to assist with preparing the U.S. Army Corps of Engineers for effective Alternate Care Facilities operations in a future pandemic event. With these objectives at the forefront and in consideration of the problem statement, the primary research question and supporting secondary research questions were developed.

## Primary Research Question

How should the U.S. Army Corps of Engineers prepare itself for effective support to Alternate Care Facility operations in future pandemic events, with consideration for the factors of time, cost, and scope, in order to provide state governments with necessary services and facilities?

## Secondary Research Questions

To support the development of solutions for the Primary Research Question, the following Secondary Research Questions were explored:

1. During COVID-19 emergency response operations, how successfully did USACE provide states with site assessment services, in consideration of time, cost, and scope factors?

2. During COVID-19 emergency response operations, how successfully did USACE provide states with Engineering and Design services, in consideration of time, cost, and scope factors?

3. During COVID-19 emergency response operations, how successfully did USACE provide states with Contracting services, in consideration of time, cost, and scope factors?

Orienting toward these stated research questions, the findings and analysis are presented below.

## Findings and Analysis

### Secondary Research Question #1: Site Assessment

The following section provides a detailed description of the performance of site assessment services by USACE during COVID-19 response operations. Through comprehensive analysis of the documentation provided by USACE headquarters and each of the eight subordinate USACE divisions, the researcher developed a rich description of the performance of each subordinate unit independently. These "Individual Performance Assessments" are referenced below and included in the Appendices, in full and complete format. Building upon these individual performance assessments, this section presents a consolidated enterprise performance assessment—based on recurring themes and significant generalizable observations from the individual performance assessments—that directly responds to the question of how successfully USACE provided states with site assessment services, in consideration of time, cost, and scope factors. This consolidated performance assessment of site assessment services then informs Functional Needs Analysis, which allows for conduct of Functional Solutions Analysis. This Functional

Solutions Analysis generates potential changes for USACE to implement in order to prepare for successful site assessment services in future pandemic response operations.

## Performance Assessment and Functional Needs Analysis

This section provides evaluation of USACE performance of site assessment services during COVID-19 response operations and discussion of USACE capability gaps through a Functional Needs Analysis.

### Individual Performance Assessment

To inform the Consolidated Performance Assessment, the researcher conducted a detailed assessment of the USACE performance of site assessment services during COVID-19 response operations through the lens of USACE Headquarters and each subordinate USACE division. These detailed assessments, independently considering the experiences of USACE Headquarters and each of the eight subordinate divisions, are presented in Appendix A.

### Consolidated Performance Assessment

The following are consolidated enterprise performance assessments—based on recurring themes and significant generalizable observations—that directly respond to the question of how successfully USACE provided states with site assessment services, in consideration of time, cost, and scope factors.

Table 3 below presents the consolidated scope successes and challenges of USACE as an enterprise performing site assessment services.

Table 3. Site Assessment (Scope) Consolidated Successes and Challenges

| U.S. Army Corps of Engineers (Consolidated) | |
|---|---|
| **Site Assessment (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Completed all requested site assessments. [Recurring Theme: HQ, 8 Divisions] | 1. Initial lack of integration with valuable stakeholders other than FEMA and state governments. [Recurring Theme: HQ, LRD, MVD, NAD, SPD, SWD] |
| 2. Effective reports were valuable to States for informing both USACE contracting and independent State contracting of ACF construction. [Recurring Theme: LRD, MVD, POD, SPD] | 2. Initial ineffective integration into State EOC planning and prioritization for site assessments. [Recurring Theme: LRD, MVD, NAD, SPD] |
| 3. Established Site Assessment Teams with Effective Composition of Engineer Disciplines. [Recurring Theme: LRD, MVD, NWD, SPD] | 3. Difficulty integrating digital solutions for site assessments. [Recurring Theme: NAD, NWD, SPD] |
| 4. Developed criteria and standards for effective site assessments. [Recurring Theme: HQ, NAD, SPD] | 4. Difficulty obtaining necessary site plans or supporting documents prior to site assessments. [Recurring Theme: MVD, NAD, SPD] |
| 5. Leveraged Technology to conduct physical site assessments. [Recurring theme: LRD, NAD, SWD] | 5. Initial difficulty establishing site assessment teams with effective composition of engineer disciplines. [Recurring Theme: NAD, SPD] |
| 6. Successful integration with FEMA and States for Defining Requirements and Priorities for USACE Site Assessment Missions. [Recurring Theme: LRD, NWD] | 6. Sub-optimal integration and employment of deployed augmentee personnel. [Recurring Theme: LRD, SPD] |
| 7. Leveraged ESF #3 PRT Members to establish ACF site assessment teams. [Recurring Theme: SPD, SWD] | 7. Initial difficulty managing the ACF site assessment mission requirements (i.e., non-standard ESF #3 task). [Significant Observation: MVD] |
| 8. Districts trained multiple site assessment teams. [Recurring Theme: NWD, SAD] | 8. Initially, site assessments had no standardized template or criteria. [Significant Observation: NAD] |
| 9. Effective integration and employment of deployed USACE augmentee personnel. [Recurring Theme: POD, SAD] | 9. Continuously required improvements to specific engineering Considerations during site assessments. [Significant Observation: NAD] |
| 10. Effective integration with state government for site assessment planning and prioritization. [Significant Observation: SWD] | 10. Isolated instances of site assessment teams not independently verifying operation of building utilities and mechanical systems. [Significant Observation: NAD] |
| 11. Established system for identifying and integrating ACF requirements owners before site assessments. [Significant Observation: LRD] | 11. Isolated instances of site assessment reports not including applicable building codes or life safety requirements. [Significant Observation: SPD] |
| 12. Inter-District Coordination to Complete Site Assessments. [Significant Observation: SPD] | |
| 13. Effective integration of Army National Guard to support site assessments. [Significant Observation: SWD] | |
| 14. Leveraged local fire departments during assessments to validate building code and fire safety. [Significant Observation: SPD] | |
| 15. Employed virtual assistance/collaboration techniques to provide site assistance to non-USACE assessments. [Significant Observation: POD] | |
| 16. Presented virtual enterprise-level site assessment training session, including use of Survey123 digital platform. [Significant Observation: SAD] | |

*Source:* Created by author.

In terms of scope successes, USACE's performance of site assessment services during COVID-19 emergency response operations was primarily characterized by the successful accomplishment of all requested site assessments. USACE ultimately executed

1,155 site assessments across 50 states and 5 territories, with eight divisions each contributing to these operations.

Referencing the preceding table, Scope Successes #1 through #9 each represent a recurring theme identified through analysis of the individual performance assessments. Scope Success #1 represents the successful completion of all site assessments, and this recurring theme was notably reflected throughout assessments of Headquarters and eight divisions. Scope Success #2 represented the next major recurring theme, with four divisions reporting the effectiveness of site assessment reports to states—allowing state officials to make informed decisions about ACF conversions. Scope Success #3 was another major recurring theme, with four divisions reporting that site assessment teams were established—despite ACF assessments not being a trained task in USACE—with effective compositions of engineer disciplines to allow for effective inspections. Scope Success #4, reported by Headquarters and two divisions, reflects that USACE developed—while executing operations—effective criteria and standards for ACF site assessments, despite no precedent for this task. Scope Success #5, reported by three divisions, reflects the successful leveraging of technology by USACE site assessment teams. Scope Success #6, reported by two divisions, documents USACE's successful integration with FEMA and states for defining USACE site assessment requirements and priorities. Scope Success #7, reported by two divisions, reflects USACE's success in adapting ESF #3 PRT members to the new task of ACF assessments. Scope Success #8, reported by two divisions, reflects the effectiveness of training and employing multiple site assessment teams. Scope Success #9, represented by two divisions, reflects the

successes associated with effectively integrating deployed USACE augmentee personnel to complete the assessment mission.

Scope Successes #10 through #16 each represent a significant observation, reported by only one division, that was generalizable to the USACE enterprise (i.e., although only one division reported the observation, this observation is reasonable or even likely to occur in any division). Scope Success #10 reflects the Southwestern Division's successful integration into state government for site assessment planning and prioritization. Differing from Scope Success #6 that refers to USACE integrating for the purpose of receiving guidance on the state's needs, this refers to USACE integration for the purpose of assisting in planning and prioritizing—tasks with which states needed significant assistance, as COVID-19 emergency response operations demonstrated. Scope Success #11 reflects the Great Lakes and Ohio River Division success in identifying and integrating facility requirements owners prior to site assessments. Differing from Scope Successes #6 and #10 because integration within the state government is no guarantor of integration with the health organization end-users (even when those health organizations are themselves coordinating directly with the state government), this refers to systematic and direct integration with facility requirements owners and end-users. Scope Success #12 documents the South Pacific Division's successful inter-district coordination. Given that USACE district boundaries do not align based on state political boundaries, this non-trivial finding is a significant best practice. Scope Success #13 reflects the Southwestern Division's success integrating the Army National Guard to support site assessments. Although National Guard personnel generally have no training to support these kinds of assessments, the Southwestern Division determined that the practice could be

significantly valuable given a short USACE training iteration and follow-on USACE technical oversight. Success #14 reflects the South Pacific Division's best practice of leveraging local fire departments to validate building code and fire safety. This best practice alleviates critical tasks from USACE site assessment teams by employing a resource that is present in every locality and virtually certain to remain operational during a future pandemic. Success #15 reflects the success of the Pacific Ocean Division in leveraging virtual collaboration platforms to assist non-USACE assessments. The Pacific Ocean Division implemented this creative solution out of necessity, with difficulty providing physical site assessment team support to the Commonwealth of the Northern Mariana Islands, but this method could be employed nationwide to expand the research of USACE's resources. Success #16 reflects the successful sharing of lessons learned mid-response by USACE subordinate units, allowing USACE as an enterprise to become more effective at site assessments even while executing operations.

In terms of scope challenges and issues, USACE's performance of site assessment services during COVID-19 emergency response operations reflected primarily minor issues with no direct risk to mission accomplishment, many of which were resolved over the course of operations. Two moderately impactful challenges were noted, but these were isolated instances.

Referencing the preceding table, Scope Challenges #1 through #6 each represent a recurring theme identified through analysis of the individual performance assessments. Scope Challenge #1 reflects that five divisions reported challenges due to initial lack of integration with valuable stakeholders other than FEMA and state governments. Although integration was effective with FEMA and state governments (as the hiring

authority and customer, respectively) to determine requirements, lacking input from other stakeholders such as end-user health groups resulted in less effective site assessments. This issue, however, was limited to initial operations, as USACE quickly identified and addressed it. Scope Challenge #2 reflects a similar issue, with four divisions reporting issues related to ineffective integration into state planning and prioritization of potential sites. While this advisory role is not necessarily a USACE requirement, the effectiveness of site assessments was reduced (or resources were used inefficiently) when states did not receive technical assistance to planning and prioritization. This issue was also resolved during the execution of assessment operations. Scope Challenge #3 documents that three divisions reported difficulty integrating digital solutions for site assessments. To some extent, this minor challenge endured throughout the duration of COVID-19 emergency response operations. While USACE headquarters attempted to streamline assessment operations by implementing enterprise solutions mid-response, some divisions found these mid-response technology deployments to be an unnecessary burden. The overall impact of this minor challenge was some inefficiency and additional work for site assessment personnel. Scope Challenge #4 reflects the challenges experienced by three divisions in obtaining site plans and supporting documentation—and the negative impacts this occasionally had on follow-on Engineering and Design work. Early in operations for some divisions, this issue was related to not requesting these documents early enough. This was generally resolved as divisions developed effective systems, but the challenge remained as site owners did not always provide these documents in a time-expedient manner. Scope Challenge #5 reflects the challenges of two divisions with initial difficulty establishing assessment teams with the right mix of engineer disciplines. As available

USACE engineers are conducting both emergency and non-emergency work continuously, divisions must be economical with their resources. Through trial and error, however, these divisions ultimately established effective team compositions. Scope Challenge #6 reflects that two divisions documented sub-optimal integration of deployed augmentee personnel—resulting in inefficiencies applying USACE resources to the overall site assessment mission. This issue is related to general management of the site assessment mission set, and it was somewhat resolved through brute force troubleshooting by individual divisions.

Scope Challenges #7 through #11 each represent a significant observation, reported by only one division, that was generalizable to the USACE enterprise (i.e., although only one division reported the observation, this observation is reasonable or even likely to occur in any division). Scope Challenge #7 reflects the significant observation that the Mississippi Valley Division had initial difficulty managing the site assessment mission requirements, given that it is not an enumerated ESF #3 task. The division's St. Paul District noted that leveraging its ESF #3 Infrastructure PRT was helpful, but it cautioned that "it's not a housing or CPF mission" and so must be approached with the specific ACF focus in mind.[1] While this division ultimately gained understanding of the mission set and requirements, the fact remains that ACF assessments do not fall under any ESF #3 mission team task or responsibility. Even for divisions that reported leveraging and adapting other ESF #3 PRT members, these represent field-expedient solutions rather than formally established systems. Scope Challenge #8 reflects the North Atlantic Division's initial lack of templates or criteria for site assessments. Being at the "tip of the spear" for the site assessment mission, this

division began operations with no precedent and no existing products, but ultimately it developed effective solutions during execution of operations. Scope Challenge #9 documents the continuous troubleshooting and refinement of site assessment criteria by the North Atlantic Division. As the troubleshooting suggests, these issues were resolved by this division as they were identified, but the challenges are still recorded here to assist in follow-on formalization of enterprise solutions. Scope #10 and #11 represent more significantly negative issues, which the researcher assesses as moderate in nature (i.e., directly impacts the mission negatively but does not cause failure to mission). As a result of site assessment teams not properly identifying certain features, two ACF construction projects were negatively impacted by unexpected increases in scope, which correspondingly resulted in increases to schedule and cost. These instances were very isolated (i.e., only two instances reported), however, and the impacts to the two construction projects were not critical.

Table 4 below presents the consolidated schedule successes and challenges of USACE as an enterprise performing site assessment services.

Table 4. Site Assessment (Schedule) Consolidated Successes and Challenges

| U.S. Army Corps of Engineers (Consolidated) | |
|---|---|
| **Site Assessment (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| 1. Teams deployed and conducted requested assessments quickly. [Recurring Theme: LRD, MVD, NAD, SAD, SPD] | 1. Lack of cost engineers on some initial site assessment teams resulted in increased duration for assessment reports and, later, Engineering and Design work. [Significant Observation: NAD] |
| 2. Districts maintained schedule availability for requests by training multiple teams. [Recurring Theme: MVD, SAD] | 2. Initial lack of integration of medical planners caused increased duration for Engineering and Design work. [Significant Observation: NAD] |
| 3. Integration of augmentee personnel expedited site assessments. [Recurring Theme: POD, SAD] | 3. Inter-District coordination occasionally increased duration of writing and submitting reports. [Significant Observation: SPD] |
| 4. Leveraged digital solutions to further reduce time to complete and submit assessment reports. [Recurring Theme: LRD, SWD] | 4. Unplanned increases in schedule duration during ACF construction/conversion due to site assessments not identifying required building code modifications. [Significant Observation: HQ] |
| 5. Inclusion of cost engineers on site assessment teams resulted in reduced duration for assessment reports and, later, Engineering and Design work. [Significant Observation: SPD] | 5. Site assessment ROM estimates on construction timeline occasionally caused issues with stakeholder expectation management. [Significant Observation: SPD] |
| 6. Inter-District coordination expedited site assessments. [Significant Observation: SPD] | |
| 7. Integration of Army National Guard expedited site assessments and submission of reports. [Significant Observation: SWD] | |
| 8. FEMA National MA (NAD-02) on 18 March 2020 expedited initiation of site assessment missions. [Significant Observation: SWD] | |

*Source:* Created by author.

In terms of schedule successes, USACE's performance of site assessment services during COVID-19 emergency response operations was primarily characterized by the remarkable speed with which USACE site assessment teams deployed and conducted requested site assessments.

Referencing the preceding table, Schedule Successes #1 through #4 each represent a recurring theme identified through analysis of the individual performance assessments. Schedule Success #1 reflects the noteworthy speed of deployment and site assessment, as reported by five divisions. Schedule Success #2 reflects the successful practice by two divisions of training and employing multiple site assessment teams in order to maintain schedule availability. Schedule Success #3 reflects the success of two divisions in integrating augmentee personnel to expedite execution of site assessments.

Schedule Success #4 reflects the successful practice by two divisions of leveraging digital solutions to reduce the time to complete and submit site assessment reports.

Schedule Successes #5 through #8 each represent a significant observation, reported by only one division, that was generalizable to the USACE enterprise (i.e., although only one division reported the observation, this observation is reasonable or even likely to occur in any division). Schedule Success #5 reflects the South Pacific Division's successful reduction of time to complete assessment reports through inclusion of cost engineers on assessment teams. Schedule Success #6 reflects the success of the South Pacific Division at expediting site assessments through inter-district coordination—allowing teams in closer geographic proximity, despite not being members of the district that received the assessment mission, to conduct the assessments. Schedule Success #7 reflects the Southwestern Division's success at employing National Guard personnel to expedite both site assessments and completion of assessment reports. Schedule Success #8 reflects the significant observation that FEMA's National MA NAD-02, which provided 100% federal funding for state-requested site assessments prior to individual state funding agreements with FEMA, allowed for site assessments to begin far sooner than standard process would have allowed. The Southwestern Division, specifically, observed that "Having a national MA in place for all states allowed USACE to begin the facility assessment much quicker than waiting on individual state to request a Mission Assignment."[2] The division noted that, "This allowed USACE to respond much quicker to begin assisting the states in assessments."[3]

In terms of schedule challenges and issues, USACE's performance of site assessment services during COVID-19 emergency response operations reflected primarily minor issues with no direct risk to mission accomplishment.

Referencing the preceding table, each challenge enumerated represents a significant observation, reported by only one division, that was generalizable to the USACE enterprise (i.e., although only one division reported the observation, this observation is reasonable or even likely to occur in any division). Schedule Challenge #1 reflects that the North Atlantic Division documented increased durations for site assessment completion and, later, Engineering and Design work by not including cost engineers on some initial site assessment teams. This issue was, however, resolved early in operations when identified. Schedule Challenge #2 reflects that the North Atlantic Division documented increased durations for Engineering and Design work—due to changes in scope upon belated medical user input—due to lack of integration with medical planners during early operations. This issue was also resolved after initial operations. Schedule Challenge #3 reflects the South Pacific Division's finding that occasionally inter-district coordination resulted in report construction delays. Although coordination friction and delays between independent units cannot be fully resolved, the impact of these delays was minor (i.e., likely less than the time saved through inter-district coordination on the physical assessment execution). Schedule Challenge #4 reflects the assessment by USACE Headquarters that unplanned increases in schedule duration occur during facility construction if site assessment do not identify required building code modifications accurately. While accurate, this schedule challenge refers to a single isolated incident—and even during that incident, the resulting schedule delays

were not mission critical. Schedule Challenge #5 reflects the South Pacific Division's finding that construction timeline estimates developed for site assessment reports occasionally caused friction with stakeholders when scope and schedule increased upon better definition of contract requirements. As site assessment estimates on construction duration are rough order of magnitude (ROM) estimates, this issue does not represent a true failing on the part of USACE site assessments, but the management of stakeholder expectations and communication of the intent of construction estimates is a minor challenge that should be addressed.

Table 5 below presents the consolidated cost successes and challenges of USACE as an enterprise performing site assessment services.

Table 5. Site Assessment (Cost) Consolidated Successes and Challenges

| **U.S. Army Corps of Engineers (Consolidated)** | |
|---|---|
| **Site Assessment (Cost)** | |
| **Successes** | **Challenges/Issues** |
| 1. States initially benefited from access to 100% Federal funding for site assessments through FEMA National MA (NAD-02) from 18 March 2020 through 14 April 2020. [Recurring Theme: HQ, MVD] | 1. Some States were not willing to request site assessments at the 25% State cost-share rate. [Recurring Theme: MVD, NAD] |
| 2. Some States were willing to contribute at the 25% State cost-share rate. [Significant Observation: MVD] | 2. Many instances of site assessment teams without dedicated cost engineer support, resulting in less accurate estimation of construction costs. [Significant Observation: HQ] |
| 3. Inclusion of cost engineers on site assessment teams resulted in highly accurate ROM cost estimates for construction. [Significant Observation: SPD] | 3. Initial site assessments resulted in cost estimates with less accuracy, as experience and parametric data were non-existent. [Significant Observation: LRD] |
| | 4. Initial lack of integration of medical planners resulted in re-work to Engineering and Design products, with correspondingly higher costs. [Significant Observation: NAD] |
| | 5. Inefficient employment of augmentee personnel resulted in some instances of increased labor costs for site assessments. [Significant Observation: LRD] |
| | 6. Scope increases related to lack of site plans and documentation resulted in cost increases. [Significant Observation: SPD] |
| | 7. Scope increases related to not independently verifying utilities and mechanical systems resulted in cost increases. [Significant Observation: SPD] |
| | 8. Site assessment ROM cost estimates occasionally caused issues with stakeholder expectation management. [Significant Observation: SPD] |

*Source:* Created by author.

In terms of cost successes, USACE's performance of site assessment services during COVID-19 emergency response operations was primarily characterized by the availability of 100% federal funding through FEMA National MA NAD-02.

Referencing the preceding table, Cost Success #1 represents the recurring theme mentioned above (and identified through analysis of the individual performance assessments) that the availability of 100% federal funding (and the presence of this funding earlier than cost-share agreements could even have been developed) enabled states to request site assessments from USACE in volume for nearly a month during the study period.

Cost Successes #2 and #3 each represent a significant observation, reported by only one division, that was generalizable to the USACE enterprise (i.e., although only one division reported the observation, this observation is reasonable or even likely to occur in any division). Cost Success #2 reflects that some states were willing to contribute at the 25% state cost-share rate, after the termination of FEMA National MA NAD-02 on 14 April 2020. Cost Success #3 reflects the South Pacific Division's observation that including cost engineers on site assessment teams resulted in highly accurate cost estimates for follow-on construction missions.[4]

In terms of cost challenges and issues, USACE's performance of site assessment services during COVID-19 emergency response operations reflected numerous significant observations—each of which, however, was relatively minor in impact—and one recurring theme regarding the unwillingness of some states to request site assessments at the 25% cost-share rate for the state.

Referencing the preceding table, Cost Challenges #1 reflects the recurring theme (identified through analysis of the individual performance assessments) that some states were unwilling to request site assessments with a 25% cost-share rate for the state. While a few states including Louisiana and Maine were specifically documented as not wanting to proceed with site assessments with a state cost-share, the extent of the issue is difficult to determine without further investigation. Available data indicates that some states were willing to accept a cost-share (as supported by Cost Success #2 above) and some states were unwilling, but the majority of states (i.e., 29 states, Washington, D.C., and 2 territories) had already entered into cost-share agreements for construction by 14 April 2020—which included mandatory cost-share of 25% for all site assessments after contract execution. Adding to this complexity, the most pressing need for site assessments occurred prior to the expiration of the FEMA National MA—and, by this point, most states had likely conducted the site assessments needed to inform construction decisions.

Cost Challenges #2 through #8 each represent a significant observation, reported by only one division, that was generalizable to the USACE enterprise (i.e., although only one division reported the observation, this observation is reasonable or even likely to occur in any division). Cost Challenge #2 reflects the USACE Headquarters observation that site assessment teams lacking dedicated cost engineer support provided less accurate estimations of construction costs. This observation is mitigated by the fact that USACE divisions generally resolved this issue after early operations by including cost engineers on assessments teams. Cost Challenge #3 reflects that initial site assessments resulted in less accurate estimates of construction costs, due to the lack of experience by engineers

with this mission set and lack of parametric data on ACF construction. This challenge, like the previous, was resolved during execution of operations as more data became available regarding ACF construction. Cost Challenge #4 reflects that higher costs of Engineering and Design labor were eventually required for re-work when medical planners were not integrated into the site assessment process. This issue was likewise resolved over the course of operations, as divisions systematically integrated medical planners into the assessment mission planning. Cost Challenge #5 reflects that inefficient employment of deployed augmentee personnel resulted in increased labor costs for site assessments. This challenge, where present, was not significantly impactful to overall site mission costs, but the issue should be addressed to avoid increases in cost in future operations. Cost Challenge #6 reflects the significant observation that scope increases, resulting from lack of existing site plans and documentation, caused corresponding increases in cost. This issue was mitigated, as much as practicable, by divisions systematizing requests for site documentation early in the site assessment planning process. To some extent, however, this challenge cannot be fully resolved, as site plans may not be provided by site owners in a timely manner. Cost Challenge #7 reflects the significant observation that scope increases, related to not independently verifying utilities and mechanical systems result in cost increases during construction. This issue was notable in one isolated instance during the execution of operations, and in this instance the cost impact was not mission critical. With that said, this issue should still be addressed to mitigate the risk of future occurrences. Cost Challenge #8 reflects the South Pacific Division's finding that construction cost estimates developed for site assessment reports occasionally caused friction with stakeholders when scope and, correspondingly,

cost increased upon better definition of contract requirements.[5] As site assessment estimates on construction cost are ROM estimates, this issue does not represent a true failing on the part of USACE site assessments, but the management of stakeholder expectations and communication of the intent of construction estimates is a minor challenge that should be addressed.

### Evaluation Criteria and Functional Needs Analysis

Building upon the consolidated performance assessment in the preceding section, the researcher screened the USACE performance of its site assessment mission against the evaluation criteria outlined in chapter 3.

Scope was assessed as "Green," indicating only minor capability gaps with no direct impact to mission. Summarizing the detailed discussion of scope in the preceding section, USACE's performance of site assessment services in consideration of scope factors was primarily characterized by the successful accomplishment of all requested site assessments. USACE ultimately executed 1,155 site assessments across 50 states and 5 territories, with eight divisions each contributing to these operations. Documented scope challenges and issues were primarily minor with no direct risk to mission accomplishment, and many of these issues were resolved over the course of operations. Two moderately impactful challenges were noted, but these were isolated instances and, moreover, the identified failings more likely reflect individual site assessment team shortcomings rather than a systemic problem. In either case, applying the mitigation criteria outlined in chapter 3, these ostensibly "Amber" capability gaps (i.e., moderate capability gap that directly impacts mission negatively, but does not cause failure to mission or cause states to discontinue future services) are mitigated one level to "Green"

because these two divisions (and others) developed standards and systems for site assessments that required independent verification of utilities, mechanical systems, and building code requirements.

Schedule was assessed as "Green," indicating only minor capability gaps with no direct impact to mission. Summarizing the detailed discussion of schedule in the preceding section, USACE's performance of site assessment services in consideration of schedule factors was primarily characterized by the remarkable speed with which USACE site assessment teams deployed and conducted requested site assessments. Identified schedule challenges and issues were primarily minor with no direct risk to mission accomplishment.

Cost was assessed as "Green," indicating only minor capability gaps with no direct impact to mission. Summarizing the detailed discussion of cost in the preceding section, USACE's performance of site assessment services in consideration of cost factors was primarily characterized by the availability of 100% federal funding through FEMA National MA NAD-02, which enabled states to request site assessments from USACE in volume for nearly a month during the study period. Several challenges and issues were reported, but, except for one notable exception, each was relatively minor in impact with no direct impact to mission. The lone exception was the recurring theme regarding the unwillingness of some states to request site assessments at the 25% cost-share rate for the state. The data on this issue, however, is inconclusive (i.e., not generalizable based on available data) so this will not be assessed as lower than "Green." From the available evidence, more states were willing to request site assessments with a 25% state cost-share than were unwilling, and the majority of states cannot be assessed

due to mandatory cost-share on site assessments prior to 100% federal funding termination as a result of signing Direct Federal Assistance agreements for USACE construction of ACFs.

Summarizing the above narrative, the overall assessment of USACE performance and, correspondingly, the severity of the capability gap is depicted below in table 6.

Table 6. Site Assessment Overall Performance and Functional Needs Analysis

| **Overall Performance Assessment and Functional Needs Analysis: Site Assessment** | | |
|---|---|---|
| **Scope** | **Schedule** | **Cost** |
| **GREEN** | **GREEN** | **GREEN** |
| Minor capability gaps with no direct impact to mission. Successful accomplishment of all requested site assessments. Documented issues were minor, excepting two isolated instances that divisions rectified systematically during execution of operations. | Minor capability gaps with no direct impact to mission. Remarkable speed of site assessment team deployment and conduct of requested site assessments. Identified schedule challenges and issues were primarily minor with no direct risk to mission accomplishment. | Minor capability gaps with no direct impact to mission. Availability of 100% federal funding enabled states to request site assessments from USACE in volume for nearly a month during the study period. Issues were minor, and unwillingness by some states to pay cost-share rates is not generalizable. |

*Source:* Created by author.

To enumerate the capability gaps identified during this Functional Needs Analysis, the three consolidated tables of successes and challenges/issues will be applied directly to Functional Solutions Analysis. Due to the unprecedented nature of the ACF mission and based on the literature review Functional Area Analysis (i.e., no currently developed USACE doctrine, emergency operations structure, training specific to ACF operations, etc.), nearly every Success and Challenge/Issue enumerated represents a capability gap that should be assessed against possible solution approaches. Observed successes require USACE to implement changes to sustain the positive performance in future pandemic events, and observed challenges and issues require USACE to implement solutions to improve performance in future pandemic events. In the few

instances in which the consolidated performance assessment does not correspond to a capability gap, this is noted specifically in the Functional Solutions Analysis.

### Functional Solutions Analysis

This section presents solutions to the capability gaps identified in the preceding Functional Needs Analysis phase. The researcher—informed by the deep contextual understanding gained through literature review (i.e., identified requirements) and analysis of collected data (i.e., identified current capabilities)—generated proposed solution approaches across the Doctrine, Organization, Training, Leadership, and Personnel (DOTLP) domains. The researcher then applied Feasible-Acceptable-Suitable evaluation criteria to these proposed solution approaches to test the validity of the approaches. Ultimately, this section consolidates the recommended solution approaches, addressing the identified capability gaps and contributing to the study's response to the primary research question of how USACE should prepare itself for effective support to ACF operations in future pandemic events.

### Generating Solutions to the Enumerated Capability Gaps

The following tables demonstrate the process by which the researcher generated solutions to address each of the enumerated capability gaps.

Table 7 below demonstrates the solutions generated across the DOTLP domains to address the capability gaps defined by USACE's ad hoc scope successes during execution of site assessment operations. To facilitate formatting and word economy, these solutions are identified as abbreviated solution approaches in the table. Detailed

descriptions of each solution are provided in narrative format after consolidation of all identified solutions.

Table 7. Site Assessment (Scope Successes) Functional Solutions Analysis

| Functional Solutions Analysis: Site Assessment (Scope, Part 1) | | | | | |
|---|---|---|---|---|---|
| **Successes** | **Doctrine** | **Organization** | **Training** | **Leadership** | **Personnel** |
| 1. Completed all requested site assessments. | No identified capability gap. | | | | |
| 2. Effective reports were valuable to States for informing both USACE contracting and independent State contracting of ACF construction. | Establish new QMS Business Process for ACF Site Assessment execution. | | | | |
| 3. Established Site Assessment Teams with Effective Composition of Engineer Disciplines. | Establish new QMS Business Process for ACF Site Assessment execution. | | | | |
| 4. Developed criteria and standards for effective site assessments. | Establish new QMS Business Process for ACF Site Assessment execution. | | | | |
| 5. Leveraged Technology to conduct physical site assessments. | Establish new QMS Business Process for ACF Site Assessment execution. | | | | |
| 6. Successful integration with FEMA and States for Defining Requirements and Priorities for USACE Site Assessment Missions. | Establish new QMS Business Process for ACF Site Assessment execution. Update to ER 500-1-28 to formalize new ESF #3 Mission PRT. | Establish ESF #3 ACF PRT. | Training for ESF #3 ACF PRT. | | |
| 7. Leveraged ESF #3 PRT Members to establish ACF site assessment teams. | No identified capability gap. | | | | |
| 8. Districts trained multiple site assessment teams. | Update to ER 500-1-28 to formalize new ESF #3 Mission PRT. | Establish ESF #3 ACF PRT. | Training for ESF #3 ACF PRT. | | |
| 9. Effective integration and employment of deployed USACE augmentee personnel. | Update to ER 500-1-28 to formalize new ESF #3 Mission PRT. | Establish ESF #3 ACF PRT. | Training for ESF #3 ACF PRT. | | |
| 10. Effective integration with state government for site assessment planning and prioritization. | Establish new QMS Business Process for ACF Site Assessment execution. Update to ER 500-1-28 to formalize new ESF #3 Mission PRT. | | | | |
| 11. Established system for identifying and integrating ACF requirements owners before site assessments. | Establish new QMS Business Process for ACF Site Assessment execution. Update to ER 500-1-28 to formalize new ESF #3 Mission PRT. | | | | |
| 12. Inter-District Coordination to Complete Site Assessments. | Update to ER 500-1-28 to formalize new ESF #3 Mission PRT. | Establish ESF #3 ACF PRT. | Training for ESF #3 ACF PRT. | | |
| 13. Effective integration of Army National Guard to support site assessments. | Update to ER 500-1-28 to formalize new ESF #3 Mission PRT. | Establish ESF #3 ACF PRT. | Training for ESF #3 ACF PRT. | | |

*Source:* Created by author.

Table 8. Site Assessment (Scope Challenges) Functional Solutions Analysis

| Functional Solutions Analysis: Site Assessment (Scope, Part 2) | | | | | |
|---|---|---|---|---|---|
| **Challenges/Issues** | **Doctrine** | **Organization** | **Training** | **Leadership** | **Personnel** |
| 1. Initial lack of integration with valuable stakeholders other than FEMA and state governments. | Update to ER 500-1-28 to formalize new ESF #3 Mission PRT. | Establish ESF #3 ACF PRT. | Training for ESF #3 ACF PRT. | | |
| 2. Initial ineffective integration into State EOC planning and prioritization for site assessments. | Update to ER 500-1-28 to formalize new ESF #3 Mission PRT. | Establish ESF #3 ACF PRT. | Training for ESF #3 ACF PRT. | | |
| 3. Difficulty integrating digital solutions for site assessments. | Establish new QMS Business Process for ACF Site Assessment execution.<br><br>Standardize digital platform solutions. | | Standardize and provide training on use of digital platform solutions for assessment tasks. | | |
| 4. Difficulty obtaining necessary site plans or supporting documents prior to site assessments. | No feasible solution to address problem directly if stakeholders cannot produce the required documents, but requesting site plans and documents should be codified within the QMS Business Process for ACF Site Assessment execution. | | | | |
| 5. Initial difficulty establishing site assessment teams with effective composition of engineer disciplines. | Establish new QMS Business Process for ACF Site Assessment execution. | | | | |
| 6. Sub-optimal integration and employment of deployed augmentee personnel. | Update to ER 500-1-28 to formalize new ESF #3 Mission PRT. | Establish ESF #3 ACF PRT. | Training for ESF #3 ACF PRT. | | |
| 7. Initial difficulty managing the ACF site assessment mission requirements (i.e., non-standard ESF #3 task). | Update to ER 500-1-28 to formalize new ESF #3 Mission PRT. | Establish ESF #3 ACF PRT. | Training for ESF #3 ACF PRT. | | |
| 8. Initially, site assessments had no standardized template or criteria. | Establish new QMS Business Process for ACF Site Assessment execution. | | | | |
| 9. Continuously required improvements to specific engineering Considerations during site assessments. | Establish new QMS Business Process for ACF Site Assessment execution. | | | | |
| 10. Isolated instances of site assessment teams not independently verifying operation of building utilities and mechanical systems. | Establish new QMS Business Process for ACF Site Assessment execution. | | | | |
| 11. Isolated instances of site assessment reports not including applicable building codes or life safety requirements. | Establish new QMS Business Process for ACF Site Assessment execution. | | | | |

*Source:* Created by author.

Table 9 below demonstrates the solutions generated across the DOTLP domains to address the capability gaps defined by USACE's ad hoc schedule successes during execution of site assessment operations. As before, these solutions are identified as abbreviated solution approaches in the table. Detailed descriptions of each solution are provided in narrative format after consolidation of all identified solutions.

Table 9. Site Assessment (Schedule Successes) Functional Solutions Analysis

| Functional Solutions Analysis: Site Assessment (Schedule, Part 1) | | | | | |
|---|---|---|---|---|---|
| **Successes** | **Doctrine** | **Organization** | **Training** | **Leadership** | **Personnel** |
| 1. Teams deployed and conducted requested assessments quickly. | No identified capability gap. | | | | |
| 2. Districts maintained schedule availability for requests by training multiple teams. | Update to ER 500-1-28 to formalize new ESF #3 Mission PRT. | Establish ESF #3 ACF PRT. | Training for ESF #3 ACF PRT. | | |
| 3. Integration of augmentee personnel expedited site assessments. | Update to ER 500-1-28 to formalize new ESF #3 Mission PRT. | Establish ESF #3 ACF PRT. | Training for ESF #3 ACF PRT. | | |
| 4. Leveraged digital solutions to further reduce time to complete and submit assessment reports. | Standardize digital platform solutions. | | Standardize and provide training on use of digital platform solutions for assessment tasks. | | |
| 5. Inclusion of cost engineers on site assessment teams resulted in reduced duration for assessment reports and, later, Engineering and Design work. | Establish new QMS Business Process for ACF Site Assessment execution. | | | | |
| 6. Inter-District coordination expedited site assessments. | Update to ER 500-1-28 to formalize new ESF #3 Mission PRT. | Establish ESF #3 ACF PRT. | Training for ESF #3 ACF PRT. | | |
| 7. Integration of Army National Guard expedited site assessments and submission of reports. | Update to ER 500-1-28 to formalize new ESF #3 Mission PRT. | Establish ESF #3 ACF PRT. | Training for ESF #3 ACF PRT. | | Formally establish the practice of requesting other military or federal agency engineers to support physical site assessments and/or report construction. |
| 8. FEMA National MA (NAD-02) on 18 March 2020 expedited initiation of site assessment missions. | | | | USACE HQ Leadership should advocate for a National MA in the event of a future pandemic event. | |

*Source:* Created by author.

Table 10 below demonstrates the solutions generated across the DOTLP domains to address the capability gaps defined by USACE's schedule challenges and issues during execution of site assessment operations. As before, these solutions are identified as

abbreviated solution approaches in the table. Detailed descriptions of each solution are provided in narrative format after consolidation of all identified solutions.

Table 10. Site Assessment (Schedule Challenges) Functional Solutions Analysis

| Functional Solutions Analysis: Site Assessment (Schedule, Part 2) | | | | | |
|---|---|---|---|---|---|
| **Challenges/Issues** | **Doctrine** | **Organization** | **Training** | **Leadership** | **Personnel** |
| 1. Lack of cost engineers on some site assessment teams resulted in increased duration for assessment reports and, later, Engineering and Design work. | Establish new QMS Business Process for ACF Site Assessment execution. | | | | |
| 2. Initial lack of integration of medical planners caused increased duration for Engineering and Design work. | Update to ER 500-1-28 to formalize new ESF #3 Mission PRT. | Establish ESF #3 ACF PRT. | Training for ESF #3 ACF PRT. | | |
| 3. Inter-District coordination occasionally increased duration of writing and submitting reports. | No feasible solution to address problem, and time savings associated with inter-district coordination will outweigh any report construction delays. | | | | |
| 4. Unplanned increases in schedule duration during ACF construction/conversion due to site assessments not identifying required building code modifications. | Establish new QMS Business Process for ACF Site Assessment execution. | | | | |
| 5. Site assessment ROM estimates on construction timeline occasionally caused issues with stakeholder expectation management. | | | | USACE Leadership, at the District and Division levels, must manage expectations with State and local leadership by communicating the meaning of ROM estimates. | |

*Source:* Created by author.

Table 11 below demonstrates the solutions generated across the DOTLP domains to address the capability gaps defined by USACE's ad hoc cost successes during execution of site assessment operations. As before, these solutions are identified as abbreviated solution approaches in the table. Detailed descriptions of each solution are provided in narrative format after consolidation of all identified solutions.

Table 11. Site Assessment (Cost Successes) Functional Solutions Analysis

| Functional Solutions Analysis: Site Assessment (Cost, Part 1) | | | | | |
|---|---|---|---|---|---|
| **Successes** | **Doctrine** | **Organization** | **Training** | **Leadership** | **Personnel** |
| 1. States initially benefited from access to 100% Federal funding for site assessments through FEMA National MA (NAD-02) from 18 March 2020 through 14 April 2020. | | | | USACE Headquarters Leadership should advocate for a National MA in the event of a future pandemic requiring ACF operations. | |
| 2. Some States were willing to contribute at the 25% State cost-share rate. | No identified capability gap. | | | | |
| 3. Inclusion of cost engineers on site assessment teams resulted in highly accurate ROM cost estimates for construction. | Establish new QMS Business Process for ACF Site Assessment execution. | | | | |

*Source:* Created by author.

Table 12 below demonstrates the solutions generated across the DOTLP domains to address the capability gaps defined by USACE's cost challenges and issues during execution of site assessment operations. As before, these solutions are identified as abbreviated solution approaches in the table. Detailed descriptions of each solution are provided in narrative format after consolidation of all identified solutions.

Table 12. Site Assessment (Cost Challenges) Functional Solutions Analysis

| Functional Solutions Analysis: Site Assessment (Cost, Part 2) | | | | | |
|---|---|---|---|---|---|
| **Challenges/Issues** | **Doctrine** | **Organization** | **Training** | **Leadership** | **Personnel** |
| 1. Some States were not willing to request site assessments at the 25% State cost-share rate. | No feasible solution to address problem directly, as willingness to pay is based on numerous factors outside USACE control including State budgets. Given the speed of site assessments (i.e., limited duration of labor hours) conducted and limited travel costs (as USACE teams were already geographically dispersed through the country), cost of site assessments cannot feasibly be decreased. | | | | |
| 2. Many instances of site assessment teams without dedicated cost engineer support, resulting in less accurate estimation of construction costs. | Establish new QMS Business Process for ACF Site Assessment execution. | | | | |
| 3. Initial site assessments resulted in cost estimates with less accuracy, as experience and parametric data were non-existent. | Establish new QMS Business Process for ACF Site Assessment execution. | | | | |
| 4. Initial lack of integration of medical planners resulted in re-work to Engineering and Design products, with correspondingly higher costs. | Update to ER 500-1-28 to formalize new ESF #3 Mission PRT. | Establish ESF #3 ACF PRT. | Training for ESF #3 ACF PRT. | | |
| 5. Inefficient employment of augmentee personnel resulted in some instances of increased labor costs for site assessments. | Update to ER 500-1-28 to formalize new ESF #3 Mission PRT. | Establish ESF #3 ACF PRT. | Training for ESF #3 ACF PRT. | | |
| 6. Scope increases related to lack of site plans and documentation resulted in cost increases. | No feasible solution to address problem directly if stakeholders cannot produce the required documents, but requesting site plans and documents should be codified within the QMS Business Process for ACF Site Assessment execution. | | | | |
| 7. Scope increases related to not independently verifying utilities and mechanical systems resulted in cost increases. | Establish new QMS Business Process for ACF Site Assessment execution. | | | | |
| 8. Site assessment ROM cost estimates occasionally caused issues with stakeholder expectation management. | | | | USACE Leadership, at the District and Division levels, must manage expectations with State and local leadership by communicating the meaning of ROM estimates. | |

*Source:* Created by author.

## Evaluation Criteria

The above solution approaches were screened against the Feasible-Acceptable Suitable evaluation criteria, as described in chapter 3. With the exception of the solutions related to establishing the ESF #3 ACF PRT (which is subsequently discussed), each solution is feasible, acceptable, and suitable. The approaches generated are highly

feasible, with no significant resource expenditures required for formalizing new QMS Business Processes, conducting digital platform training, orienting leadership towards key engagement topics in future pandemic events, and establishing plans for future collaboration with other military or federal agency engineers. The approaches are acceptable, with few associated risks. The approaches are suitable, with reasonable expectation of solving the associated capability gaps.

For establishing the ESF #3 ACF PRT, the associated solutions are certainly acceptable (i.e., few associated risks) and suitable (i.e., solves the associated problem). In terms of feasibility, the researcher contends that the price of establishing the framework and training ESF #3 Alternate Care Facilities PRT members to a level of parity with the ESF #3 Infrastructure Assessment (IA) PRT or ESF #3 Temporary Housing PRT is justified by preparedness to save lives in a future pandemic event. Understanding the reality of a funds constrained environment, however, the researcher believes that establishing an ESF #3 ACF PRT and training members can be accomplished at lower funding levels than those of currently existing ESF #3 PRTs. Possible approaches to achieve this are cross-training IA PRT members (or including this training along with recurring IA PRT training) and/or maintaining only enough (i.e., fewer overall) members of the newly established ACF PRT to support planning at division level and "train the trainer" capacity.

### Consolidated Solutions to the Capability Gaps

Table 13 below documents the consolidated solutions generated (and screened against evaluation criteria) to the capabilities gaps identified in USACE's current preparedness to conduct site assessment services in a future pandemic event.

Table 13. Site Assessment Consolidated Functional Solutions Analysis

| Functional Solutions Analysis: Site Assessment (Consolidated) | |
|---|---|
| **Doctrine** | Update to ER 500-1-28 to formalize new ESF #3 Mission PRT. |
| | Establish new QMS Business Process(es) for ACF Site Assessment execution. |
| | Standardize digital platform solutions. |
| **Organization** | Establish ESF #3 ACF PRT. |
| **Training** | Provide training as required for newly established PRT. |
| | Standardize and provide training on use of digital platform solutions for assessment tasks. |
| **Leadership** | USACE Headquarters Leadership should advocate for a National MA in the event of a future pandemic requiring ACF operations. |
| | USACE Leadership, at the District and Division levels, must manage expectations with State and local leadership by communicating the purpose of ROM estimates. |
| **Personnel** | Recognizing personnel limitations in a national-level pandemic event, formally establish the practice of requesting other military or federal agency engineers to support physical site assessments and/or report construction. |

*Source:* Created by author.

In terms of Doctrine, the researcher recommends the following: Engineer Regulation 500-1-28 (Emergency Employment of Army and Other Resources: National Response Planning Guide) should be updated to formalize the establishment of a new ESF #3 ACF PRT. Among the necessary updates, Chapter 2-2.3 "Teams" should be modified to reflect this new ACF PRT, alongside the currently established "Temporary Roofing PRT," "Temporary Housing PRT," and "Infrastructure Assessment PRT."

QMS Business Processes should be established to inform and govern the conduct of ACF site assessments. Valuable "lessons learned" have been gained through both successes and challenges during the execution of site assessment operations, but these lessons are ineffective if not codified and accessible to USACE personnel. As a non-exhaustive list, this new QMS Business Process (or Processes) should include the following:

1. Guidelines for integrating with FEMA regional response coordination centers and state Emergency Operations Centers (EOCs) to define requirements and priorities for site assessment operations.

2. Guidelines for integrating with state government health agencies and any additional requirements owners for site assessment planning and prioritization.

3. General criteria, standards, and templates for conducting ACF site assessments, including full listing from the North Atlantic Division's comprehensive engineering considerations document.

4. Standardized site assessment reports, with examples; reference to any standardized digital platform, if required.

5. Relevant internet links to access the standardized ACF site assessment digital platform, with guide to using the platform.

6. Guidelines for integrating augmentees into a site assessment team.

Digital platform solutions for conducting and documenting ACF site assessments should be standardized and formally established. This doctrinal solution may be accomplished, as suggested above, through a QMS Business Process, but any formal codification should suffice. As issues implementing digital platform solutions were a recurring theme, however, this simple solution should not be overlooked.

In terms of Organization, the researcher recommends the establishment of a new ESF #3 ACF PRT. This ESF #3 ACF PRT should have structure similar to the current ESF #3 IA PRT (and in fact, efficiencies may be gained by cross-training or "dual hatting" these team members). Management elements of this newly established PRT could deploy in anticipation of formal pandemic disaster declarations, and these elements could begin assisting supported divisions with planning and preparation to conduct site assessments and provide guidance on integration of any deploying augmentee personnel. After formal pandemic disaster declarations, these management elements could integrate

with state EOCs to alleviate the challenges, issues, and confusion of the COVID-19 emergency response operations, at which time no trained ESF #3 PRT existed. Based on the funding provided to this new ESF #3 PRT, teams of support elements could then deploy as well to lead site assessment teams themselves or "train the trainer" to increase the effectiveness of district site assessment teams.

In terms of Training, the researcher recommends the following: Provide training as required for the new ESF #3 ACF PRT, with standards and regular intervals similar to those of the current ESF #3 IA PRT. Training should also be provided, perhaps in digital "on-demand" format, for any standardized digital platform solutions required by USACE Headquarters to conduct site assessments.

In terms of Leadership, the researcher recommends the following: USACE Headquarters leadership should strongly consider advocating for a National MA to provide 100% federal funding for site assessments prior to state disaster declarations and cost-share agreements with individual states. This was critical to expediting site assessments during COVID-19 emergency response operations. USACE leadership, at division and district levels, should be aware of the need to manage expectations with state and local leadership on the intent of the "rough order of magnitude" construction cost and schedule estimates formulated during the site assessment phase. This expectation management is critical to ensuring state officials are most informed and not caught unaware if cost and schedule impacts result from contract definitization.

In terms of personnel, the researcher does not recommend any costly or controversial (and unfeasible) new hires of key personnel such as cost engineers. With that said, the researcher recommends, in recognition of personnel limitations in a

national-level pandemic event, that USACE formally establish the practice of requesting military or other federal agency engineers to support physical site assessments and/or report construction. This practice was implemented by very few units during COVID-19 emergency response operations, but it was highly effective in the locations where it was implemented.

### Secondary Research Question #2: Engineering and Design

The following section provides a detailed description of the performance of Engineering and Design services by USACE during COVID-19 response operations. Through comprehensive analysis of the documentation provided by USACE headquarters and each of the eight subordinate USACE divisions, the researcher developed a rich description of the performance of each subordinate unit independently. These "Individual Performance Assessments" are referenced below and included in the Appendices, in full and complete format. Building upon these individual performance assessments, this section presents a consolidated enterprise performance assessment—based on recurring themes and significant generalizable observations from the individual performance assessments—that directly responds to the question of how successfully USACE provided states with Engineering and Design services, in consideration of time, cost, and scope factors. This consolidated performance assessment of Engineering and Design services then informs Functional Needs Analysis, which allows for conduct of Functional Solutions Analysis. This Functional Solutions Analysis generates potential changes for USACE to implement in order to prepare for successful Engineering and Design services in future pandemic response operations.

## Performance Assessment and Functional Needs Analysis

This section provides evaluation of the USACE performance of Engineering and Design services during COVID-19 response operations and discussion of USACE capability gaps through a Functional Needs Analysis.

### Individual Performance Assessment

To inform the Consolidated Performance Assessment, the researcher conducted a detailed assessment of the USACE performance of Engineering and Design services during COVID-19 response operations through the lens of USACE Headquarters and each subordinate USACE division. These detailed assessments, independently considering the experiences of USACE Headquarters and each of the eight subordinate divisions, are presented in Appendix B.

### Consolidated Performance Assessment

The following are consolidated enterprise performance assessments—based on recurring themes and significant generalizable observations—that directly respond to the question of how successfully USACE provided states with Engineering and Design services, in consideration of time, cost, and scope factors.

Table 14 below presents the consolidated scope successes and challenges of USACE as an enterprise performing Engineering and Design services.

Table 14. Engineering and Design (Scope) Consolidated Successes and Challenges

| U.S. Army Corps of Engineers (Consolidated) | |
|---|---|
| **Engineering and Design (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Completed site-specific Engineering and Design for 38 ACFs contracted through USACE and 36 ACFs executed by states independently. [Recurring Theme: HQ, 8 Divisions] | 1. Continuous improvements required regarding specific Engineering and Design considerations. [Recurring Theme: HQ, NAD] |
| 2. USACE subordinate units leveraged HNC/MX standardized designs to execute site-specific Engineering and Design for states, while also openly providing the designs to states for their independent use. [Recurring Theme: HQ, LRD, MVD, NAD, SPD, SWD] | 2. Confusion surrounding the authoritative standard for medical terminology. [Recurring Theme: NAD, SWD] |
| 3. Successfully integrated with state government and medical planners to modify design scope to meet end-user needs. [Recurring Theme: HQ, LRD, MVD, NAD, SPD] | 3. USACE standardized ACF designs were too robust for implementation in Hawaii and Pacific island U.S. territories. [Significant Observation: POD] |
| 4. Engaged in regular USACE-internal Knowledge Sharing conference calls to synchronize Engineering and Design criteria, best practices, and emerging challenges for ACFs in real-time. [Recurring Theme: NAD, SPD, SWD, MVD] | 4. Initial lack of integration with medical planners and providers during Engineering and Design resulted in additional PWS re-work to meet end-user needs. [Significant Observation: NAD] |
| 5. Provided states with Engineering technical support to inform ACF decision-making process. [Recurring Theme: MVD, NAD, SWD] | 5. High frequency of changes to USACE enterprise-level templates and formats for PWS/CWE caused confusion and lack of consistency. [Significant Observation: SPD] |
| 6. Effectively responded to state requests for design of COVID-positive facilities. [Recurring Theme: HQ, LRD] | 6. Lack of formal PWS Review Process (with periodic reviews involving all stakeholders) resulted in unresolved scope issues until PWS was submitted for final review. [Significant Observation: SPD] |
| 7. Effective Engineering and Design of ACF outside standard design criteria. [Significant Observation: MVD] | 7. During E and D for the first correctional facility ACF, initial lack of awareness of correctional facility regulatory standards resulted in PWS scoping issues and construction inefficiencies. [Significant Observation: MVD] |
| 8. Provided states with both “high end” and “low end” PWS estimates to enable state planners to conceptualize range of ACF solutions. [Significant Observation: NAD] | |
| 9. Conducted Design Charrette to initiate successful Engineering and Design effort, integrated with all key stakeholders. [Significant Observation: MVD] | |

*Source:* Created by author.

In terms of scope successes, USACE’s performance of Engineering and Design services during COVID-19 emergency response operations was chiefly characterized by open distribution of 4 standardized ACF designs and the successful completion of site-specific Engineering and Design documentation for more than 70 ACFs across the United States.

Referencing the preceding table, Scope Successes #1 through #6 each represent a recurring theme identified through analysis of the individual performance assessments. Scope Success #1 represents the successful completion of site-specific Engineering and

Design throughout the United States, and this recurring theme was notably reflected throughout Headquarters and eight divisions. Scope Success #2 represented the next major recurring theme, with USACE Headquarters and five divisions reporting the successful employment of HNC/MX standardized ACF designs both to inform USACE site-specific Engineering and Design and to enable states to execute ACF conversions independently. Scope Success #3 was another major recurring theme, with Headquarters and four divisions reporting that they successfully integrated with state government and medical planners to modify design scope as required to meet end-user needs for ACFs. Scope Success #4, reported by four divisions, reflects that USACE successfully hosted regular "Knowledge Sharing" conference calls to disseminate Engineering and Design best practices and emerging challenges to improve enterprise capability during mission execution. Scope Success #5, reported by three divisions, reflects that USACE—separate from site-specific Engineering and Design services—also provided states with effective Engineering technical support to inform their decision-making regarding ACF conversions, with and without USACE contracting and construction support. Scope Success #6, reported by Headquarters and one division, documents that USACE responded effectively to state requests to provide ACF designs for treating COVID-positive patients—which was not the original intention of the ACF concept (i.e., the original concept was to provide existing medical facilities with overflow capacity for non-COVID patients after maximum capacities were exceeded with influx of COVID-positive patients). Shortly after the first COVID-positive ACF conversions in the North Atlantic Division area of responsibility, each of the eight participating divisions offered COVID-positive design services to requesting states.

Scope Successes #7 through #9 each represent a significant observation, reported by only one division, that was generalizable to the USACE enterprise (i.e., although only one division reported the observation, this observation is reasonable or even likely to occur in any division). Scope Success #7 reflects that USACE subordinate units demonstrated success with Engineering and Design of ACFs that did not conform to the standardized design criteria provided by the USACE HNC/MX. The Mississippi Valley Division's Memphis District provides a compelling example of this capability with its successful Engineering and Design for the Commercial Appeal ACF in Memphis, TN, which was a unique engineering design to convert a vacant commercial office space. Scope Success #8 reflects the North Atlantic Division's success in providing states with both a "high end" and "low end" Performance Work Statement, enabling states to conceptualize additional options for ACF capability. Scope Success #9 documents the Mississippi Valley Division's successful employment of the "Design Charrette" concept, by which all stakeholders congregate together for a focused initial work period to ensure accurate definition of requirements and synchronization across all team members.

In terms of scope challenges and issues, USACE's documented problems executing Engineering and Design services during COVID-19 emergency response operations were primarily minor in nature (e.g., inefficiencies and initial scoping issues resolved organically during operations) with one notable exception: The enterprise-distributed ACF standardized designs were not feasible for ACF conversions in Hawaii and the Pacific island U.S territories.

Referencing the preceding table, Scope Challenges #1 and #2 represent recurring themes of minor problems identified through analysis of the individual performance

assessments. Scope Challenge #1 documents the continuous troubleshooting and refinement of Engineering and Design considerations and criteria by USACE Headquarters and the North Atlantic Division. These issues were resolved as they were identified, but the challenges are still recorded here to assist in follow-on formalization of enterprise solutions. Scope Challenge #2 reflects the issue, reported by the North Atlantic Division and the Southwestern Division, that confusion surrounded the authoritative standard for medical terminology. Medical facility planning experts from the USACE HNC/MX—operating from well-established USACE Engineer Regulations governing the design of Department of Defense hospitals and medical centers—distributed guidance using their standard medical terminology. The Department of Health and Human Services, however, as the federal agency lead for COVID-19 response operations, was employing slightly different medical terminology in its guidance to state governments. The resulting impacts were only minor in nature, but the issue certainly warrants attention as federal agency terminology should be synchronized in any future pandemic response.

Scope Challenges #3 through #7 each represent a significant observation, reported by only one division that was impactful to USACE as an enterprise. Scope Challenge #3 is region-specific but critical enough to warrant attention at enterprise-level. Scope Challenges #4 through #7 represent generalizable observations (i.e., although only one division reported the observation, this observation is reasonable or even likely to occur in any division). Scope Challenge #3 reflects that the USACE standardized ACF designs were not feasible for Hawaii and the Pacific island U.S. territories. The Pacific Ocean Division noted that the four standardized ACF designs were "too robust" in scope for implementation in the Pacific Ocean region.[6] Commenting further, the division noted

explicitly, "Mainland ACF plans required adaptations for use within the [Hawaii District] Area of Responsibility and were too expensive for implementation."[7] Highlighting the need for more options, the division stated, "It was important to recognize the needs and regional considerations within the Area of Responsibility and to provide design options."[8] Through the end of the study period, the Pacific Ocean Division continued to explore unique Engineering and Design solutions for potential ACFs in the region, but no ACF designs were accepted by Hawaii or Pacific island U.S. territories by the end of the study period. With that said, it is also important to note that no state or territory has declared that an ACF was urgently needed but not provided due to inability to produce feasible designs. The full relevance and impact of the situation are still undetermined, in consideration of the myriad complex factors influencing the decision to execute—or not execute—an ACF conversion. One certain conclusion, however, is that standardized ACF designs feasible for the Pacific Ocean region should be developed to expedite Engineering and Design support in a future pandemic event.

Scope Challenge #4 reflects the North Atlantic Division's initial lack of effective integration with medical planners and providers resulting in unnecessary revisions of Performance Work Statements upon final review. This challenge was resolved quickly during early operations. Scope Challenge #5 documents the South Pacific Division's concerns with frequent changes to USACE enterprise-level templates and formats for Engineering and Design products, specifically Performance Work Statements and cost estimates. While these "on-the-fly" changes were intended to provide USACE subordinate units with the best templates as quickly as possible, the division's comment is warranted that high frequency of changes can result in confusion and lack of

consistency. Scope Challenge #6 reflects the South Pacific Division's observation that the lack of a formal Performance Work Statement review process, with periodic reviews involving all stakeholders, resulted in scope issues being unresolved until Performance Work Statement submission for final review. The impact was inefficiency due to scoping issues requiring resolution after final review. Scope Challenge #7 documents the scoping issues and construction inefficiencies observed by the Mississippi Valley Division due to lack of awareness of unique correctional facility regulatory requirements during design of the Frank Lotter Building ACF in Milwaukee, WI. This ACF was the first implemented in a correctional facility nationwide, and the division captured the lessons learned and resolved the deficiencies for future operations.

Table 15 below presents the consolidated schedule successes and challenges of USACE as an enterprise performing Engineering and Design services.

Table 15. Engineering and Design (Schedule) Consolidated Successes and Challenges

| **U.S. Army Corps of Engineers (Consolidated)** | |
|---|---|
| **Engineering and Design (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| 1. Rapid execution of Engineering and Design products to achieve aggressive contracting and construction timelines. [Recurring Theme: LRD, SPD] | 1. Lack of formal PWS Review Process resulted in increased Engineering and Design schedule duration due to PWS revisions. [Significant Observation: SPD] |
| 2. USACE-internal Knowledge Sharing conference calls expedited Engineering and Design work enabling rapid construction of ACFs. [Significant Observation: SWD] | 2. During early operations, PWSs underestimated the time required for low-voltage integration during ACF conversions. [Significant Observation: HQ] |
| 3. HNC/MX standard designs expedited PWS development. [Significant Observation: NAD] | |
| 4. Integration and direct collaboration with medical end-users reduced schedule delays resulting from unnecessary PWS re-work. [Significant Observation: NAD] | |

*Source:* Created by author.

In terms of schedule successes, USACE's performance of Engineering and Design services during COVID-19 emergency response operations was characterized by

rapid execution of Engineering and Design work that enabled states to achieve aggressive timelines for COVID-19 response.

Referencing the preceding table, Schedule Success #1 represents the recurring theme—identified through analysis of the individual performance assessments—noted by the Great Lakes and Ohio River Division and the South Pacific Division that Engineering and Design was executed rapidly to achieve state requirements for aggressive timelines on contracting and construction of ACFs. The Great Lakes and Ohio River Division, for example, completed full site-specific Engineering and Design in only three days for the Nashville General Hospital ACF.[9] The South Pacific Division highlighted that its "quick development of Performance Work Statements resulted in rapid construction and delivery of the ACFs to the state-selected sites."[10]

Schedule Successes #2 through #4 each represent a significant observation, reported by only one division, that was generalizable to the USACE enterprise (i.e., although only one division reported the observation, this observation is reasonable or even likely to occur in any division). Schedule Success #2 reflects the Southwestern Division's observation that USACE-internal "Knowledge Sharing" conference calls expedited Engineering and Design Work by providing design teams with "known costs, duration, timeframes, best practices, and challenges."[11] Schedule Success #3 reflects the North Atlantic Division's observation that, "HNC developed standard [Performance Work Statements] expedited project [Performance Work Statement] development."[12] Schedule Success #4 reflects the North Atlantic Division's observation that, "Ongoing collaboration has saved great time and cost, and provides the best product for patient care providers."[13]

In terms of schedule challenges and issues, USACE's performance of Engineering and Design services during COVID-19 emergency response operations reflected primarily minor issues with no direct risk to mission accomplishment.

Referencing the preceding table, each challenge enumerated represents a significant observation, reported by only one division, that was generalizable to the USACE enterprise (i.e., although only one division reported the observation, this observation is reasonable or even likely to occur in any division). Schedule Challenge #1 reflects that the South Pacific Division observed increased Engineering and Design schedule durations due to unnecessary Performance Work Statement revisions resulting from a lack of a formal review process, incorporating periodic reviews with all stakeholders. Schedule Challenge #2 reflects the USACE Headquarters observation that, during early operations, Engineering and Design teams underestimated the time required for low-voltage integration during ACF conversions. This issue, however, was resolved quickly upon identification.

Table 16 below presents the consolidated cost successes and challenges of USACE as an enterprise performing Engineering and Design services.

Table 16. Engineering and Design (Cost) Consolidated Successes and Challenges

| U.S. Army Corps of Engineers (Consolidated) | |
|---|---|
| **Engineering and Design (Cost)** | |
| **Successes** | **Challenges/Issues** |
| 1. Through FEMA National MA (NAD-02), states received access to USACE standardized ACF designs at 100% federal cost, for use either with USACE site-specific Engineering and Design or independent state development. [Significant Observation: HQ] | 1. Cost Engineering efforts during PWS development for the first ACFs in the nation resulted in several ROM cost estimates that notably underestimated actual construction costs. [Significant Observation: LRD] |
| 2. Integration and direct collaboration with medical end-users mitigated cost increases associated with PWS re-work and post-contract award modifications. [Significant Observation: NAD] | 2. USACE standardized ACF designs were too expensive for implementation in Hawaii and Pacific island U.S. territories. [Significant Observation: POD] |
| 3. Cost Engineering practice of providing "high end" and "low end" cost estimates enabled state planners to identify cost-effective ACF solutions. [Significant Observation: NAD] | 3. Lack of formal PWS Review Process (with periodic reviews involving all stakeholders) resulted in increased Engineering and Design labor costs due to PWS revisions and less accurate construction cost estimates for state planner decision-making. [Significant Observation: SPD] |
| | 4. Initial lack of awareness of correctional facility regulatory requirements resulted in additional Engineering and Design labor costs and, more significantly, underestimated ROM cost estimates for construction. [Significant Observation: MVD] |
| | 5. Cost inefficiencies resulted from "building to capacity" or "building to need," as opposed to "building to available staffing." [Significant Observation: LRD] |
| | 6. During early operations, initial Performance Work Statements, with corresponding construction cost estimates, underestimated the costs required for low-voltage integration during ACF conversions. [Significant Observation: HQ] |

*Source:* Created by author.

In terms of cost successes, USACE's performance of Engineering and Design services during COVID-19 emergency response operations was primarily characterized by the open availability of four standardized ACF designs at no-cost to states through 100% federal funding from FEMA National MA NAD-02.

Referencing the preceding table, each enumerated success represents a significant observation, reported by only one division, that was generalizable to the USACE enterprise (i.e., although only one division reported the observation, this observation is reasonable or even likely to occur in any division). Cost Success #1 reflects that states were able to access, at no cost to them, four standardized ACF designs created by the USACE HNC/MX. These conceptual designs benefited states by allowing them to contract independently at lower cost for site-specific design and construction or,

alternately, request USACE support for site-specific design (also at reduced labor costs due to the existence of the standardized design concepts). Cost Success #2 reflects the North Atlantic Division's observation that, "Direct and open collaboration between design staff and end users saves time and cost."[14] Cost Success #3 reflects the North Atlantic Division's success with the Cost Engineering practice of providing both "high end" and "low end" cost estimates—corresponding with higher and lower scopes of ACF design—to enable state planners to identify cost-feasible ACF solutions.

In terms of cost challenges and issues, USACE's performance of Engineering and Design services during COVID-19 emergency response operations was characterized by a notable few significant cost increases during early operations and the observation that the USACE standardized ACF designs were too expensive for implementation in Hawaii and the Pacific island U.S. territories.

Referencing the preceding table, each enumerated issue represents a significant observation, reported by only one division that was impactful to USACE as an enterprise. Cost Challenge #2 is region-specific but critical enough to warrant attention at enterprise-level. Cost Challenge #1 and Challenges #4 through #7 represent generalizable observations (i.e., although only one division reported the observation, this observation is reasonable or even likely to occur in any division).

Cost Challenge #1 reflects that, during Engineering and Design work for the McCormick Place ACF (one of the first ACFs to be constructed in the nation), "Cost models for ROMs did not exist for ACS facilities and were developed in two days."[15] Ultimately, the actual construction costs for the project reached $64 million, as compared to the estimate at contract award of only $26 million.[16] While the USACE cost engineers

attending to this work acted professionally and were impacted by the total absence of existing parametric cost data (as the ACF concept was newly pioneered to respond to the COVID-19 pandemic), this still represented a significantly negative impact for the state.

Cost Challenge #2 reflects that the USACE standardized ACF designs were too expensive for implementation in Hawaii and the Pacific island U.S. territories. Referencing the four standardized ACF designs, the Pacific Ocean Division noted that, "Mainland ACF plans required adaptations for use within the [Hawaii District] Area of Responsibility and were too expensive for implementation."[17] As stated in the corresponding Scope Challenge #2 above, the full relevance and impact of the situation are still undetermined, as the Pacific Ocean Division continued to explore lower cost options in the region through the end of the study period. One certain conclusion, however, is that lower-cost standardized ACF designs should be developed to facilitate the most effective Engineering and Design support for Hawaii and the Pacific island U.S. territories in a future pandemic event.

Cost Challenge #3 reflects the South Pacific Division's finding that additional Engineering and Design labor costs resulted from its lack of a formal review process for Performance Work Statements. Cost Challenge #4 reflects the Mississippi Valley Division's observed cost increases associated with late identification of the unique regulatory requirements for correctional facilities. While the issue was resolved after this first correctional facility ACF conversion, the observation is documented here to ensure the lesson learned is captured for any future correctional facility ACF conversions (as correctional facilities are expected "hot zones" during contagious disease events). Cost Challenge #5 reflects the observation by the Great Lakes and Ohio River Division that

cost inefficiencies resulted from the practice of "building to capacity" or "building to need," with "building to available staffing" being the preferred criteria unless specifically directed otherwise by the state. Cost Challenge #6 reflects the USACE Headquarters observation that, during early operations, Engineering and Design teams underestimated the costs associated with low-voltage integration during ACF conversions. This issue, however, was resolved quickly upon identification.

### Evaluation Criteria and Functional Needs Analysis

Building upon the consolidated performance assessment in the preceding section, the researcher screened the USACE performance of its Engineering and Design mission against the evaluation criteria outlined in chapter 3.

Scope was assessed as "Amber," indicating moderate capability gaps that impact mission negatively but do not result in mission failure or states discontinuing services. Summarizing the detailed discussion of scope in the preceding section, USACE's performance of Engineering and Design services during COVID-19 emergency response operations was chiefly characterized by open distribution of 4 standardized ACF designs and the successful completion of site-specific Engineering and Design documentation for more than 70 ACFs across the United States. Additionally, in terms of scope challenges and issues, USACE's documented problems executing Engineering and Design services were predominantly minor in nature (e.g., inefficiencies and initial scoping issues resolved organically during operations). The notable exception, however, was that the USACE ACF standardized designs were not feasible for ACF conversions in Hawaii and the Pacific island U.S territories. This issue represents a significant capability gap that the researcher categorized as "moderate" in nature, with negative impacts to mission

accomplishment without resulting in mission failure or states discontinuing services. A categorization as a "major" capability gap was not assessed because of the following: Firstly, there was no documented failure to mission because there was no clear evidence that any required ACFs were not constructed due to this issue. Although no ACFs were constructed for Hawaii or Pacific island U.S. territories during the period of the study, these regions were "behind the curve" of the continental United States in regard to COVID-19 infection rates and, as a result, had additional time to make decisions. Secondly, there was no discontinuation of services because Hawaii and several territories continued to explore lower cost options with USACE. At the end of the study period, USACE continued to develop Engineering and Design solutions for lower cost ACF conversions with Guam. The categorization as a "moderate" capability gap—and the resulting assessment of "Amber" for the overall assessment of scope—was not mitigated one level higher because of the following: While USACE subordinate unit engineers have proven capability to develop Engineering and Design solutions for ACFs in sites not conforming to the standardized designs (as seen with the preceding section's Consolidated Scope Success #7), no successful resolution (i.e., an accepted Engineering and Design solution in the Pacific Ocean region) was achieved during the study period, although USACE efforts continued.

Schedule was assessed as "Green," indicating only minor capability gaps with no direct impact to mission. Summarizing the detailed discussion of schedule in the preceding section, USACE's performance of Engineering and Design services was characterized by rapid execution that enabled states to achieve aggressive timelines for

COVID-19 response. Identified schedule challenges and issues were primarily minor with no direct risk to mission accomplishment.

Cost was assessed as "Amber," indicating moderate capability gaps that impact mission negatively but do not result in mission failure or states discontinuing services. In terms of cost successes, USACE's performance of Engineering and Design services characterized by the open availability of four standardized ACF designs at no-cost to states through 100% federal funding from FEMA National MA NAD-02. Ultimately, however, cost challenges and issues predominated: The notably significant cost increases documented by the Great Lakes and Ohio River Division between contract execution estimates and final construction costs represent a "moderate" capability gap that impacted mission negatively but did not cause failure to mission.

Before further analysis on these impacts, it is important to note that the Great Lakes and Ohio River Division cost engineers executed professionally and likely better than any other cost engineers would have in this emergency situation. The concept of the ACF was completely new, developed in an unprecedented global pandemic requiring emergency medical solutions. There was no available parametric data, and the risk of inaccuracies in cost estimation with the initial ACF designs was extremely high. It is also important to note that the division simultaneously developed several very precise cost estimates, even during initial operations—a testament to the professionalism and skill of these cost engineers who lacked any usable parametric data. Finally, the researcher highlights that the division's cost estimates (and the cost estimates of USACE as an enterprise) became increasingly better as more parametric data became available.

With that said, cost increases after contract award of this magnitude could reasonably cause failure to mission by way of states terminating contract (with irrecoverable damages) due to insufficient funds to complete the project at the 25% state cost-share. For the McCormick ACF, the ultimate difference in cost to the state between contract cost estimate and actual cost was $9.5 million ($6.5 million estimated as compared to $16 million actual). Cost increases of this magnitude could also reasonably result in a state discontinuing future services to avoid additional cost issues. Given these factors, this issue could be considered a "major" capability gap, resulting in an overall assessment of "Red" for cost. With mitigation, however, the researcher assessed this "Amber" based on the following: The cost increase did not result in failure to mission, as the state was able to manage the cost increase. Additionally, the state did not discontinue services with USACE as it continued progress on McCormick and three additional ACFs simultaneously. In terms of impact to the state's willingness to continue requesting services with USACE, the evidence is inconclusive. While the state did not enter into any other contracts for Engineering and Design after the cost increase at McCormick, it also did not terminate any contracts or transition to execution through another contracted firm. As an additional mitigating factor, these cost estimation issues were largely resolved in the division (and enterprise-wide through sharing information) with the gain of parametric cost data from initial ACF conversions.

The observation by the Pacific Ocean Division that the USACE standardized ACF designs were too expensive for implementation in Hawaii and the Pacific island U.S. territories also represents a "moderate" capability gap that impacted mission negatively but did not cause failure to mission. Corresponding with the treatment of this issue in the

overall assessment of scope, categorization as a "major" capability gap was not assessed because of the following: Firstly, there was no documented failure to mission because there was no clear evidence that any required ACFs were not constructed due to the high costs associated with the designs. Secondly, there was no discontinuation of services because Hawaii and several territories continued to explore lower cost options with USACE. At the end of the study period, USACE continued to develop Engineering and Design solutions for lower cost ACF conversions with Guam. The categorization as a "moderate" capability gap—and the resulting assessment of "Amber" for the overall assessment of scope—was not mitigated one level higher because of the following: No successful resolution (i.e., an accepted Engineering and Design solution in the Pacific Ocean region) was achieved during the study period, although USACE efforts continued.

Summarizing the above narrative, the overall assessment of USACE performance and, correspondingly, the severity of the capability gap is depicted below in table 17.

Table 17. Engineering and Design Overall Performance and Functional Needs Analysis

| Overall Performance Assessment and Functional Needs Analysis: Engineering and Design | | |
|---|---|---|
| **Scope** | **Schedule** | **Cost** |
| **AMBER** | **GREEN** | **AMBER** |
| Moderate capability gaps that impact mission negatively but do not result in mission failure or states discontinuing services. Excepting the Pacific Ocean area of responsibility, USACE Engineering and Design services were overwhelmingly successful, providing states with standardized ACF design documentation and site-specific Engineering and Design products, either of which could be utilized with or without contracting construction through USACE. In the Pacific Ocean area of responsibility, however, the scope of the standardized USACE design was unfeasible for many ACF conversions. | Very minor capability gaps with no direct impact to mission. USACE succeeded in developing Engineering and Design products rapidly to facilitate construction contractor solicitation and on-demand construction contract award by states. Few schedule challenges or issues were reported, and those reported had only very minor effects, with no direct impact to mission. | Moderate capability gaps that impact mission negatively but do not result in mission failure or states discontinuing services. USACE provided states with highly cost-effective support in the form of standardized ACF design documentation and pre-DFA technical engineering support, each at 100% federal cost share. Negative mission impacts, however, resulted from a few noteworthy construction cost increases related to uncertainty in early operations. Additionally, standardized ACF designs were "too expensive" for implementation in Hawaii and the Pacific island U.S. territories. |

*Source:* Created by author.

To enumerate the capability gaps identified during this Functional Needs Analysis, the three consolidated tables of successes and challenges/issues will be applied directly to Functional Solutions Analysis. Due to the unprecedented nature of the ACF mission and based on the literature review Functional Area Analysis (i.e., no currently developed USACE doctrine or emergency operations structure specific to ACF operations, etc.), nearly every Success and Challenge/Issue enumerated represents a capability gap that should be assessed against possible solution approaches. Observed successes require USACE to implement changes to sustain the positive performance in future pandemic events, and observed challenges and issues require USACE to implement solutions to improve performance in future pandemic events. In the instances in which the consolidated performance assessment does not correspond to a capability gap, this is noted specifically in the Functional Solutions Analysis.

Functional Solutions Analysis

This section presents solutions to the capability gaps identified in the preceding Functional Needs Analysis phase. The researcher—informed by the deep contextual understanding gained through literature review (i.e., identified requirements) and analysis of collected data (i.e., identified current capabilities)—generated proposed solution approaches across the Doctrine, Organization, Training, Leadership, and Personnel (DOTLP) domains. The researcher then applied Feasible-Acceptable-Suitable evaluation criteria to these proposed solution approaches to test the validity of the approaches. Ultimately, this section consolidates the recommended solution approaches, addressing the identified capability gaps and contributing to the study's response to the primary research question of how USACE should prepare itself for effective support to ACF operations in future pandemic events.

Generating Solutions to the Enumerated Capability Gaps

The following tables demonstrate the process by which the researcher generated solutions to address each of the enumerated capability gaps.

Table 18 below demonstrates the solutions generated across the DOTLP domains to address the capability gaps defined by USACE's ad hoc scope successes during execution of Engineering and Design services. To facilitate formatting and word economy, these solutions are identified as abbreviated solution approaches in the table. Detailed descriptions of each solution are provided in narrative format after consolidation of all identified solutions.

Table 18. Engineering and Design (Scope Successes) Functional Solutions Analysis

| Functional Solutions Analysis: Engineering and Design (Scope, Part 1) | | | | | |
|---|---|---|---|---|---|
| **Successes** | **Doctrine** | **Organization** | **Training** | **Leadership** | **Personnel** |
| 1. Completed site-specific Engineering and Design for 38 ACFs contracted through USACE and 36 ACFs by states independently. | No identified capability gap. | | | | |
| 2. USACE subordinate units leveraged HNC/MX standard designs for site-specific Engineering and Design, while providing the designs to states for independent use. | Update Engineer Publications to Codify Standard Designs. | | HNC/MX develops training and workshops. | | |
| 3. Successfully integrated with state government and medical planners to modify design scope to meet end-user needs. | Establish QMS Business Process for ACF Design. | | | | |
| 4. Engaged in USACE-internal Knowledge Sharing conference calls to synchronize Engineering and Design criteria, best practices, and emerging challenges for ACFs. | No identified capability gap. | | | | |
| 5. Provided states with Engineering technical support to inform ACF decision-making. | No identified capability gap. | | | | |
| 6. Effectively responded to state requests for design of COVID-positive facilities. | No identified capability gap. | | | | |
| 7. Effective Engineering and Design of ACF outside standard design criteria. | No identified capability gap. | | | | |
| 8. Provided states with both "high end" and "low end" PWS estimates to enable state planners to conceptualize range of solutions. | Establish QMS Business Process for ACF Design. | | | | |
| 9. Conducted Design Charrette to initiate successful Engineering and Design effort, integrated with all key stakeholders. | Establish QMS Business Process for ACF Design. | | | | |

*Source:* Created by author.

Table 19 below demonstrates the solutions generated across the DOTLP domains to address the capability gaps defined by USACE's scope challenges and issues during execution of Engineering and Design services. As before, these solutions are identified as abbreviated solution approaches in the table. Detailed descriptions of each solution are provided in narrative format after consolidation of all identified solutions.

Table 19. Engineering and Design (Scope Challenges) Functional Solutions Analysis

| Functional Solutions Analysis: Engineering and Design (Scope, Part 2) | | | | | |
|---|---|---|---|---|---|
| **Challenges/Issues** | **Doctrine** | **Organization** | **Training** | **Leadership** | **Personnel** |
| 1. Continuous improvements required regarding specific Engineering and Design considerations. | Update Engineer Publications to Codify Standard Designs. | | | | |
| 2. Confusion surrounding the authoritative standard for medical terminology. | Update HNC/MX Standard Operating Procedures. | | | | |
| 3. USACE standardized ACF designs were too robust for implementation in Hawaii and Pacific island U.S. territories. | Develop "low-scope" ACF design concept and standards; codify in USACE Engineer Publications update. | | | | |
| 4. Initial lack of integration with medical planners and providers during Engineering and Design resulted in additional PWS re-work to meet end-user needs. | Establish QMS Business Process for ACF Design. | | | | |
| 5. High frequency of changes to USACE enterprise-level templates and formats for PWS/CWE caused confusion and lack of consistency. | Formally publish new Engineer Forms (ENG) based on COVID-19 ops. | | | | |
| 6. Lack of formal PWS Review Process (with periodic reviews involving all stakeholders) resulted in unresolved scope issues until PWS was submitted for final review. | Establish QMS Business Process for ACF Design. | | | | |
| 7. During E and D for the first correctional facility ACF, initial lack of awareness of correctional facility regulatory standards resulted in PWS scoping issues and construction inefficiencies. | Update Engineer Publications to Codify Standard Designs. | | | | |

*Source:* Created by author.

Table 20 below demonstrates the solutions generated across the DOTLP domains to address the capability gaps defined by USACE's ad hoc schedule successes during execution of Engineering and Design services. As before, these solutions are identified as abbreviated solution approaches in the table. Detailed descriptions of each solution are provided in narrative format after consolidation of all identified solutions.

Table 20. Engineering and Design (Schedule Successes) Functional Solutions Analysis

| Functional Solutions Analysis: Engineering and Design (Schedule, Part 1) | | | | | |
|---|---|---|---|---|---|
| **Successes** | **Doctrine** | **Organization** | **Training** | **Leadership** | **Personnel** |
| 1. Rapid execution of Engineering and Design products to achieve aggressive contracting and construction timelines. | No identified capability gap. | | | | |
| 2. Regular USACE-internal Knowledge Sharing conference calls expedited Engineering and Design work enabling rapid construction and delivery of state-requested ACFs. | No identified capability gap. | | | | |
| 3. HNC/MX standard designs expedited PWS development. | Update Engineer Publications to Codify Standard Designs. | | | | |
| 4. Integration and direct collaboration with medical end-users reduced schedule delays resulting from unnecessary PWS re-work. | Establish QMS Business Process for ACF Design. | | | | |

*Source:* Created by author.

Table 21 below demonstrates the solutions generated across the DOTLP domains to address the capability gaps defined by USACE's schedule challenges and issues during execution of Engineering and Design services. As before, these solutions are identified as abbreviated solution approaches in the table. Detailed descriptions of each solution are provided in narrative format after consolidation of all identified solutions.

Table 21. Engineering and Design (Schedule Challenges) Functional Solutions Analysis

| Functional Solutions Analysis: Engineering and Design (Schedule, Part 2) | | | | | |
|---|---|---|---|---|---|
| **Challenges/Issues** | **Doctrine** | **Organization** | **Training** | **Leadership** | **Personnel** |
| 1. Lack of formal PWS Review Process (with periodic reviews involving all stakeholders) resulted in increased Engineering and Design schedule duration due to PWS revisions. | Establish QMS Business Process for ACF Design. | | | | |
| 2. During early operations, initial Performance Work Statements, with corresponding construction schedule estimates, underestimated the time required for low-voltage integration during ACF conversions. | Update Engineer Publications to Codify Standard Designs. | | | | |

*Source:* Created by author.

Table 22 below demonstrates the solutions generated across the DOTLP domains to address the capability gaps defined by USACE's ad hoc cost successes during execution of Engineering and Design services. As before, these solutions are identified as abbreviated solution approaches in the table. Detailed descriptions of each solution are provided in narrative format after consolidation of all identified solutions.

Table 22. Engineering and Design (Cost Successes) Functional Solutions Analysis

| Functional Solutions Analysis: Engineering and Design (Cost, Part 1) | | | | | |
|---|---|---|---|---|---|
| **Successes** | **Doctrine** | **Organization** | **Training** | **Leadership** | **Personnel** |
| 1. Through FEMA National MA (NAD-02), states received access to USACE standardized ACF designs at 100% federal cost, for use either with USACE site-specific Engineering and Design or independent state development. | Update Engineer Publications to Codify Standard Designs. | | | USACE Headquarters Leadership should advocate for a National MA in the event of a future pandemic requiring ACF operations. | |
| 2. Integration and direct collaboration with medical end-users mitigated cost increases associated with PWS re-work and post-contract award modifications. | Establish QMS Business Process for ACF Design. | | | | |
| 3. Cost Engineering practice of providing "high end" and "low end" cost estimates enabled state planners to identify cost-effective ACF solutions. | Establish QMS Business Process for ACF Design. | | | | |

*Source:* Created by author.

Table 23 below demonstrates the solutions generated across the DOTLP domains to address the capability gaps defined by USACE's cost challenges and issues during execution of Engineering and Design services. As before, these solutions are identified as abbreviated solution approaches in the table. Detailed descriptions of each solution are provided in narrative format after consolidation of all identified solutions.

Table 23. Engineering and Design (Cost Challenges) Functional Solutions Analysis

| Functional Solutions Analysis: Engineering and Design (Cost, Part 2) | | | | | |
|---|---|---|---|---|---|
| **Challenges/Issues** | **Doctrine** | **Organization** | **Training** | **Leadership** | **Personnel** |
| 1. Cost Engineering efforts during PWS development for the first ACFs in the nation resulted in several ROM cost estimates that notably underestimated actual construction costs. | Update Engineer Publications to Codify Standard Designs.<br><br>Updates to TRACES to assist in future ACF cost estimates. | | | | |
| 2. USACE standardized ACF designs were too expensive for implementation in Hawaii and Pacific island U.S. territories. | Develop "low-scope" ACF design concept and standards; codify in USACE Engineer Publications update. | | | | |
| 3. Lack of formal PWS Review Process (with periodic reviews involving all stakeholders) resulted in increased Engineering and Design labor costs due to PWS revisions and less accurate construction cost estimates for state planner decision-making. | Establish QMS Business Process for ACF Design. | | | | |
| 4. Initial lack of awareness of correctional facility regulatory requirements resulted in additional Engineering and Design labor costs and, more significantly, underestimated ROM cost estimates for construction. | Update Engineer Publications to Codify Standard Designs. | | | | |
| 5. Cost inefficiencies resulted from "building to capacity" or "building to need," as opposed to "building to available staffing." | Establish QMS Business Process for ACF Design. | | | | |
| 6. During early operations, initial Performance Work Statements, with corresponding construction cost estimates, underestimated the costs required for low-voltage integration during ACF conversions. | Update Engineer Publications to Codify Standard Designs.<br><br>Updates to TRACES to assist in future ACF cost estimates. | | | | |

*Source:* Created by author.

## Evaluation Criteria

The above solution approaches were screened against the Feasible-Acceptable Suitable evaluation criteria, as described in chapter 3. Each solution is feasible, acceptable, and suitable. The approaches generated are feasible due to the limited resource expenditure required for the recommended doctrinal updates and limited additional training. The approaches are acceptable due to few associated risks. The

approaches are suitable due to reasonable expectation of solving the associated capability gaps.

Consolidated Solutions to the Capability Gaps

Table 24 below documents the consolidated solutions generated (and screened against evaluation criteria) to the capabilities gaps identified in USACE's current preparedness to Engineering and Design services in a future pandemic event.

Table 24. Engineering and Design Consolidated Functional Solutions Analysis

| **Functional Solutions Analysis: Engineering and Design (Consolidated)** | |
|---|---|
| **Doctrine** | Update Engineer Publications to Codify Standard Designs. |
| | Develop "low-scope" ACF design concept and standards; codify in USACE Engineer Publications Update. |
| | Establish new QMS Business Process for ACF Design Process. |
| | Formally publish new Engineer Forms (ENG) based on COVID-19 ACF Engineering and Design. |
| | Update HNC/MX Standard Operating Procedures. |
| **Organization** | No solutions recommended in the Organization domain. |
| **Training** | HNC/MX develops and manages ACF Design training and workshops. |
| **Leadership** | USACE Headquarters Leadership should advocate for a National MA in the event of a future pandemic requiring ACF operations. |
| **Personnel** | No solutions recommended in the Personnel domain. |

*Source:* Created by author.

In terms of Doctrine, the researcher recommends that USACE update and/or develop applicable Engineer Publications—including, as appropriate, Engineer Manuals (EMs), Engineer Pamphlets (EPs), and United Facilities Guide Specifications (UFGS)—to codify the designs, criteria, best practices, and pitfalls observed during ACF Engineering and Design for COVID-19 emergency response operations. These updates should include the following:

1. Standardized ACF Designs.

2. Specific Engineering and Design considerations highlighted by subordinate units during COVID-19 operations.

3. Unique regulatory requirements for ACF conversions in correctional facilities.

4. Low-Voltage Integration solutions for ACF conversions.

5. Cost Engineering considerations for ACF conversions.

For the above considerations #1 through #4, USACE should appoint the Medical Facilities Mandatory Center of Expertise (Huntsville National Center) as the responsible party. For the above consideration #5, USACE should appoint the Civil Works Cost Engineering and Agency Technical Review Mandatory Center of Expertise (Walla Walla District Cost Engineering Branch) as the responsible party.

USACE should also develop and codify (with the above Engineer Publications updates) a "low-scope" ACF design concept to resolve support challenges to Hawaii and Pacific island U.S. territories. USACE should appoint the Medical Facilities Mandatory Center of Expertise (Huntsville National Center) as the responsible party, with input from the Pacific Ocean Division.

Additionally, to sustain the successes and resolve the issues experienced by USACE subordinate unit Engineering and Design teams, USACE should establish a new QMS Business Process for the ACF Design Process. The new process should include the following:

1. Guidelines for Engineering and Design team integration with state government and medical planners.

2. Guidelines for Engineering and Design team collaboration with medical end-users.

3. Validated best practices for supporting state decision-making, including providing "high end" and "low end" Performance Work Statements.

4. Validated best practices for coordinating the Engineering and Design process, including hosting a Design Charrette and a formal review process for Performance Work Statements.

USACE should also formally publish new Engineer Forms (ENG Forms), based on COVID-19 ACF Engineering and Design. The refinement and publishing of these forms and templates on the USACE central repository should alleviate form and template issues reported by USACE subordinate units.

Additionally, to resolve the medical terminology confusion documented by several divisions, the Medical Facilities Mandatory Center of Expertise (Huntsville National Center) should update its Standard Operating Procedures to reflect the same terminology used by the Department of Health and Human Services. The terminology differences were minor, but the change is sensible considering that the Department of Health and Human Services will be the federal lead agency in any future pandemic response.

In terms of Training, the researcher recommends that the Medical Facilities Mandatory Center of Expertise (Huntsville National Center) develop and manage ACF design training, with possible virtual design workshops if determined to be value-added. This training does not need to be comprehensive, but on-demand training resources—such as presentations or recorded classes—could provide significant value for district Engineering and Design teams preparing for an impending pandemic response mission.

In terms of Leadership, the researcher recommends that USACE Headquarters leadership strongly consider advocating for a National MA at the onset of any future pandemic event to provide 100% federal funding for the Medical Facilities Mandatory

Center of Expertise (Huntsville National Center) to assess current ACF design viability and immediately produce required design changes. Although the ACF design concepts developed during COVID-19 emergency response operations (and codified in Engineer Publication updates) will undoubtedly provide value, this verification and any associated changes will provide significant value for expediting Engineering and Design solutions in a future pandemic event.

### Secondary Research Question #3: Contracting

The following section provides a detailed description of the performance of Contracting services by USACE during COVID-19 response operations. Through comprehensive analysis of the documentation provided by USACE headquarters and each of the eight subordinate USACE divisions, the researcher developed a rich description of the performance of each subordinate unit independently. These "Individual Performance Assessments" are referenced below and included in the Appendices, in full and complete format. Building upon these individual performance assessments, this section presents a consolidated enterprise performance assessment—based on recurring themes and significant generalizable observations from the individual performance assessments—that directly responds to the question of how successfully USACE provided states with Contracting services, in consideration of time, cost, and scope factors. This consolidated performance assessment of Contracting services then informs Functional Needs Analysis, which allows for conduct of Functional Solutions Analysis. This Functional Solutions Analysis generates potential changes for USACE to implement in order to prepare for successful Contracting services in future pandemic response operations.

## Performance Assessment and Functional Needs Analysis

This section provides evaluation of the USACE performance of Contracting services during COVID-19 response operations and discussion of USACE capability gaps through a Functional Needs Analysis.

### Individual Performance Assessment

To inform the Consolidated Performance Assessment, the researcher conducted a detailed assessment of the USACE performance of Contracting services during COVID-19 response operations through the lens of USACE Headquarters and each subordinate USACE division. These detailed assessments, independently considering the experiences of USACE Headquarters and each of the eight subordinate divisions, are presented in Appendix C.

### Consolidated Performance Assessment

The following are consolidated enterprise performance assessments—based on recurring themes and significant generalizable observations—that directly respond to the question of how successfully USACE provided states with Contracting services, in consideration of time, cost, and scope factors.

Table 25 below presents the consolidated scope successes and challenges of USACE as an enterprise performing Contracting services.

Table 25. Contracting (Scope) Consolidated Successes and Challenges

| U.S. Army Corps of Engineers (Consolidated) | |
|---|---|
| **Contracting (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. USACE successfully executed contract award and construction oversight for 38 ACFs, providing a total of 15,074 patient care spaces across the United States. [Recurring Theme: HQ, 8 Divisions] | 1. Knowledge and preparedness to employ emergency contracting vehicles. [Recurring Theme: MVD, NAD, SPD] |
| 2. Employment of emergency contracting vehicles. [Recurring Theme: LRD, NAD, NWD, SPD] | 2. Continuous improvements required regarding specific Contracting practices and considerations. [Recurring Theme: NAD, SPD] |
| 3. Effective responses to state requests to de-scope or suspend/cancel contracts. [Recurring Theme: LRD, NAD, SPD] | 3. State preference for use of local contractors. [Recurring Theme: NAD, SWD] |
| 4. USACE enterprise and individual Divisions developed and shared COVID-19 Contracting templates, guidance documents, and best practices. [Recurring Theme: HQ, NAD, SPD] | 4. Enterprise-level guidance on acquisition strategy and contracting vehicles. [Significant Observation: NAD] |
| 5. USACE-enterprise Knowledge Sharing calls to integrate and synchronize Contracting techniques. [Recurring Theme: NAD, SAD] | 5. Evaluating Contractors with limited time available. [Significant Observation: NAD] |
| 6. Divisions quickly developed effective emergency contracting systems to address requirements of ACF mission. [Recurring Theme: LRD, NAD] | 6. Project close-out complicated by defining transition from Construction phase to Operations and Maintenance phase. [Significant Observation: NAD] |
| 7. Effective staffing for construction oversight. [Recurring Theme: LRD, MVD] | 7. Definitization process for Undefinitized Contract Actions (UCAs). [Significant Observation: MVD] |
| 8. Effective construction project kick-off and close-out. [Significant Observation: MVD] | 8. Availability of CORs impacted some project operations. [Significant Observation: HQ] |
| 9. Effective contactor selection methods. [Significant Observation: LRD] | |
| 10. Leveraged Local 8(a) contractors. [Significant Observation: SPD] | |

*Source:* Created by author.

In terms of scope successes, USACE's performance of Contracting services during COVID-19 emergency response operations was chiefly characterized by successful contract award and construction oversight for 38 ACFs, providing a total of 15,074 patient care spaces across the United States.

Referencing the preceding table, Scope Successes #1 through #7 each represent a recurring theme identified through analysis of the individual performance assessments. Scope Success #1 represents the above referenced successful completion of 38 ACFs across the United States. Scope Success #2 represented the next major recurring theme, with four divisions reporting the successful employment of emergency contracting

vehicles to address state requirements for ACF construction. Scope Success #3 was another major recurring theme, with three divisions reporting that they effectively de-scoped or suspended/canceled ACF construction contracts upon state requests. Scope Success #4, reported by Headquarters and two divisions, reflects that USACE successfully developed and shared—mid-execution and in real time—emergency contracting documents proven effective for ACF construction. Scope Success #5, reported by two divisions, reflects that USACE conducted effective "Knowledge Sharing" conference calls to integrate and synchronize best practices and caution against emerging pitfalls regarding contracting for ACF construction. Scope Success #6, reported by two divisions, documents that USACE divisions—in the absence of prescriptive enterprise guidance—quickly developed effective emergency contracting systems to meet the requirements of the ACF mission. Scope Success #7, reported by Headquarters and one division, documents that USACE employed effective staffing for oversight of contractor ACF construction.

Scope Successes #8 through #10 each represent a significant observation, reported by only one division, that was generalizable to the USACE enterprise (i.e., although only one division reported the observation, this observation is reasonable or even likely to occur in any division). Scope Success #8 reflects the Mississippi Valley Division's highlight that it employed effective construction project kick-off and close-out to facilitate ACF project delivery. Scope Success #9 reflects the Great Lakes and Ohio River Division's effective contractor selection methods. Scope Success #10 documents the South Pacific Division's successful employment of local 8(a) contractors for ACF construction.

In terms of scope challenges and issues, USACE's documented problems executing Contracting services during COVID-19 emergency response operations were primarily minor in nature, including various inefficiencies and initial issues that were identified and often resolved organically during operations.

Referencing the preceding table, Scope Challenges #1 through #3 represent recurring themes of minor problems identified through analysis of the individual performance assessments. Scope Challenge #1 notes that three divisions each documented a lack of knowledge and preparedness by Contracting Officers to employ emergency contracting vehicles. It is important to note that, while all USACE Contracting Officers are trained and certified for their positions, not all USACE Contracting Officers are routinely tasked with emergency contracting. The Mississippi Valley Division noted that certain districts were excellent in this capability, while others—particularly those with primarily Civil Works missions—did not have "the contracting instruments in place to immediately perform the ACF mission."[18] It is also important to note, however, that divisions quickly responded—developing effective systems despite their lack of knowledge and experience—resulting in no direct risk to mission from this challenge. Scope Challenge #2 documents the continuous troubleshooting and refinement of Contracting considerations and criteria by the North Atlantic Division and the South Pacific Division. These issues were resolved as they were identified, but the challenges are still recorded here to assist in follow-on formalization of enterprise solutions. Scope Challenge #3 reflects the documented preference by several states for employing local contractors for ACF construction. Baltimore District, for example, noted that for potential ACF build-outs in Maryland, the "State wants to use

local state contractors to greatest extent possible."[19] This is not necessarily a problem for USACE as the use of local contractors is authorized and occasionally mandated by rule, but it does represent a challenge to be addressed and managed because preferred local contractors may not meet federal and/or USACE requirements and qualifications.

Scope Challenges #4 through #8 each represent a significant observation, reported by only one division, that was generalizable to the USACE enterprise (i.e., although only one division reported the observation, this observation is reasonable or even likely to occur in any division). Scope Challenge #4 reflects the significant observation by the North Atlantic Division that enterprise-level guidance and direction on ACF acquisition strategies and contract vehicles was not provided at the onset of operations. Instead, the North Atlantic Division—receiving the first ACF mission requests from states—developed "from the bottom up" contracting strategies and best practices for ACF construction. These strategies and best practices were ultimately identified and disseminated through the USACE enterprise, but the North Atlantic Division's comment is noteworthy because higher level guidance and direction would promote consistency and unity of effort throughout the enterprise in any future pandemic event. Scope Challenge #5 reflects the North Atlantic Division's observation that properly evaluating contractors was challenging under the incredible time constraints of the pandemic response operations. It documented that, "Collecting past performance information for Contractors to submit with their proposal within a 24 hour period was a difficult task of proposed Contractors."[20] Scope Challenge #6 documents the North Atlantic Division's observation that project close-out was complicated by poorly defined transitions from the Construction phase to the Operations and Maintenance phase, as often facilities would

become operational for the state while USACE completed final close-out tasks—occasionally resulting in confusion about which organization had responsibility for certain tasks and whether contract modifications could still be made. Scope Challenge #7 reflects the Mississippi Valley Division's comment on the need for a formal definitization process for Undefinitized Contract Actions (UCAs). The division's Memphis District, commenting on unfamiliarity with the process and the lack of established systems, specifically stated the need to, "Structure the definitization process more formally. Because it significantly diverges from the norm, USACE should consider a more deliberate and formal process."[21] Scope Challenge #8 documents the observation by USACE Headquarters that availability of CORs impacted some project operations. This observation was not independently corroborated by any division as a notable challenge or issue during operations, but its inclusion is warranted here based on the USACE Headquarters inclusion. While lack of availability of CORs is certainly an issue of concern, no evidence suggests it was directly impactful to mission accomplishment during operations.

Table 26 below presents the consolidated schedule successes and challenges of USACE as an enterprise performing Contracting services.

Table 26. Contracting (Schedule) Consolidated Successes and Challenges

| U.S. Army Corps of Engineers (Consolidated) | |
|---|---|
| **Contracting (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| 1. USACE successfully completed 36 of 38 projects on-schedule (with 19 finished ahead of schedule), with 2 projects finished 1-2 days behind schedule with no impact to state requirements. [Recurring Theme: HQ, 8 Divisions] | 1. Rights of Entry requirements risked delays to ACF schedule. [Recurring Theme: NAD, SPD] |
| 2. Emergency contracting vehicles expedited project delivery. [Recurring Theme: LRD, NAD, SPD] | 2. Initial construction oversight staffing not sufficient to support short duration project delivery timeline. [Significant Observation: SPD] |
| 3. Mitigation of schedule risk. [Significant Observation: LRD] | |

*Source:* Created by author.

In terms of schedule successes, USACE's performance of Contracting services during COVID-19 emergency response operations was characterized by rapid delivery of ACF projects that enabled states to achieve aggressive timelines for COVID-19 response.

Referencing the preceding table, Schedule Successes #1 and #2 each represent a recurring theme identified through analysis of the individual performance assessments. Schedule Success #1, noted by Headquarters and eight divisions, documents that USACE successfully executed contract award and construction oversight for all state-requested ACFs—ultimately providing a total of 38 ACFs and 15,074 patient care spaces across the United States. Schedule Success #2 represents the recurring theme, as evidenced by the experiences of three divisions, that USACE's emergency contracting vehicles expedited project delivery. The North Atlantic Division, after developing the UCA vehicle early in COVID-19 emergency operations, noted that it, "allows for a much shorter acquisition duration. Considering the significant increase of infected individuals with COVID-19, any time savings is critical."[22]

Schedule Success #3 represents a significant observation, reported by only one division, that was generalizable to the USACE enterprise (i.e., although only one division

reported the observation, this observation is reasonable or even likely to occur in any division). Specifically, Schedule Success #3 reflects the observation by the Great Lakes and Ohio River Division that it was successful at mitigating schedule risk by adhering to developed milestone plans and leveraging its CORs—practices which are standard for all USACE construction oversight.

In terms of schedule challenges and issues, USACE's performance of Contracting services during COVID-19 emergency response operations reflected primarily minor issues with no direct risk to mission accomplishment.

Referencing the preceding table, Schedule Challenge #1 represents the recurring theme—identified through analysis of the individual performance assessments—that issues with Rights of Entry requirements risked delays to ACF schedule. The North Atlantic Division, observing that USACE real estate personnel often had difficulty securing these permissions within emergency time constraints, noted that these real estate personnel must, "understand work in emergency response needs to be expedited, completed in hours not days."[23]

Schedule Challenge #2 represents a significant observation, reported by only one division, that was generalizable to the USACE enterprise (i.e., although only one division reported the observation, this observation is reasonable or even likely to occur in any division). Specifically, Schedule Challenge #2 reflects the South Pacific Division's observation that its initial construction oversight staffing was insufficient—and that a full-time COR, dedicated Assistant Contracting Officer, and multiple Quality Assurance personnel was necessary for achieving the extremely expedited project timelines.[24] This

issue, however, was resolved by the division immediately upon identification, with no negative impacts to mission.

In terms of cost specifically, USACE as an enterprise managed total construction contract costs of $715 million, with an average cost of $18.8 million per ACF and an average cost per patient care space of $47,000. Table 27 below presents the consolidated cost successes and challenges of USACE as an enterprise performing Contracting services.

Table 27. Contracting (Cost) Consolidated Successes and Challenges

| U.S. Army Corps of Engineers (Consolidated) | |
|---|---|
| **Contracting (Cost)** | |
| **Successes** | **Challenges/Issues** |
| 1. Effective contracting protocols to ensure contract costs were fair, even while employing UCAs. [Significant Observation: LRD] | 1. UCAs carried greater risk of contract award cost estimates being inaccurate compared to final costs. [Recurring Theme: LRD, NAD, SPD] |
| 2. Sharing of ACF parametric cost data and best practices within division and across the USACE-enterprise. [Significant Observation: NAD] | 2. Cost of construction contract noted as one of state justifications for reducing scope or potentially choosing not to award construction contract through USACE. [Recuring Theme: NAD, SPD] |
| | 3. Articulation of "Not to Exceed" Cost and Cost Estimates to Stakeholders. [Recurring Theme: HQ, SPD] |
| | 4. Risk of sub-optimal contractor cost bids due to limited competition. [Significant Observation: HQ] |
| | 5. Irrecoverable costs from de-scoping contracts mid-execution. [Significant Observation: LRD] |

*Source:* Created by author.

In terms of cost successes, USACE's performance of Contracting services during COVID-19 emergency response operations was characterized by adherence to established Contracting protocols to ensure contract costs were fair and the sharing of ACF cost data across the USACE enterprise.

Referencing the preceding table, each enumerated success represents a significant observation, reported by only one division, that was generalizable to the USACE

enterprise (i.e., although only one division reported the observation, this observation is reasonable or even likely to occur in any division). Cost Success #1 reflects the observation by the Great Lakes and Ohio River Division that it employed effective contracting protocols to ensure contract costs were fair, even while employing emergency contracting vehicles such as UCAs. With the primary goal of "contract awards at fair and reasonable prices in response to the COVID-19 pandemic," the division stated that, "Price analysis were used to determine price reasonableness for individual contracts . . . The Government obtained appropriate data on the prices of similar medical renovations and costs to create additional temporary medical facilities."[25] Cost Success #2 reflects the North Atlantic Division's observation that emergency contracting best practices and parametric cost data for ACF construction were being shared across the USACE enterprise to improve overall USACE performance. Of the parametric cost data that was invaluable to refined estimates, the division noted that, "All of this information is being shared across USACE via the TRACES (Tri-Service Automated Cost Engineering System) portal and is specific to the Cost Community of Practice."[26]

In terms of cost challenges and issues, USACE's performance of Contracting services during COVID-19 emergency response operations was characterized by the high risk of construction cost increases due to employing emergency contracting vehicles and the concerns of states related to these costs.

Referencing the preceding table, Cost Challenges #1 through #3 represent recurring themes identified through analysis of the individual performance assessments. Cost Challenge #1 reflects the observation of three divisions that emergency contracting vehicles—such as the UCAs employed frequently during these operations—carried a

high risk of contract award cost estimates being inaccurate as compared to final construction costs. The Great Lakes and Ohio River Division noted that, "Cost risk is high," considering that, "there was less time to prepare the IGE and solicit subcontractors or develop a 'bottoms up' estimates (labor, material, and equipment based on a conceptual or real design)."[27] Cost Challenge #2 reflects that two divisions documented indications that states were considering de-scoping ACF contracts—or even choosing not to contract construction through USACE altogether—at least partly due to construction contract costs. The South Pacific Division noted that "reducing immediate costs" was the partial justification for the state of Colorado choosing to de-scope its Laramie County Ranch Complex ACF from 1,600 patient care spaces to only 200 patient care spaces. The North Atlantic Division documented that USACE construction contract cost estimates were a noted consideration for the state of Maryland as to whether it decided to contract with USACE or construct independently.[28] Cost Challenge #3 reflects that USACE Headquarters and the South Pacific Division noted challenges managing expectations with states as to the meaning of "Not to Exceed" costs and contract-award cost estimates. The South Pacific Division, specifically, noted issues with managing state expectations of the risk of contract-award cost estimates increasing during construction. It noted that several states, "were provided Current Working Estimates (CWEs) throughout the process, but several customers did not realize that these estimates could change and that they were likely to increase as more issues and challenges were discovered by both USACE and contractors."[29]

Cost Challenges #4 and #5 each represent a significant observation, reported by only one division, that was impactful to USACE as an enterprise. Cost Challenge #4

reflects the observation by USACE Headquarters that limited competition due to qualified contractor availability carried the risk of sub-optimal construction contract bids. It noted, however, that, "During a national declared emergency or pandemic it is expected that other than full and open competition requirements are likely to be instituted in order to meet the unusual and compelling urgency of some mission objectives."[30] Cost Challenge #5 reflects the observation by the Great Lakes and Ohio River Division that, while it was fully capable of supporting state requests to de-scope ACF contracts mid-execution, these changes "impacted the sunk costs that could not be recovered."[31]

Evaluation Criteria and Functional Needs Analysis

Building upon the consolidated performance assessment in the preceding section, the researcher screened the USACE performance of its Contracting mission against the evaluation criteria outlined in chapter 3.

Scope was assessed as "Green," indicating minor capability gaps with no direct impact to mission. Summarizing the detailed discussion of scope in the preceding section, USACE's performance of Contracting services during COVID-19 emergency response operations was chiefly characterized by successful contract award and construction oversight for 38 ACFs, providing a total of 15,074 patient care spaces across the United States. In terms of scope challenges and issues, several were identified, but these were primarily minor in nature, including various inefficiencies and initial issues that were identified and often resolved organically during operations. Each should be addressed by the USACE enterprise—particularly the recurring theme that many districts and Contracting Officers were initially unprepared to employ emergency contracting

instruments—but none directly impacted the successful accomplishment of the USACE ACF contracting mission.

Schedule was assessed as "Green," reflecting only extremely minor capability gaps with no direct impact to mission. Summarizing the detailed discussion of schedule in the preceding section, USACE's performance of Contracting services during COVID-19 emergency response operations was characterized by rapid delivery of ACF projects that enabled states to achieve aggressive timelines for COVID-19 response. Of the 38 ACF projects delivered, 19 ACFs were completed ahead of schedule, 17 ACFs were completed on schedule, and only 2 ACFs were completed behind schedule—with these 2 ACFs only 1-2 days behind schedule with no negative impacts to state requirements. Identified schedule challenges and issues were few and minor, with no direct risk to mission accomplishment.

Cost was assessed as "Amber," indicating moderate capability gaps that impact mission negatively but do not result in mission failure or states discontinuing services. In terms of cost successes, USACE's performance of Contracting services during COVID-19 emergency response operations was characterized by adherence to established Contracting protocols to ensure contract costs were fair. Ultimately, however, cost challenges and issues predominated: Emergency contracting vehicles carried a high risk of contract award cost estimates being inaccurate as compared to final construction costs (i.e., actual construction costs ultimately exceeded cost estimates at contract award). Confusion surrounding the definiteness of contract-award cost estimates was difficult to articulate to states, resulting in challenges with expectation management. Each of these issues individually represents a "moderate" capability gap that impacted mission

negatively but did not cause failure to mission, and neither could be clearly resolved during the course of operations. Perhaps most significantly, two divisions noted that supported states de-scoped contracts—or even considered choosing not to contract construction through USACE altogether—at least partly due to construction contract costs. The researcher also assesses this issue as a "moderate" capability gap, rather than a "major" capability gap, because cost could not be established as the primary concern (although it was a noted component) in any of these cases. Additionally, in cases of de-scoping, USACE still successfully provided contracting services, although reduced as compared to initial estimates. In cases with states considering not contracting through USACE, there is no clear evidence that a state ever decided not to contract through USACE due to construction contract costs. Although this could possibly have occurred, myriad factors impact state decisions on how to proceed, and no state definitively noted USACE construction contract costs as being the justification for contracting independently.

Summarizing the above narrative, the overall assessment of USACE performance and, correspondingly, the severity of the capability gap is depicted below in table 28.

Table 28. Contracting Overall Performance and Functional Needs Analysis

| Overall Performance Assessment and Functional Needs Analysis: Contracting | | |
|---|---|---|
| **Scope** | **Schedule** | **Cost** |
| **GREEN** | **GREEN** | **AMBER** |
| Minor capability gaps with no direct impact to mission. USACE successfully executed contract award and construction oversight for 38 ACFs, providing a total of 15,074 patient care spaces across the United States. Several Contracting scope challenges and issues were identified, but each was relatively minor and/or resolved internally during execution of operations. | Extremely minor capability gaps with no direct impact to mission. USACE successfully completed 36 of 38 projects on-schedule (with 19 finished ahead of schedule), with 2 projects finished 1-2 days behind schedule with no impact to state requirements. Few Contracting schedule challenges and issues were identified, and each had only minor impacts and was resolved internally during execution of operations. | Moderate capability gaps that impact mission negatively but do not result in mission failure or states discontinuing services. USACE mitigated cost issues appropriately, but cost increases associated with the use of emergency contracting vehicles caused moderately negative impacts to mission. |

*Source:* Created by author.

To enumerate the capability gaps identified during this Functional Needs Analysis, the three consolidated tables of successes and challenges/issues will be applied directly to Functional Solutions Analysis. Due to the unprecedented nature of the ACF mission and based on the literature review Functional Area Analysis, many of the Successes and Challenges/Issues enumerated represent capability gaps that should be assessed against possible solution approaches. Many observed successes require USACE to implement changes to sustain the positive performance in future pandemic events, and many observed challenges and issues require USACE to implement solutions to improve performance in future pandemic events. In the instances in which the consolidated performance assessment does not correspond to a capability gap, this is noted specifically in the Functional Solutions Analysis.

## Functional Solutions Analysis

This section presents solutions to the capability gaps identified in the preceding Functional Needs Analysis phase. The researcher—informed by the deep contextual understanding gained through literature review (i.e., identified requirements) and analysis

of collected data (i.e., identified current capabilities)—generated proposed solution approaches across the Doctrine, Organization, Training, Leadership, and Personnel (DOTLP) domains. The researcher then applied Feasible-Acceptable-Suitable evaluation criteria to these proposed solution approaches to test the validity of the approaches. Ultimately, this section consolidates the recommended solution approaches, addressing the identified capability gaps and contributing to the study's response to the primary research question of how USACE should prepare itself for effective support to ACF operations in future pandemic events.

## Generating Solutions to the Enumerated Capability Gaps

The following tables demonstrate the process by which the researcher generated solutions to address each of the enumerated capability gaps.

Table 29 below demonstrates the solutions generated across the DOTLP domains to address the capability gaps defined by USACE's ad hoc scope successes during execution of Contracting services. To facilitate formatting and word economy, these solutions are identified as abbreviated solution approaches in the table. Detailed descriptions of each solution are provided in narrative format after consolidation of all identified solutions.

Table 29. Contracting (Scope Successes) Functional Solutions Analysis

| Functional Solutions Analysis: Contracting (Scope, Part 1) | | | | | |
|---|---|---|---|---|---|
| **Successes** | **Doctrine** | **Organization** | **Training** | **Leadership** | **Personnel** |
| 1. USACE successfully executed contract award and construction oversight for 38 ACFs, providing a total of 15,074 patient care spaces across the United States. | No identified capability gap. | | | | |
| 2. Employment of emergency contracting vehicles. | Develop comprehensive "ACF Acquisition Guide" based on the response "Pandemic Response Desk Guide" and collection of documents, templates from operations.<br><br>Establish new QMS Business Process for ACF Contracting. | | Incorporate Emergency Contracting training into Contracting Officer and Representative standard training. | | |
| 3. Effective responses to state requests to de-scope or suspend/cancel contracts. | No identified capability gap. | | | | |
| 4. USACE enterprise and individual Divisions developed and shared COVID-19 Contracting templates, guidance documents, and best practices. | Establish new QMS Business Process for ACF Contracting. | | | | |
| 5. USACE-enterprise Knowledge Sharing calls to integrate and synchronize Contracting techniques. | Establish new QMS Business Process for ACF Contracting. | | | | |
| 6. Divisions quickly developed effective emergency contracting systems to address requirements of ACF mission. | Develop comprehensive "ACF Acquisition Guide" based on the response "Pandemic Response Desk Guide" and collection of documents, templates from operations.<br><br>Establish new QMS Business Process for ACF Contracting. | | | | |
| 7. Effective staffing for construction oversight. | Establish new QMS Business Process for ACF Contracting. | | | | |
| 8. Effective construction project kick-off and close-out. | Establish new QMS Business Process for ACF Contracting. | | | | |
| 9. Effective contactor selection methods. | No identified capability gap. | | | | |
| 10. Leveraged Local 8(a) contractors. | No identified capability gap. | | | | |

*Source:* Created by author.

Table 30 below demonstrates the solutions generated across the DOTLP domains to address the capability gaps defined by USACE's scope challenges and issues during execution of Contracting services. As before, these solutions are identified as abbreviated

solution approaches in the table. Detailed descriptions of each solution are provided in narrative format after consolidation of all identified solutions.

Table 30. Contracting (Scope Challenges) Functional Solutions Analysis

| Functional Solutions Analysis: Contracting (Scope, Part 2) | | | | | |
|---|---|---|---|---|---|
| **Challenges/Issues** | **Doctrine** | **Organization** | **Training** | **Leadership** | **Personnel** |
| 1. Knowledge and preparedness to employ emergency contracting vehicles. | Develop comprehensive "ACF Acquisition Guide" based on the response "Pandemic Response Desk Guide" and collection of documents, templates from operations.<br><br>Establish new QMS Business Process for ACF Contracting. | | Incorporate Emergency Contracting training into Contracting Officer and Representative standard training. | | |
| 2. Continuous improvements required regarding specific Contracting practices. | Establish new QMS Business Process for ACF Contracting. | | | | |
| 3. State preference for use of local contractors. | | | | USACE Leadership, at the Division and District level, must articulate USACE Contracting requirements and manage expectations. | |
| 4. Enterprise-level guidance on acquisition strategy and contracting vehicles. | Develop comprehensive "ACF Acquisition Guide" based on the response "Pandemic Response Desk Guide" and collection of documents, templates from operations.<br><br>Establish new QMS Business Process for ACF Contracting. | | | | |
| 5. Evaluating Contractors with limited time available. | Incorporate ACF Contractor Solicitation into SAM Disaster Response Registry. | | | | |
| 6. Project close-out complicated by defining transition from Construction phase to O and M phase. | Establish new QMS Business Process for ACF Contracting. | | | | |
| 7. Definitization process for UCAs. | Establish new QMS Business Process for ACF Contracting. | | | | |
| 8. Availability of CORs impacted some project operations. | | | | | Leverage NAVFAC CORs. |

*Source*: Created by author.

Table 31 below demonstrates the solutions generated across the DOTLP domains to address the capability gaps defined by USACE's ad hoc schedule successes during execution of Contracting services. As before, these solutions are identified as abbreviated solution approaches in the table. Detailed descriptions of each solution are provided in narrative format after consolidation of all identified solutions.

Table 31. Contracting (Schedule Successes) Functional Solutions Analysis

| Functional Solutions Analysis: Contracting (Schedule, Part 1) | | | | | |
|---|---|---|---|---|---|
| **Successes** | **Doctrine** | **Organization** | **Training** | **Leadership** | **Personnel** |
| 1. USACE successfully completed 36 of 38 projects on-schedule (with 19 finished ahead of schedule), with 2 projects finished 1-2 days behind schedule with no impact to state requirements. | No identified capability gap. | | | | |
| 2. Emergency contracting vehicles expedited project delivery. | Develop comprehensive "ACF Acquisition Guide" based on the response "Pandemic Response Desk Guide" and collection of documents, templates from operations.<br><br>Establish new QMS Business Process for ACF Contracting. | | | | |
| 3. Mitigation of schedule risk. | No identified capability gap. | | | | |

*Source:* Created by author.

Table 32 below demonstrates the solutions generated across the DOTLP domains to address the capability gaps defined by USACE's schedule challenges and issues during execution of Contracting services. As before, these solutions are identified as abbreviated solution approaches in the table. Detailed descriptions of each solution are provided in narrative format after consolidation of all identified solutions.

Table 32. Contracting (Schedule Challenges) Functional Solutions Analysis

| Functional Solutions Analysis: Contracting (Schedule, Part 2) | | | | | |
|---|---|---|---|---|---|
| **Challenges/Issues** | **Doctrine** | **Organization** | **Training** | **Leadership** | **Personnel** |
| 1. Rights of Entry requirements risked delays to ACF schedule. | | | Incorporate Emergency Response requirements and timelines into standard Real Estate training. | | |
| 2. Initial construction oversight staffing not sufficient to support short duration project delivery timeline. | Establish new QMS Business Process for ACF Contracting. | | | | |

*Source:* Created by author.

Table 33 below demonstrates the solutions generated across the DOTLP domains to address the capability gaps defined by USACE's ad hoc cost successes during execution of Contracting services. As before, these solutions are identified as abbreviated solution approaches in the table. Detailed descriptions of each solution are provided in narrative format after consolidation of all identified solutions.

Table 33. Contracting (Cost Successes) Functional Solutions Analysis

| Functional Solutions Analysis: Contracting (Cost, Part 1) | | | | | |
|---|---|---|---|---|---|
| **Successes** | **Doctrine** | **Organization** | **Training** | **Leadership** | **Personnel** |
| 1. Effective contracting protocols to ensure contract costs were fair, even while employing UCAs. | No identified capability gap. | | | | |
| 2. Sharing of ACF parametric cost data and best practices within division and across the USACE-enterprise. | Updates to TRACES to assist in future ACF cost estimates.<br><br>Establish new QMS Business Process for ACF Contracting. | | | | |

*Source:* Created by author.

Table 34 below demonstrates the solutions generated across the DOTLP domains to address the capability gaps defined by USACE's cost challenges and issues during execution of Contracting services. As before, these solutions are identified as abbreviated

solution approaches in the table. Detailed descriptions of each solution are provided in narrative format after consolidation of all identified solutions.

Table 34. Contracting (Scope Challenges) Functional Solutions Analysis

| Functional Solutions Analysis: Contracting (Cost, Part 2) | | | | | |
|---|---|---|---|---|---|
| **Challenges/Issues** | **Doctrine** | **Organization** | **Training** | **Leadership** | **Personnel** |
| 1. UCAs carried greater risk of contract award cost estimates being inaccurate compared to final costs. | | | | USACE Leadership, at the Division and District level, must articulate to stakeholders the benefits and risks of emergency contracting vehicles. | |
| 2. Cost of construction contract noted as one of state justifications for reducing scope of ACF. | No feasible solution to this challenge, as it is predicated on state willingness to pay (and the associated complex budgetary and fiscal considerations of the state in question). | | | | |
| 3. Articulation of "Not to Exceed" Cost and Cost Estimates to Stakeholders. | | | | USACE Leadership, at the Division and District level, must articulate the meaning of these terms and manage expectations. | |
| 4. Risk of sub-optimal contractor cost bids due to limited competition. | Incorporate ACF Contractor Solicitation into SAM Disaster Response Registry. | | | | |
| 5. Irrecoverable costs from de-scoping contracts mid-execution. | | | | USACE Leadership, at the Division and District level, must articulate the impacts of requesting scope changes at late stages of the construction process. | |

*Source:* Created by author.

## Evaluation Criteria

The above solution approaches were screened against the Feasible-Acceptable Suitable evaluation criteria, as described in chapter 3. Each solution is feasible, acceptable, and suitable. The approaches generated are feasible due to the limited resource expenditure required for the recommended doctrinal updates and limited additional training. The approaches are acceptable due to few associated risks. The approaches are suitable due to reasonable expectation of solving the associated capability gaps.

Consolidated Solutions to the Capability Gaps

Table 35 below documents the consolidated solutions generated (and screened against evaluation criteria) to the capabilities gaps identified in USACE's current preparedness to Contracting services in a future pandemic event.

Table 35. Contracting Consolidated Functional Solutions Analysis

| Functional Solutions Analysis: Contracting (Consolidated) | |
|---|---|
| **Doctrine** | Develop comprehensive "ACF Acquisition Guide" based on the "Pandemic Response Desk Guide" developed during operations and all corresponding documents, templates, etc. |
| | Establish new QMS Business Process for ACF Contracting Guidelines. |
| | Incorporate ACF Contractor Solicitation into SAM Disaster Response Registry. |
| | Updates to TRACES to assist in future ACF cost estimates. |
| **Organization** | No solutions recommended in the Organization domain. |
| **Training** | Incorporate Emergency Contracting training into Contracting Officer and Contracting Officer Representative standard training. |
| | Incorporate Emergency Response requirements and timelines into standard Real Estate training. |
| **Leadership** | USACE Leadership, at the Division and District level, must articulate USACE Contracting requirements and manage expectations with stakeholders. |
| | USACE Leadership, at the Division and District level, must articulate to stakeholders the benefits and risks of emergency contracting vehicles. |
| | USACE Leadership, at the Division and District level, must articulate the meaning of cost estimate terms and manage expectations with stakeholders. |
| **Personnel** | Leverage NAVFAC CORs to support USACE contracting, when necessary and appropriate. |

*Source:* Created by author.

In terms of Doctrine, the researcher recommends first and foremost that USACE develop a comprehensive "ACF Acquisition Guide," building upon the "Pandemic Response Desk Guide" that was generated mid-way through execution of COVID-19 emergency response operations. This guidance document would provide emergency contracting best practices, availability and employment criteria for specific emergency contracting instruments, and a formalized definitization process for Undefinitized Contract Actions, along with information on documents, forms, and templates validated as effective during COVID-19 operations. It would also alleviate the challenge of divisions independently generating emergency contracting systems to respond to a future

pandemic, and it would provide the enterprise-level guidance that was noted as an issue by the North Atlantic Division. This document would also serve to bridge knowledge and experience gaps for Contracting Officers not routinely engaged in emergency contracting.

Additionally, to sustain the successes and resolve the issues experienced by USACE subordinate unit Contracting teams, USACE should establish a new QMS Business Process as guidance for ACF Contracting. The new process should include the following:

1. Guidelines for employing emergency contracting vehicles, with links and references to additional information.
2. Links to USACE-enterprise repository for ACF Contracting templates.
3. Recommended staffing for construction oversight.
4. Guidelines for effective project kick-off and close-out.
5. Additional contracting considerations identified as significant during COVID-19 operations.

USACE should also seek incorporation of ACF contractors into the Disaster Response Registry, hosted by the U.S. Government System for Award Management (SAM). Given that the SAM already solicits contractors to list themselves as willing to provide services (e.g., debris removal, reconstruction) in other disasters such as floods and hurricanes to which USACE responds, the inclusion of ACF contractors is a relatively simple and low-cost adjustment that could support a future pandemic response. This change would address the documented challenge of evaluating contractors with limited time during emergency operations while also improving the likelihood of lower-cost contract bids through increased competition.

Additionally, USACE should ensure updates to TRACES based on all data from the enterprise's 38 completed ACF projects to assist in future ACF cost estimates. The North Atlantic Division noted that, during execution of COVID-19 emergency operations, USACE districts were providing updates to TRACES with validated parametric cost data from completed ACF projects. A deliberate effort should be made to ensure that all parametric cost data is captured to best inform the ability of USACE Contracting to develop IGEs and negotiate contract costs in a future pandemic.

In terms of Training, the researcher recommends that the USACE Directorate of Contracting incorporate additional emergency contracting training into the standard courses required for Contracting Officers and Contracting Officer Representatives. This would improve the readiness of USACE personnel not routinely involved in emergency contracting. The researcher also recommends that USACE Real Estate leadership incorporate emergency response requirements and timelines into the standard training for real estate personnel. This would improve the readiness of these personnel to expedite tasks such as Rights of Entry during emergency response operations of any kind. In either case, inclusion as a block of instruction into already mandated training could provide a low-cost option to provide significant capability for emergency contracting in a future pandemic.

In terms of Leadership, the researcher recommends that USACE leadership at the division and district levels prioritize communicating the following points to key stakeholders in any future ACF contracting:

1. USACE Contracting does seek to employ local contractors, when feasible and appropriate, but Federal Acquisition Regulation and USACE Contracting standards

and guidelines may not allow every local contractor preferred by states due to qualifications, experience, etc.

2. Emergency contracting instruments provide the capability to expedite project delivery, but the associated costs will likely be greater.

3. Cost estimates at contract award and "Not to Exceed" costs may increase due to definitization of scope during construction phase, particularly with emergency contracting vehicles.

In terms of Personnel, the researcher recommends, in recognition of personnel limitations in a national-level pandemic event, that USACE formally establish the practice of requesting military or other federal agency engineers to support as CORs. The practice of leveraging NAVFAC CORs, in particular, was noted by USACE Headquarters during COVID-19 emergency response operations, and this practice could prove effective in a future pandemic event.

## Primary Research Question

Supported by the detailed treatment of each secondary research question, the primary research question—investigating how USACE should prepare itself for effective support to ACF operations in future pandemic events, with consideration for the factors of time, cost, and scope—is directly addressed by combining each secondary research question's consolidated DOTLP solutions, which were generated to address the capability gaps identified in USACE capability to conduct Site Assessment, Engineering and Design, and Contracting services for ACF operations. Simply, USACE should prepare itself for effective support to ACF operations in future pandemic events by implementing the solutions recommended in table 13, table 24, and table 35. By implementing these

solutions, USACE will bridge the capability gaps identified during ACF operations for the COVID-19 pandemic.

## Summary

This chapter presented the findings and analysis from investigation of the data relevant to the primary and secondary research questions. The chapter provided detailed discussion of each of the three secondary research questions, with comprehensive descriptions of USACE performance during COVID-19 response operations through consolidated USACE enterprise assessments based on recurring themes and significant generalizable observations. Building upon these performance assessments, each section presented a Functional Needs analysis based on the literature review Functional Area Analysis. Subsequently, each section presented a Functional Solutions Analysis generating potential changes for USACE to implement. Consolidating the solutions generated in each section, the chapter ultimately generated a response to the primary research question.

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[1] U.S. Army Corps of Engineers St. Paul District, Mississippi Valley Division, "COVID-19 Pandemic: Hotwash Comments, 09 April 2020," (St. Paul, MN, 2020).

[2] U.S. Army Corps of Engineers Southwestern Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," (Dallas, TX, 2020), 69.

[3] Ibid.

[4] U.S. Army Corps of Engineers Albuquerque District, South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," (Albuquerque, NM, 2020), 374.

[5] U.S. Army Corps of Engineers South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," (San Francisco, CA, 2020), 27.

[6] U.S. Army Corps of Engineers Pacific Ocean Division, "COVID-19 Pandemic: After Action Report, 29 June 2020," (Honolulu, HI, 2020), 36.

[7] Ibid., 35.

[8] Ibid., 36.

[9] U.S. Army Corps of Engineers Great Lakes and Ohio River Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," (Cincinnati, OH, 2020), 15-16.

[10] South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 5.

[11] U.S. Army Corps of Engineers Southwestern Division, "COVID-19 Pandemic: Hotwash Presentation, 07 July 2020," (Dallas, TX, 2020), 12.

[12] U.S. Army Corps of Engineers North Atlantic Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," (New York, NY, 2020), F-1-2.

[13] U.S. Army Corps of Engineers New York District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," (New York, NY, 2020), F-3.

[14] Ibid.

[15] Great Lakes and Ohio River Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," 30.

[16] Ibid., 32.

[17] Pacific Ocean Division, "COVID-19 Pandemic: After Action Report, 29 June 2020," 35.

[18] U.S. Army Corps of Engineers Rock Island District, Mississippi Valley Division, "COVID-19: MVR Regional AAR Comments, 23 April 2020," (Rock Island, IL, 2020), 4.

[19] U.S. Army Corps of Engineers Baltimore District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 15 June 2020," (Baltimore, MD, 2020), 71.

[20] North Atlantic Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," F-6-2.

[21] U.S. Army Corps of Engineers Memphis District, Mississippi Valley Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," (Memphis, TN, 2020), 41.

[22] Baltimore District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 15 June 2020," 186-187.

[23] North Atlantic Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," F-7-20.

[24] U.S. Army Corps of Engineers Sacramento District, South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," (Sacramento, CA, 2020), 509.

[25] Great Lakes and Ohio River Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," 35.

[26] U.S. Army Corps of Engineers New England District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," (Concord, MA, 2020), 131.

[27] Great Lakes and Ohio River Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," 30.

[28] Baltimore District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 15 June 2020," 71.

[29] South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 124.

[30] U.S. Army Corps of Engineers Headquarters, "COVID-19 Pandemic: Final After Action Report, 31 July 2020," (Washington, DC, 2020), K-10.

[31] Great Lakes and Ohio River Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," 49.

# CHAPTER 5

# CONCLUSIONS AND RECOMMENDATIONS

## Chapter Introduction

### Overview

Reflecting on the findings and analysis presented in chapter 4, this chapter summarizes the conclusions of the research conducted, presents the implications for the U.S. Army Corps of Engineers, and proposes recommendations for the Chief Decision Maker. Additionally, this chapter provides recommendations for future research based on findings and conclusions from this research. The chapter concludes with closing thoughts on preparation for future pandemic response operations by the U.S. Army Corps of Engineers.

### Purpose of the Research

The purpose of this study is to provide the Chief of Engineers, as the Chief Decision Maker within the U.S. Army Corps of Engineers, with a rich description of the organization's performance of Alternate Care Facilities tasks during the COVID-19 pandemic in order to identify capability gaps and subsequently generate solutions to bridge these gaps. This study makes recommendations—based on the solutions generated to identified capability gaps—to the Chief of Engineers to assist with preparing the U.S. Army Corps of Engineers for effective Alternate Care Facilities operations in a future pandemic event. With these objectives at the forefront and in consideration of the problem statement, the primary research question and supporting secondary research questions were developed.

## Primary Research Question

How should the U.S. Army Corps of Engineers prepare itself for effective support to Alternate Care Facility operations in future pandemic events, with consideration for the factors of time, cost, and scope, in order to provide state governments with necessary services and facilities?

## Secondary Research Questions

To support the development of solutions for the Primary Research Question, the following Secondary Research Questions were explored:

1. During COVID-19 emergency response operations, how successfully did USACE provide states with site assessment services, in consideration of time, cost, and scope factors?
2. During COVID-19 emergency response operations, how successfully did USACE provide states with Engineering and Design services, in consideration of time, cost, and scope factors?
3. During COVID-19 emergency response operations, how successfully did USACE provide states with Contracting services, in consideration of time, cost, and scope factors?

Orienting toward these stated research questions, the following section considers the conclusions of the research.

## Conclusions

### Enterprise Performance Assessment and Functional Needs Analysis

By addressing each secondary research question, the researcher developed a comprehensive assessment of USACE enterprise performance during COVID-19 emergency response operations while concurrently identifying capability gaps in USACE's ability to respond to a future pandemic event.

Table 36 below, employing the evaluation criteria outlined in chapter 3, summarizes this study's aggregate response to the questions of how successfully USACE performed Site Assessment, Engineering and Design, and Contracting services in consideration of factors of scope, schedule, and cost.

Table 36. USACE Overall Performance and Functional Needs Analysis

| Overall Performance Assessment and Functional Needs Analysis | | | |
|---|---|---|---|
| | **Scope** | **Schedule** | **Cost** |
| | **GREEN** | **GREEN** | **GREEN** |
| **Site Assessment** | Minor capability gaps with no direct impact to mission. Successful accomplishment of all requested site assessments. Documented issues were minor, excepting two isolated instances that divisions rectified systematically during execution of operations. | Minor capability gaps with no direct impact to mission. Remarkable speed of site assessment team deployment and conduct of requested site assessments. Identified schedule challenges and issues were primarily minor with no direct risk to mission accomplishment. | Minor capability gaps with no direct impact to mission. Availability of 100% federal funding enabled states to request site assessments from USACE in volume for nearly a month during the study period. Issues were minor, and unwillingness by some states to pay cost-share rates is not generalizable. |
| **Engineering and Design** | **AMBER** | **GREEN** | **AMBER** |
| | Moderate capability gaps that impact mission negatively but do not result in mission failure or states discontinuing services. Excepting the Pacific Ocean area of responsibility, USACE Engineering and Design services were overwhelmingly successful, providing states with standardized ACF design documentation and site-specific Engineering and Design products, either of which could be utilized with or without contracting construction through USACE. In the Pacific Ocean area of responsibility, however, the scope of the standardized USACE design was unfeasible for many ACF conversions. | Very minor capability gaps with no direct impact to mission. USACE succeeded in developing Engineering and Design products rapidly to facilitate construction contractor solicitation and on-demand construction contract award by states. Few schedule challenges or issues were reported, and those reported had only very minor effects, with no direct impact to mission. | Moderate capability gaps that impact mission negatively but do not result in mission failure or states discontinuing services. USACE provided states with highly cost-effective support in the form of standardized ACF design documentation and pre-DFA technical engineering support, each at 100% federal cost share. Negative mission impacts, however, resulted from a few noteworthy construction cost increases related to uncertainty in early operations. Additionally, standardized ACF designs were "too expensive" for implementation in Hawaii and the Pacific island U.S. territories. |
| **Contracting** | **GREEN** | **GREEN** | **AMBER** |
| | Minor capability gaps with no direct impact to mission. USACE successfully executed contract award and construction oversight for 38 ACFs, providing a total of 15,074 patient care spaces across the United States. Several Contracting scope challenges and issues were identified, but each was relatively minor and/or resolved internally during execution of operations. | Extremely minor capability gaps with no direct impact to mission. USACE successfully completed 36 of 38 projects on-schedule (with 19 finished ahead of schedule), with 2 projects finished 1-2 days behind schedule with no impact to state requirements. Few Contracting schedule challenges and issues were identified, and each had only minor impacts and was resolved internally during execution of operations. | Moderate capability gaps that impact mission negatively but do not result in mission failure or states discontinuing services. USACE mitigated cost issues appropriately, but cost increases associated with the use of emergency contracting vehicles caused moderately negative impacts to mission. |

*Source:* Created by author.

Expanding on the summary information provided in table 36, the below narratives provide additional description of the study's conclusions within each area of significance.

Site Assessment

In consideration of scope factors, USACE's performance of site assessment services was primarily characterized by the successful accomplishment of all requested site assessments. USACE ultimately executed 1,155 site assessments across 50 states and 5 territories, with eight divisions each contributing to these operations. Documented scope challenges and issues were primarily minor with no direct risk to mission accomplishment, and many of these issues were resolved over the course of operations.

In consideration of schedule factors, USACE's performance of site assessment services was primarily characterized by the remarkable speed with which USACE site assessment teams deployed and conducted requested site assessments. Identified schedule challenges and issues were primarily minor with no direct risk to mission accomplishment.

In consideration of cost factors, USACE's performance of site assessment services was primarily characterized by the availability of 100% federal funding through FEMA National MA NAD-02, which enabled states to request site assessments from USACE in volume for nearly a month during the study period. Several challenges and issues were reported, but, except for one notable exception, each was relatively minor in impact with no direct impact to mission.

Engineering and Design

In consideration of scope factors, USACE's performance of Engineering and Design services was chiefly characterized by open distribution of 4 standardized ACF designs and the successful completion of site-specific Engineering and Design documentation for more than 70 ACFs across the United States. Despite this success, USACE ACF standardized designs were not feasible for ACF conversions in Hawaii and the Pacific island U.S territories. This issue represents a significant capability gap that the researcher categorized as "moderate" in nature, with negative impacts to mission accomplishment without resulting in mission failure or states discontinuing services.

In consideration of schedule factors, USACE's performance of Engineering and Design services was characterized by rapid execution that enabled states to achieve

aggressive timelines for COVID-19 response. Identified schedule challenges and issues were primarily minor with no direct risk to mission accomplishment.

In consideration of cost factors, despite the availability of four standardized ACF designs at no cost to states, cost challenges and issues predominated: The notably significant cost increases documented by the Great Lakes and Ohio River Division between contract execution estimates and final construction costs represent a "moderate" capability gap that impacted mission negatively but did not cause failure to mission. Additionally, the observation by the Pacific Ocean Division that the USACE standardized ACF designs were too expensive for implementation in Hawaii and the Pacific island U.S. territories also represents a "moderate" capability gap that impacted mission negatively but did not cause failure to mission.

Contracting

In consideration of scope factors, USACE's performance of Contracting services was chiefly characterized by successful contract award and construction oversight for 38 ACFs, providing a total of 15,074 patient care spaces across the United States. In terms of scope challenges and issues, several were identified, but these were primarily minor in nature, including various inefficiencies and initial issues that were identified and often resolved organically during operations.

In consideration of schedule factors, USACE's performance of Contracting services was characterized by rapid delivery of ACF projects that enabled states to achieve aggressive timelines for COVID-19 response. Of the 38 ACF projects delivered, 19 ACFs were completed ahead of schedule, 17 ACFs were completed on schedule, and only 2 ACFs were completed behind schedule—with these 2 ACFs only 1-2 days behind

schedule with no negative impacts to state requirements. Identified schedule challenges and issues were few and minor, with no direct risk to mission accomplishment.

In consideration of cost factors, while USACE executed all appropriate measures to ensure construction contract costs were fair and appropriate, USACE's performance of Contracting services was characterized by the high risk of construction cost increases due to employing emergency contracting vehicles and the concerns of states related to these costs. These issues represented "moderate" capability gaps that impacted mission negatively but did not cause failure to mission.

## Functional Solutions Analysis

By generating solutions to the capability gaps identified through study of the secondary research questions, the researcher developed a comprehensive response to the question of how USACE should prepare itself for effective support to ACF operations in future pandemic events, with consideration for the factors of time, cost, and scope.

Responding directly to the primary research question, USACE should prepare itself for effective support to ACF operations in future pandemic events by implementing the solutions documented previously in table 13, table 24, and table 35. These solutions were generated through consideration of the DOTLP domains, and each was screened against Feasible, Acceptable, and Suitable evaluation criteria.

First presented in chapter 4, table 13 documents the solutions generated to bridge identified capability gaps in the performance of Site Assessment services. The table is reproduced below, as table 37, for convenience.

Table 37. Site Assessment Consolidated Functional Solutions Analysis (Rep.)

| Functional Solutions Analysis: Site Assessment (Consolidated) |
|---|

| | |
|---|---|
| **Doctrine** | Update to ER 500-1-28 to formalize new ESF #3 Mission PRT. |
| | Establish new QMS Business Process(es) for ACF Site Assessment execution. |
| | Standardize digital platform solutions. |
| **Organization** | Establish ESF #3 ACF PRT. |
| **Training** | Provide training as required for newly established PRT. |
| | Standardize and provide training on use of digital platform solutions for assessment tasks. |
| **Leadership** | USACE Headquarters Leadership should advocate for a National MA in the event of a future pandemic requiring ACF operations. |
| | USACE Leadership, at the District and Division levels, must manage expectations with State and local leadership by communicating the purpose of ROM estimates. |
| **Personnel** | Recognizing personnel limitations in a national-level pandemic event, formally establish the practice of requesting other military or federal agency engineers to support physical site assessments and/or report construction. |

*Source:* Created by author.

First presented in chapter 4, table 24 documents the solutions generated to bridge identified capability gaps in the performance of Engineering and Design services. The table is reproduced below, as table 38, for convenience.

Table 38. Engineering and Design Consolidated Functional Solutions Analysis (Rep.)

| **Functional Solutions Analysis: Engineering and Design (Consolidated)** | |
|---|---|
| **Doctrine** | Update Engineer Publications to Codify Standard Designs. |
| | Develop "low-scope" ACF design concept and standards; codify in USACE Engineer Publications Update. |
| | Establish new QMS Business Process for ACF Design Process. |
| | Formally publish new Engineer Forms (ENG) based on COVID-19 ACF Engineering and Design. |
| | Update HNC/MX Standard Operating Procedures. |
| **Organization** | No solutions recommended in the Organization domain. |
| **Training** | HNC/MX develops and manages ACF Design training and workshops. |
| **Leadership** | USACE Headquarters Leadership should advocate for a National MA in the event of a future pandemic requiring ACF operations. |
| **Personnel** | No solutions recommended in the Personnel domain. |

*Source:* Created by author.

First presented in chapter 4, table 35 documents the solutions generated to bridge identified capability gaps in the performance of Contracting services. The table is reproduced below, as table 39, for convenience.

Table 39. Contracting Consolidated Functional Solutions Analysis (Rep.)

| **Functional Solutions Analysis: Contracting (Consolidated)** |
|---|

| | |
|---|---|
| **Doctrine** | Develop comprehensive "ACF Acquisition Guide" based on the "Pandemic Response Desk Guide" developed during operations and all corresponding documents, templates, etc. |
| | Establish new QMS Business Process for ACF Contracting Guidelines. |
| | Incorporate ACF Contractor Solicitation into SAM Disaster Response Registry. |
| | Updates to TRACES to assist in future ACF cost estimates. |
| **Organization** | No solutions recommended in the Organization domain. |
| **Training** | Incorporate Emergency Contracting training into Contracting Officer and Contracting Officer Representative standard training. |
| | Incorporate Emergency Response requirements and timelines into standard Real Estate training. |
| **Leadership** | USACE Leadership, at the Division and District level, must articulate USACE Contracting requirements and manage expectations with stakeholders. |
| | USACE Leadership, at the Division and District level, must articulate to stakeholders the benefits and risks of emergency contracting vehicles. |
| | USACE Leadership, at the Division and District level, must articulate the meaning of cost estimate terms and manage expectations with stakeholders. |
| **Personnel** | Leverage NAVFAC CORs to support USACE contracting, when necessary and appropriate. |

*Source:* Created by author.

By implementing the above solutions, USACE will bridge the capability gaps identified during COVID-19 response operations, enabling the organization to provide states with effective Site Assessment, Engineering and Design, and Contracting services, respectively, in a future pandemic event. For narrative descriptions for the above solution approaches, see chapter 4.

## Implications

Reflecting on this study's assessment of USACE performance, the researcher notes that USACE—without any prior guidance, training, or preparation for constructing ACFs under emergency conditions and time constraints—performed exceedingly well as an organization. Owing to its regular mission set including emergency management (with deployable teams trained to conduct assessments of infrastructure), engineering and design (including for Department of Defense medical facilities), and contracting (including emergency contracting instruments), USACE was the ideal choice to support the ACF mission during COVID-19 response operations.

Still, as identified through this study's Functional Needs Analysis, capability gaps exist that should be addressed to prepare USACE most effectively for a future pandemic response requiring ACF operations. Some of these gaps are relatively minor, such as nearly all gaps identified in the conduct of Site Assessment services, but by addressing these gaps USACE can formalize best practices and improve upon challenges and issues to perform more systematically (as compared to the successful "field expedient" solutions innovated during COVID-19 response operations) in a future pandemic event. Conversely, some of these gaps were more significant, such as the challenge of providing feasible ACF designs for Hawaii and the Pacific island U.S. territories, and by addressing these gaps USACE can ensure an even higher level of support to the nation in a future pandemic event.

## Recommendations for Decisionmakers

As outlined in the response to the primary research question, the researcher recommends that USACE implement the DOTLP solutions generated through this study's modified Capabilities Based Analysis. Furthermore, given that the recommended solution set requires limited expenditure of resources, the researcher recommends that USACE implement all of proposed solution approaches—addressing the capability gaps in performance of Site Assessment, Engineering and Design, and Contracting services. A consolidated listing of all DOTLP solutions proposed by this study is presented below, as table 40.

Table 40. USACE Consolidated Functional Solutions Analysis

| Functional Solutions Analysis | |
|---|---|
| **Doctrine** | Update to ER 500-1-28 to formalize new ESF #3 Mission PRT. |
| | Establish new QMS Business Process(es) for ACF Site Assessment execution. |
| | Standardize digital platform solutions. |
| | Update Engineer Publications to Codify Standard Designs. |
| | Develop "low-scope" ACF design concept and standards; codify in USACE Engineer Publications Update. |
| | Establish new QMS Business Process for ACF Design Process. |
| | Formally publish new Engineer Forms (ENG) based on COVID-19 ACF Engineering and Design. |
| | Update HNC/MX Standard Operating Procedures. |
| | Develop comprehensive "ACF Acquisition Guide" |
| | Establish new QMS Business Process for ACF Contracting Guidelines. |
| | Incorporate ACF Contractor Solicitation into SAM Disaster Response Registry. |
| | Updates to TRACES to assist in future ACF cost estimates. |
| **Organization** | Establish ESF #3 ACF PRT. |
| **Training** | Provide training as required for newly established PRT. |
| | Standardize and provide training on use of digital platform solutions for assessment tasks. |
| | HNC/MX develops and manages ACF Design training and workshops. |
| | Incorporate Emergency Contracting training into Contracting Officer and Contracting Officer Representative standard training. |
| | Incorporate Emergency Response requirements and timelines into standard Real Estate training. |
| **Leadership** | USACE Headquarters Leadership should advocate for a National MA in the event of a future pandemic requiring ACF operations. |
| | USACE Leadership, at the District and Division levels, must manage expectations with State and local leadership by communicating the purpose of ROM estimates. |
| | USACE Leadership, at the Division and District level, must articulate USACE Contracting requirements in regard to local contractors and manage expectations with stakeholders. |
| | USACE Leadership, at the Division and District level, must articulate to stakeholders the benefits and risks of emergency contracting vehicles. |
| **Personnel** | Leverage other military or federal agency engineers to support site assessments. |
| | Leverage military or federal agency CORs to support USACE contracting. |

*Source:* Created by author.

If priorities of implementation must be assigned, however, the researcher recommends first implementing the solutions documented in table 38, as the Functional Needs Analysis identified the most significant capability gaps in the performance of Engineering and Design services. Continuing with this framework, the researcher next recommends implementing the solutions documented in table 39, as the performance of Contracting services reflected the next most significant capability gaps. Finally, the researcher recommends implementing the solutions documented in table 37, as the performance of Site Assessment services reflected the most minor capability gaps.

## Recommendations for Future Research

To generate higher resolution on the topic, the researcher recommends future research into this study's primary and secondary research questions but informed by the perspective of FEMA, as the lead agency for emergency management and effectively the "hiring agency" for USACE in its support role to the states. As pre-research scoping determined that no existing documentation was produced by FEMA in regard to USACE performance in ACF operations, the researcher recommends interviews and/or surveys as the proposed data collection methods.

In a similar vein, the researcher recommends future research into this study's primary and secondary research questions but informed by the perspective of the states, as the "customer" ultimately requiring USACE support. As pre-research scoping into the availability of existing documentation by states regarding USACE performance of ACF operations was inconclusive, the proposed data collection methods for this future research are interviews and/or surveys. Additionally, as investigation into each of the 50 states would require an extreme application of time and/or resources, the recommended approach is to select a limited number of states (e.g., 10 states) that received the most significant ACF efforts (Site Assessments, Engineering and Design, and Contracting) during the COVID-19 pandemic. Another recommended approach is to investigate specifically those states that terminated construction contracts with USACE and/or chose to construct ACFs without USACE contracting support.

To examine a tangent to the research in this study, the researcher recommends future research to investigate specifically the difference in scope, schedule, and cost for ACFs contracted independently by states. These results could then be compared with the

scope, schedule, and cost data available for USACE contracted ACFs to generate conclusions about why states contracted independently.

To examine more broadly the topic of ACF operations in pandemic response, the researcher recommends investigating the most effective "whole of government" approach to executing ACF operations. While this study investigated the valuable topic of how USACE should prepare to respond most effectively in a future pandemic based on its requirements during COVID-19 response operations, exploration of this broader subject would examine both the role that USACE *should* perform in a future pandemic event and, equally importantly, what roles should be performed by other federal agencies. While this whole of government approach presents an expansive and daunting subject for research, the resulting findings and conclusions would provide significant value towards achieving the most effective U.S. federal government response in a future pandemic.

## Closing Thoughts

As the Chief of Engineers LTG Todd Semonite enjoined during a White House Press Briefing in April 2020, "You got to be able to get the mission essential done. Lives are on the line here, and we've got to be able to get everything done to be able to save those lives."[1] With the primary concern of the Chief Decision Maker established, this study investigated what preparations are required by the U.S. Army Corps of Engineers to "get the mission essential done" in a future pandemic event. Through rigorous analysis of over 7,000 pages of After Action Reports produced by the Headquarters and each of the eight participating divisions, this study identified meaningful capability gaps and, subsequently, generated solutions to bridge these gaps to enable effective support to states through Site Assessment, Engineering and Design, and Contracting services for

Alternate Care Facilities in a future pandemic event. During COVID-19 response operations, the U.S. Army Corps of Engineers proved once again that it accomplishes its mission to, "Deliver public engineering services; partnering to reduce risks from disasters."[2] In order to continue providing effective public service, the organization must ensure that it acknowledges its capability gaps identified during the COVID-19 pandemic and subsequently bridges those gaps, bolstering its already impressive engineering capabilities and ensuring preparedness for any future pandemic event. The U.S. Army Corps of Engineers is a top-tier, world-class learning organization, and this researcher holds supreme confidence that the organization will build on its experiences during COVID-19 emergency response operations to further enhance its capabilities to serve the United States of America

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[1] Trump, "Remarks by President Trump, Vice President Pence, and Members of the Coronavirus Task Force in Press Briefing, April 2020."

[2] USACE, "Mission and Vision,"

# APPENDIX A

## SITE ASSESSMENT: INDIVIDUAL PERFORMANCE ASSESSMENT

### Overview

The following is a detailed description of the USACE performance of site assessment services during COVID-19 response operations through the lens of USACE Headquarters and each subordinate USACE division.

### Headquarters

Through the perspective of USACE Headquarters, the USACE performance of site assessment services during COVID-19 response operations was an overwhelming success, with the primary observation being the successful completion of each of the 1,155 site assessments requested. The challenges and issues identified were relatively minor (i.e., inefficiencies) or isolated in nature.

In terms of scope specifically, the successes and challenges of USACE site assessment operations are highlighted in table 41 below.

Table 41. Site Assessment (Scope) HQ Successes and Challenges

| **Headquarters, U.S. Army Corps of Engineers** | |
|---|---|
| **Site Assessment (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Completed all requested site assessments (1,155 across 50 states and 5 territories). | 1. Widespread (during early operations) lack of integration with valuable stakeholders other than FEMA and state governments. |
| 2. Provided key assistance to states identifying and prioritizing potential ACF sites for assessment. | 2. Isolated instances of site assessment teams not independently verifying operation of building utilities and mechanical systems. |
| 3. Developed criteria and standards for effective site assessments. | 3. Isolated instances of site assessment reports not including applicable building codes or life safety requirements. |
| 4. Leveraged existing site information to enhance site assessment reports. | |

*Source:* Created by author.

Regarding Scope Success #1, USACE headquarters noted that 100% of requested site assessments were completed during the period of the study.[1] Referencing table 42 below, each of the eight USACE divisions with states in its area of responsibility successfully completed all requested assessments.

Table 42. Site Assessments Completed, March-June 2020

| Site Assessments Completed, March – June 2020[2] | | |
|---|---|---|
| **Division** | **Assessments Requested** | **Assessments Completed** |
| Great Lakes and Ohio River Division | 146 | 146 |
| Mississippi Valley Division | 128 | 128 |
| North Atlantic Division | 249 | 249 |
| Northwestern Division | 156 | 156 |
| Pacific Ocean Division | 49 | 49 |
| South Atlantic Division | 161 | 161 |
| South Pacific Division | 150 | 150 |
| Southwestern Division | 116 | 116 |
| **Total** | **1,155** | **1,155** |

*Source:* Created by author.

When considering the assessments completed, note that the number of assessments reported by divisions in succeeding sections may be greater than the number reported in table 42. This is because several of these site assessments were collaborations between divisions. Subordinate units often tallied these assessments, even if another unit counted them as well because of its contributions. The researcher has allowed these units to report these duplicate numbers because, firstly, it does not negatively impact the research (being qualitative in nature) and, secondly, the shared efforts still contributed to the experience of that division, even if another division also gained experience.

Regarding Scope Success #2, USACE headquarters highlighted that USACE assisted in identifying ACF sites for assessment by applying "epidemiological and hospital data to determine where ACFs will be needed."[3] Regarding Scope Success #3, USACE effectively considered whether healthcare requirements would be met, including number of patients to support, "proximity to nearby hospitals, utility requirements, air filtration and handling capacities, safety features for emergency response and egress, staging of ambulances, and parking availability."[4] Regarding Scope Success #4, USACE obtained annual testing reports, when available, for potential ACF sites to provide additional valuable information about existing issues that may not be determined during a physical site assessment.[5]

Regarding Scope Challenge #1, due to viewing ACF operations as a State responsibility, USACE only considered the state and local governments as primary stakeholders with inputs to scope.[6] Local hospital representatives were often not consulted early in ACF operations, resulting in reduced effectiveness of the sites in eventual operation.[7] Regarding Scope Challenge #2, site assessments occasionally did not have USACE personnel verify existing building systems and features necessary for ACF operations (e.g., fire dampers, smoke dampers, fire detection, fire suppression, HVAC systems), and correspondingly did not factor in the work required for these necessary features during the ACF conversion.[8] Regarding Scope Challenge #3, site assessment reports sometimes did not provide initial assessment of applicable building codes or life safety occupancy requirements, and correspondingly did not factor in the work required for these necessary features during the ACF conversion.[9]

In terms of schedule specifically, the successes and challenges of USACE site assessment operations are highlighted in table 43 below.

Table 43. Site Assessment (Schedule) HQ Successes and Challenges

| Headquarters, U.S. Army Corps of Engineers | |
|---|---|
| **Site Assessment (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| No significant observations reported. | 1. Unplanned increases in schedule duration during ACF construction/conversion due to site assessments not identifying required building code modifications. |

*Source:* Created by author.

Regarding Schedule Challenge #1, site assessment reports sometimes did not provide initial assessment of applicable building codes or life safety occupancy requirements, and correspondingly did not factor in the work required for these necessary features during the ACF conversion.[10] This resulted in unplanned increases in schedule duration for ACF conversion.

In terms of cost specifically, the successes and challenges of USACE site assessment operations are highlighted in table 44 below.

Table 44. Site Assessment (Cost) HQ Successes and Challenges

| Headquarters, U.S. Army Corps of Engineers | |
|---|---|
| **Site Assessment (Cost)** | |
| **Successes** | **Challenges/Issues** |
| 1. States initially benefited from access to 100% Federal funding for site assessments through FEMA National MA (NAD-02) from 18 March 2020 through 14 April 2020. | 1. Many instances of site assessment teams without dedicated cost engineer support, resulting in less accurate estimation of construction costs. |
| 2. Average cost of site assessment was approximately $6,000, which was feasible in many instances for States when required to contribute at the 25% State cost-share rate. | |

*Source:* Created by author.

Regarding Cost Success #1, funding for site assessments was possible at 100% federally funded rate through FEMA's National MA (NAD-02, National Level Effort for Site Assessments) from 18 March 2020 through 14 April 2020, at which point this National MA expired and further site assessments were required to be under DFA with states.[11] Subsequently, funding for site assessments was only possible under DFA with states, at 75% federal funds—requiring states to pay 25% cost-share of site assessments.[12] Regarding Cost Success #2, the average cost of USACE site assessments was approximately $6,000 per assessment on average across the United States, as demonstrated in table 45 below.

Table 45. Site Assessment Costs

| Site Assessment Costs[13] | | | |
|---|---|---|---|
| **Division** | **Total Cost** | **Assessments Completed** | **Average Cost Per Assessment** |
| Great Lakes and Ohio River Division | $941,039.08 | 146 | $6,445.48 |
| Mississippi Valley Division | $807,651.99 | 128 | $6,309.78 |
| North Atlantic Division | $1,482,353.85 | 249 | $5,953.23 |
| Northwestern Division | $1,572,223.29 | 156 | $10,078.35 |
| Pacific Ocean Division | $147,347.12 | 49 | $3,007.08 |
| South Atlantic Division | $1,160,371.48 | 161 | $7,207.28 |
| South Pacific Division | $715,000 | 150 | $4,766.67 |
| Southwestern Division | $525,248.78 | 116 | $4,528.01 |
| **Total** | **$7,351,235.59** | **1,155** | **$6,036.99** |

*Source:* Created by author.

Regarding Cost Challenge #1, sometimes site assessment teams did not have a cost estimator to support the assessment reports.[14] This resulted in less accurate ROM cost estimation when making ACF conversion decisions with state representatives.[15]

## Great Lakes and Ohio River Division

Through the perspective of the Great lakes and Ohio River Division, the performance of site assessment services during COVID-19 response operations was highly successful. The division noted some initial scope issues (i.e., reduced effectiveness, although the assessments still provided useful information) due to expediting work as quickly as possible, but it quickly developed effective systems.

In terms of scope specifically, the successes and challenges of the division's site assessment operations are highlighted in table 46 below.

Table 46. Site Assessment (Scope) LRD Successes and Challenges

| Great Lakes and Ohio River Division | |
|---|---|
| **Site Assessment (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Completed all requested site assessments (157). | 1. For the earliest site assessments, expedited assessment timeline too quickly to integrate healthcare experts or requirements owners. |
| 2. Effective reports were valuable to States for informing both USACE contracting and independent State contracting of ACF construction. | 2. Initial site assessment reports provided less data for Engineering and Design teams to produce detailed Plans and Specifications. |
| 3. Successful key leader engagement with FEMA and States resulted in situational understanding of State requirements and effective site assessment missions. | 3. Sub-optimal integration and employment of deployed augmentee personnel. |
| 4. Integration of Site Assessment Teams with State Facility Survey Teams | 4. Ineffective integration into State EOC planning and prioritization for site assessments. |
| 5. Leveraged technology to create digital system for recording site assessment information. | |
| 6. Established site assessment teams with effective composition of engineer disciplines. | |
| 7. Quickly established system for identifying and integrating ACF requirements owners before site assessments. | |

*Source:* Created by author.

Regarding Scope Success #1, the division successfully completed 100% of requested site assessments during the period of the study.[16] Regarding Scope Success #2, the division noted that, "Several states utilized USACE assessments and designs to independently execute the construction."[17] Examples of this include Fairmont Regional Medical Center in Fairmont, WV; Dayton Convention Center in Dayton, OH; Fair and Expo Center in Louisville, KY; St. Francis/Thomas Hospital in Charleston, WV; and Lawrence Convention Center in Pittsburgh, PA.[18] Regarding Scope Success #3, the division developed a process for "COVID-19 Task Force" operations, by which key leader engagement was dictated to establish relationships and ensure flow of information requirements to USACE from FEMA and State leadership.[19] This engagement "allowed early situational understanding of state priorities and facility assessment missions."[20] Regarding Scope Success #4, the division's "COVID-19 Task Force" operations methodology succeeded in achieving "early integration of USACE survey teams with State Facility Survey Teams.[21] Teams were integrated, conducted assessments and information exchange on the same day LNO integration occurred."[22] Regarding Scope Success #5, the division leveraged technology to significantly decrease the time required from physical site inspections to completion and delivery of a site assessment report to state officials, allowing them to make informed decisions on ACF build-outs.[23] The Buffalo District, for example, transitioned from the use of hardcopy assessment forms to fillable PDFs that could be edited on tablet devices, toughbooks, or even smart cellular phones.[24] Regarding Scope Success #6, the division's survey leads coordinated with technical support leads for ACFs on inspections to ensure the right integration of engineers to complete effective assessments.[25] Regarding Scope Success #7, the division quickly and successfully implemented procedures whereby decision-makers for ACFs were identified from the moment a site was assessed for potential conversion, and the division coordinated with these decision-makers to ensure requirements were understood as the sites were assessed.[26] Using the TCF Center and Suburban Collection Showplace as examples, the division identified and integrated the Regional HHS Director from the time the sites were selected for assessment.[27]

Regarding Scope Challenge #1, the division initially expedited requested site assessments so quickly that several inspections (prior to the development of a more refined system/methodology and checklists) were conducted without engaging healthcare experts either at the federal or state level.[28] Without a clear concept of end-user needs, the assessment team provided less useful reports for informing future decisions.[29] Regarding Scope Challenge #2, the Chicago District completed initial assessments prior to any USACE design or construction of an ACF, so "experience and parametric data was [sic] limited," which resulted in less useful site assessment information for Engineering and Design teams to create the Performance Work Statement.[30] Regarding Scope Challenge #3, the Detroit District struggled initially to integrate and employ deployed augmentee personnel into assessment teams, resulting in valuable personnel being underutilized early in assessment operations.[31] Regarding Scope Challenge #4, the division noted that additional efficiencies could be gained by coordinating with State EOCs more effectively for site assessment planning. Some states were "doubling up" by requesting site assessments from both USACE and other groups.[32] Pittsburgh District, for example, found that it was conducting site assessments at the same sites as National

Guard teams instead of being "better utilized increasing the amount of assessments rather than the effort for each respective site."[33]

In terms of schedule specifically, the successes and challenges of the division's site assessment operations are highlighted in table 47 below.

Table 47. Site Assessment (Schedule) LRD Successes and Challenges

| Great Lakes and Ohio River Division | |
|---|---|
| **Site Assessment (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| 1. Teams deployed extremely quickly to conduct requested assessments. | No significant observations reported. |
| 2. Teams submitted assessment reports to States (including cost estimates) within days, as opposed to weeks or even months by standard work timelines. | |
| 3. Leveraged digital solutions to further reduce time to complete and submit assessment reports. | |

*Source:* Created by author.

Regarding Schedule Success #1, the Buffalo District's site assessment teams deployed as quickly as 2 to 24 hours from notification of state requests within its area of operations.[34] Regarding Schedule Success #2, the division noted that, "time from initial facility survey to cost estimate was usually a matter of days for a process that could easily take weeks or months under normal process."[35] Regarding Schedule Success #3, the Buffalo District's previously referenced use of fillable PDFs was one example of the division's teams leveraging technology to decrease the time required from physical site inspections to completion and delivery of a site assessment report to State officials.[36] This allowed states to make informed decisions on ACF build-outs quickly.[37]

In terms of cost specifically, the successes and challenges of the division's site assessment operations are highlighted in table 48 below.

Table 48. Site Assessment (Cost) LRD Successes and Challenges

| Great Lakes and Ohio River Division | |
|---|---|
| **Site Assessment (Cost)** | |
| **Successes** | **Challenges/Issues** |
| | |
| 1. Detailed site assessment for Sherman Hospital facility resulted in highly accurate cost estimation for $18.3 million construction project. | 1. Initial site assessments resulted in cost estimates with less accuracy, as experience and parametric data were non-existent. |
| | 2. Inefficient employment of augmentee personnel resulted in some instances of increased labor costs for site assessments. |

*Source:* Created by author.

Regarding Cost Success #1, the division noted this key instance of highly accurate cost estimates allowing informed decisions by the state with regard to potential construction costs. The division's site assessment for Sherman Hospital was completed "on a short timeframe with limited information."[38] Photographs, assessment report, and additional supporting memorandums allowed for cost engineers to develop a ROM estimate that was highly accurate to the final contract value--$20 million estimated as compared to the eventual contract amount of $18.3 million.[39]

Regarding Cost Challenge #1, the division noted that Chicago District completed initial assessments prior to any USACE design or construction of an ACF, so "experience and parametric data was [sic] limited," which resulted in ROM cost estimates with less accuracy.[40] Regarding Cost Challenge #2, the previously referenced Detroit District struggles to efficiently employ augmentee personnel resulted in higher that necessary costs for site assessments, which attracted the attention of FEMA and State officials. LRE noted that "Visibility and reporting requirements are increasing from FEMA and the State on our labor expenditures and there is increasing discussion on how we manage the labor force when there is a lull in the receipt of the MAs to build the next facility."[41]

## Mississippi Valley Division

Through the perspective of the Mississippi Valley Division, the performance of site assessment services during COVID-19 response operations was successful, with documented issues being minor in nature and resolved internally during the course of operations.

In terms of scope specifically, the successes and challenges of the division's site assessment operations are highlighted in table 49 below.

Table 49. Site Assessment (Scope) MVD Successes and Challenges

| **Mississippi Valley Division** | |
|---|---|
| **Site Assessment (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Completed all requested site assessments (147). | 1. For the earliest site assessments, lack of integration with requirements owners reduced effectiveness. |
| 2. Effective reports were valuable to States for informing both USACE contracting and independent State contracting of ACF construction. | 2. Ineffective integration into State EOC planning and prioritization for site assessments. |
| 3. Established site assessment teams with effective composition of engineer disciplines. | 3. Difficulty obtaining necessary site plans or supporting documents prior to site assessments. |
| | 4. Lack of integration of site assessment report writer-editor into assessment planning and templates. |
| | 5. Early in operations, difficulty managing the ACF site assessment mission requirements (i.e., non-standard ESF #3 task) |

*Source:* Created by author.

Regarding Scope Success #1, the division successfully completed 100% of requested site assessments during the period of the study.[42] Regarding Scope Success #2, the division noted that, even for sites not ultimately constructed through USACE, states applied USACE site assessments to inform their decision-making to convert the sites. The state of Minnesota applied the site assessment conducted by St. Paul District to inform its decision to convert the Langton Place Roseville facility in St. Paul, MN.[43] The state of Louisiana applied the site assessment conducted by New Orleans District to inform its decision to convert the Ernest N. Morial Convention Center facility in New Orleans, LA.[44] Regarding Scope Success #3, the New Orleans District fielded teams of three people with one Mechanical Engineer, one Electrical Engineer, and one Structural Engineer or Architect per team, which it believed "was the right mix to allow judgment in assessing each sites [sic] strengths and shortcomings."[45]

Regarding Scope Challenge #1, the division noted that lack of integrations with requirements owners reduced its effectiveness during initial operations. New Orleans District reported that it could provide more value with its assessment reports if it understood "the intended requirements, e.g., COVID/Non-COVID, isolation by room/pods (with negative pressure), or isolation by floor or convention area space (with return air separation/filtration) would be helpful going into the assessment."[46] St. Paul District reported teams sometimes being "confused as to the planned purpose and capacity, non-COVID, COVID non-ICU, or COVID-ICU."[47] Regarding Scope Challenge #2, St. Paul District noted that, "During a number of the initial Alternate Care Facility site assessments, our assessment teams arrived at and assessed facilities that did not meet our baseline requirements such as lead/asbestos free or having a central fire alarm system."[48] When St. Paul District communicated this finding, the state representatives indicated that they would not have recommended these sites for assessment if they had understood the USACE criteria.[49] As St. Paul District concluded, "This resulted in wasted time/effort visiting facilities that could have been screened out prior to physical assessment through coordination/integration with State requirements owners."[50] Regarding Scope Challenge #3, New Orleans District reported that often its assessment teams would identify useful hardcopy plans or documents while conducting assessments, and—while these were useful to add detail to the reports—transmitting these files digitally from the site owner to USACE *prior* to assessments would allow closer inspection of items of concern.[51] Regarding Scope Challenge #4, St. Paul District noted that its site assessment report writer-editor was not initially recruited for his role prior to teams conducting several assessments. His lack of integration prior to team departures resulted in some writing inefficiency as he was not familiar with their assessment templates and documentation tools.[52] Regarding Scope Challenge #5, St. Paul District reported that, initially, its ACF "management cell was not organized until a week after [assessments began]" because ACF site assessments had not previously been a USACE task. The district leveraged its ESF #3 Infrastructure PRT model, which was fairly effective, but still noted "it's not a housing or CPF mission" and so must be approached with the specific ACF focus in mind.[53]

In terms of schedule specifically, the successes and challenges of the division's site assessment operations are highlighted in table 50 below.

Table 50. Site Assessment (Schedule) MVD Successes and Challenges

| **Mississippi Valley Division** | |
|---|---|
| **Site Assessment (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| 1. Teams deployed quickly and worked non-standard labor hours to expedite requested assessments. | No significant observations reported. |
| 2. Trained numerous teams in order to ensure availability for requests. | |

*Source:* Created by author.

Regarding Schedule Success #1, the division noted that its site assessment teams were available for site assessments at all hours, with "long night shifts" when necessary to complete multiple site assessments in a given day.[54] The St. Louis District commander noted that "all assigned assessments were completed in very short timeframes and under

very strenuous circumstances."[55] Regarding Schedule Success #2, New Orleans District employed a pool of 7-8 trained teams, which it stated "helped provide flexibility for substitution when individual team members have availability issues."[56]

In terms of cost specifically, the successes and challenges of the division's site assessment operations are highlighted in table 51 below.

Table 51. Site Assessment (Cost) MVD Successes and Challenges

| Mississippi Valley Division | |
|---|---|
| **Site Assessment (Cost)** | |
| **Successes** | **Challenges/Issues** |
| 1. States initially benefited from access to 100% Federal funding for site assessments through FEMA National MA (NAD-02) from 18 March 2020 through 14 April 2020. | 1. Some States were not willing to request site assessments at the 25% State cost-share rate. |
| 2. Some States were willing to contribute at the 25% State cost-share rate. | |

*Source:* Created by author.

Regarding Cost Success #1, the division noted that, during the time period of 100% federal funding for site assessments through FEMA's National MA NAD-02, all states in the division area of operations requested numerous site assessments. As one example, the division documented that, "On 21 March 2020, Governor John Bel Edwards requested USACE assistance under an FOS National Mission Assignment to assess local sites for conversion to alternate care facilities."[57] Regarding Cost Success #2, the division highlighted that some states demonstrated willingness to pay a cost-share of 25% for additional site assessments.[58] Missouri, for example, requested additional site assessments at this cost-share rate through FEMA, and St. Louis District supported.[59] Minnesota also requested site assessments at 25% cost share, with an agreement for $100k signed on 16 April 2020 and St. Paul District supporting.[60] Iowa requested additional site assessments at 25% cost share, with an agreement for $50k signed on 21 April and Rock Island District supporting.[61]

Regarding Cost Challenge #1, the division noted that some states, who had requested ACF site assessments through 100% federal funding, were not willing to conduct more assessments after the FEMA National MA had expired. Citing a high-profile example, the division noted that, after Governor John Bel Edwards made his initial request for site assessments under the 100% federal funding rate, "The mission assignment expired without the Governor electing to transfer to a DFA Mission on 13 April 2020."[62]

## North Atlantic Division

Through the perspective of the North Atlantic Division, the performance of site assessment services during COVID-19 response operations was ultimately successful, but the division did experience numerous minor issues during early operations prior to developing effective systems. The division also noted isolated instances of more significant (i.e., moderate, as opposed to minor) negative impacts.

In terms of scope specifically, the successes and challenges of the division's site assessment operations are highlighted in table 52 below.

Table 52. Site Assessment (Scope) NAD Successes and Challenges

| North Atlantic Division | |
|---|---|
| **Site Assessment (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Completed all requested site assessments (249). | 1. Initial site assessments had no standardized template or criteria. |
| 2. Developed checklists and templates with criteria and standards for effective site assessments. | 2. Ineffective integration into State EOC planning and prioritization for site assessments. |
| 3. Leveraged technology to create the Survey123 digital system for recording site assessment information. | 3. During early operations, lack of integration with valuable stakeholders other than FEMA and state governments. |
| 4. Effective coordination with FEMA. | 4. Difficulty obtaining necessary site plans or supporting documents prior to site assessments. |
| | 5. Instances of site assessment teams not independently verifying operation of building utilities and mechanical systems. |
| | 6. Initial difficulty establishing site assessment teams with effective composition of engineer disciplines. |
| | 7. Some districts had difficulty integrating digital solutions for site assessments. |
| | 8. Continuously required improvements to specific engineering considerations during site assessments. |

*Source:* Created by author.

Regarding Scope Success #1, the division successfully completed 100% of requested site assessments during the period of the study.[63] Regarding Scope Success #2, the division documented that its districts "utilized established checklists and templates to perform site assessments."[64] To this point, New York District reported that for effective site assessments it compiled and followed a list of "important site attributes" that were informed by "decision makers, designers, and stakeholders prior to site visits, which helped teams focus their attention in the field."[65] Regarding Scope Success #3, the Norfolk District's Facility Assessment Teams developed the Survey123 digital platform for consolidating site assessment information—which enabled faster inputting of site assessment data into digital report format while in the field and instant sharing of completed assessment products.[66] The product was so successful and improved assessment performance so significantly that HQUSACE implemented it enterprise-wide.[67] Regarding Scope Success #4, the division explicitly noted that it considered the coordination between FEMA and USACE a "success."[68]

Regarding Scope Challenge #1, the division noted that, during early operations, NAD was performing site assessments without a standardized template, resulting in less uniformity and ease of communicating information for the customer.[69] Regarding Scope Challenge #2, initially NAD was not prioritizing sites near hospital structures, which meant less available infrastructure support if that site was ultimately selected.[70] The root cause of this issue was NAD not integrating into State EOC planning, as states themselves were not prioritizing sites near existing hospitals—and the division was simply executing as the customer requested. The New York District observed that its local stakeholders "initially considered many potential ACF site locations that could provide large capacities but were not located near hospitals."[71] Instead of integrating into the State EOC to provide assistance to prioritization, "USACE completed site assessments for many of these sites."[72] Regarding Scope Challenge #3, initially site assessment teams did not meet with medical teams prior to site assessments (or during site assessments), and so end-user medical staffing requirements were not well

understood.[73] Regarding Scope Challenge #4, the division documented that floor plans and as-built documents were not always acquired prior to site visits.[74] New York District specifically commented that, "obtaining existing facility as-built information can be challenging."[75] Regarding Scope Challenge #5, initial site assessments did not always physically verify available utilities and capacity "including water supply and wastewater, fire safety, power, etc."[76] Provided reports and comments from site owners were recorded, but failure to verify independently resulted in occasional mischaracterization of sites.[77] Regarding Scope Challenge #6, the division noted issues during early operations with providing the correct engineer disciplines to site assessment teams. As a prime example, Baltimore District's original site assessment team organization consisted of a civil/structural engineer, mechanical engineer, electrical engineer, and fire protection engineer.[78] The district found that without a cost engineer/estimator, "it increased the time and complexity to add cost estimations after the fact."[79] Regarding Scope Challenge #7, the division noted the need for better training and enforcement of using digital platforms for site assessments because the overall conduct of operations validated the significance of "real-time GIS databases for upward reporting."[80] The New York District also commented that, "The ACF site assessment mission moved from manual field notes to a digital collection platform, unfortunately NY District was so far out in front of the effort that we didn't have time to incorporate its use into our process."[81] Regarding Scope Challenge #8, the division developed a list of specific engineering considerations that, when not identified during initial assessments caused issues. This list included "Civil/Site Development" considerations such as "Validate existing utilities," "Architectural" considerations such as, "Measure elevators, hallways, and other critical transport areas to ensure medical access," and "Mechanical" considerations such as "Verify capacity of mechanical units and air flow into building."[82]

In terms of schedule specifically, the successes and challenges of the division's site assessment operations are highlighted in table 53 below.

Table 53. Site Assessment (Schedule) NAD Successes and Challenges

| **North Atlantic Division** | |
|---|---|
| **Site Assessment (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| 1. Teams deployed and conducted assessments quickly. | 1. Lack of cost engineers on initial site assessment teams resulted in increased duration for assessment reports and, later, Engineering and Design work. |
| | 2. Initial lack of integration of medical planners caused increased duration for Engineering and Design work. |

*Source:* Created by author.

Regarding Schedule Success #1, the division noted that site assessment teams deployed and conducted assessments quickly. The Norfolk District commander reported that the district's site assessment teams, "mobilized in just 2 days and completed over 81 assessments in 10 working days. The sense of urgency and momentum gained was significant."[83] The Baltimore District's teams also performed at a noteworthy pace, completing over 60 site assessments and providing detailed reports to state officials in less than 30 days.[84] At the completion of site assessment operations, the overall assessment of leadership at the Regional After Action Report conference was that, "site

assessments were done expeditiously and professionally under high stress environment."[85]

Regarding Schedule Challenge #1, the division noted that lack of cost engineers on initial site assessment teams "increased the time and complexity to add cost estimations after the fact."[86] Regarding Schedule Challenge #2, the Baltimore District observed that when medical planners "were remote or only involved in state task force meetings" during early operations, the result was increased schedule duration due to requiring "rework to designs."[87]

In terms of cost specifically, the successes and challenges of the division's site assessment operations are highlighted in table 54 below.

Table 54. Site Assessment (Cost) NAD Successes and Challenges

| North Atlantic Division | |
|---|---|
| **Site Assessment (Cost)** | |
| **Successes** | **Challenges/Issues** |
| No significant observations reported. | 1. Some States were not willing to request site assessments at the 25% State cost-share rate. |
| | 2. Initial lack of integration of medical planners resulted in re-work to Engineering and Design products, with correspondingly higher costs. |

*Source:* Created by author.

Regarding Cost Challenge #1, the state of Maine expressed interest on 04 April 2020 for site assessment support from USACE, with 2 sites specifically identified as requiring assessment and as many as 8 additional sites requiring assessment. The New England District reported that "Maine is working through FEMA to get an exception to policy for the 25% cost share with assessments. Maine is not currently willing to go forward with the assessments if a cost share is involved."[88] Regarding Cost Challenge #2, the Baltimore District's previously mentioned "rework to designs" due to lack of integration of medical personnel in early operations resulted in a corresponding increase in labor costs for Engineering and Design.[89]

## Northwestern Division

Through the perspective of the Northwestern Division, the performance of site assessment services during COVID-19 response operations was successful, with few reported challenges or issues.

In terms of scope specifically, the successes and challenges of the division's site assessment operations are highlighted in table 55 below.

Table 55. Site Assessment (Scope) NWD Successes and Challenges

| Northwestern Division | |
|---|---|
| **Site Assessment (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Completed all requested site assessments (167). | 1. Survey123 digital platform was under-utilized due to late deployment at enterprise-level. |
| 2. Districts trained multiple site assessment teams. | |
| 3. Effective integration with FEMA and States by embedding liaison teams within EOCs of FEMA regions and States. | |
| 4. Effective assessment team composition that was flexible to stakeholder needs. | |

*Source:* Created by author.

Regarding Scope Success #1, the division successfully completed 100% of requested site assessments during the period of the study.[90] Regarding Scope Success #2, the Seattle District trained and established two independent site assessment teams, which conducted a total of 19 site assessments in a relatively short period of time.[91] The Seattle District commander stated that this provided "the technical engineering support that allowed local, state, federal, and tribal leaders the ability to quickly determine the feasibility of use and resourcing if necessary."[92] Regarding Scope Success #3, to coordinate the site assessment mission effectively, Seattle District embedded liaison teams within both the Washington State EOC and the FEMA regional response coordination center.[93] This allowed effective integration and synchronization of USACE resources towards site assessments.[94] Regarding Scope Success #4, the Seattle District commander stated that the district's "assessment teams evolved in structure and knowledge to meet the needs of our partners."[95]

Regarding Scope Challenge #1, the division noted that the Survey123 digital platform, not initially required by USACE Headquarters for data collection, was under-utilized after its introduction.[96] Assessment teams preferred to use the assessment spreadsheet that had been distributed by USACE Headquarters initially.[97] When Survey123 was made mandatory, the division perceived the transition as imposing significant "double work" on the assessment teams.[98]

In terms of schedule and cost, the division reported no significant observations.

## Pacific Ocean Division

Through the perspective of the Pacific Ocean Division, the performance of site assessment services during COVID-19 response operations was very successful. Although this division conducted significantly fewer site assessments than other divisions (i.e., only 49 site assessments, with each of the other participating divisions conducting no fewer than 100 site assessments each), it documented several noteworthy successes with no significant challenges or issues reported.

In terms of scope specifically, the successes and challenges of the division's site assessment operations are highlighted in table 56 below.

Table 56. Site Assessment (Scope) POD Successes and Challenges

| Pacific Ocean Division | |
|---|---|
| **Site Assessment (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Completed all requested site assessments (49). | No significant observations reported. |
| 2. Effective reports were valuable to States for informing both USACE contracting and independent State contracting of ACF construction. | |
| 3. Employed virtual assistance/collaboration techniques to provide site assistance. | |
| 4. Effective integration and employment of deployed augmentee personnel. | |

*Source:* Created by author.

Regarding Scope Success #1, the division successfully completed 100% of requested site assessments during the period of the study.[99] Regarding Scope Success #2, the division noted that its reports were effective enough for informing both USACE contracting and independent state contracting of ACFs. Alaska District, for example, conducted the site assessment that led directly to the State's decision to request USACE support for follow-on design and construction of the Alaska Airlines Center ACF.[100] Hawaii District, conversely, provided technical assistance to site assessments for the Commonwealth of the Northern Mariana Islands, and this territory applied the information from these site assessments to inform its own independently contracted design and construction.[101] Regarding Scope Success #3, the Hawaii District, when providing the aforementioned technical assistance, employed virtual assistance and collaboration techniques to support the island territory most effectively, given its distant geographic location.[102] Regarding Scope Success #4, the Hawaii District—again seeking creative solutions for providing support throughout its geographically dispersed area of operations—identified and integrated augmentees already living in these distant locations. For assessments in Guam, the district "leveraged NAVFAC for ACF assessments in Guam and activated an Army Reservist who resided in Guam and had previous experience with the district supporting disaster response."[103] For assessments in American Samoa, an employee of Hawaii District who already resided in that location assisted with the site assessment mission.[104]

In terms of schedule specifically, the successes and challenges of the division's site assessment operations are highlighted in table 57 below.

Table 57. Site Assessment (Schedule) POD Successes and Challenges

| Pacific Ocean Division | |
|---|---|
| **Site Assessment (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| 1. Integration of augmentee personnel significantly expedited site assessments. | No significant observations reported. |

*Source:* Created by author.

Regarding Schedule Success #1, the division noted that, by employing the referenced creative techniques to conduct assessments without deploying teams forward, site assessments were conducted more quickly than waiting to coordinate inter-territory movements during the initial confusion of the COVID-19 pandemic.[105]

In terms of cost specifically, the division reported no significant observations.

South Atlantic Division

Through the perspective of the South Atlantic Division, the performance of site assessment services during COVID-19 response operations was highly successful. This division documented significant success, including providing enterprise-level site assessment training, while reporting no significant challenges or issues.

In terms of scope specifically, the successes and challenges of the division's site assessment operations are highlighted in table 58 below.

Table 58. Site Assessment (Scope) SAD Successes and Challenges

| South Atlantic Division | |
|---|---|
| **Site Assessment (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Completed all requested site assessments (161). | No significant observations reported. |
| 2. Presented virtual enterprise-level site assessment training session, including use of Survey123 digital platform. | |
| 3. Effective integration and employment of deployed augmentee personnel. | |
| 4. Districts trained multiple site assessment teams. | |

*Source:* Created by author.

Regarding Scope Success #1, the division successfully completed 100% of requested site assessments during the period of the study.[106] Regarding Scope Success #2, the Wilmington District commander stated that the district's site assessment teams "volunteered to present a virtual Alternate Care Facility Assessment Training session on lessons learned and using Survey 123 for Forward Engineer Support Team (FEST) Alternate Care Facilities Teams, SAD, and HQ USACE—a testament to their effectiveness and teamwork."[107] This provides a compelling example of how the division shared best practices to continuously improve its level of support for site assessment missions, while volunteering to share those lessons learned outside of the division to improve the assessment performance of USACE as an enterprise. Regarding Scope Success #3, the division highlighted how the Mobile District integrated with USACE Huntsville National Center to request (and receive) engineer augmentation to support site assessments in the northern areas of the state of Alabama.[108] Regarding Scope Success #4, the Wilmington District commander noted that, "Having to complete numerous assessments simultaneously, the District formed and equipped multiple assessment teams to rapidly move to the point of need."[109]

In terms of schedule specifically, the successes and challenges of the division's site assessment operations are highlighted in table 59 below.

Table 59. Site Assessment (Schedule) SAD Successes and Challenges

| South Atlantic Division | |
|---|---|
| **Site Assessment (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| 1. Teams deployed and conducted assessments quickly. | No significant observations reported. |
| 2. Integration of augmentee personnel significantly expedited site assessments. | |
| 3. Multiple trained site assessment teams allowed for high volume of assessments in time-constrained environment. | |

*Source:* Created by author.

Regarding Schedule Success #1, the division noted numerous examples of the rapid pace of site assessment operations. Of particular note, the Savannah District commander highlighted that, "The first assessment requests were received and executed in Atlanta and Savanah within 48 hours, which is a testament to the incredible flexibility and adaptability of the DA Civilian workforce across USACE."[110] Regarding Schedule Success #2, the Mobile District's effective integration with USACE Huntsville National Center also allowed for significantly more site assessments in a given period of time because the Mobile District's organic assessment teams were not conducting round trips to northern Alabama. Regarding Schedule Success #3, the Wilmington District's formation of multiple assessment teams allowed the district to "rapidly move to the point of need," and ultimately conduct 38 site assessments in a period of only 2 weeks in North Carolina.[111]

In terms of cost specifically, the division reported no significant observations.

## South Pacific Division

Through the perspective of the South Pacific Division, the performance of site assessment services during COVID-19 response operations was highly successful. The division documented significant successes and developed several noteworthy best practices. The division did note several minor issues during early operations and one long-duration minor issue with integrating digital platform solutions. The division also noted one isolated instance of more significant (i.e., moderate, as opposed to minor) negative impacts related to an assessment team not independently verifying building utilities and mechanical systems.

In terms of scope specifically, the successes and challenges of the division's site assessment operations are highlighted in table 60 below.

Table 60. Site Assessment (Scope) SPD Successes and Challenges

| South Pacific Division | |
|---|---|
| **Site Assessment (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Completed all requested site assessments (150). | 1. Some initial difficulty establishing site assessment teams with effective composition of engineer disciplines. |
| 2. Effective reports were valuable to States for informing both USACE contracting and independent State contracting of ACF construction. | 2. Difficulty obtaining necessary site plans or supporting documents prior to site assessments. |
| 3. Inter-District coordination to complete site assessments. | 3. Instances of site assessment teams not independently verifying operation of building utilities and mechanical systems. |
| 4. Leveraged ESF #3 PRT Members to establish ACF site assessment teams. | 4. Some districts had difficulty integrating digital solutions for site assessments. |
| 5. Leveraged HNC design guidance to develop criteria and standards for effective site assessments. | 5. Ineffective integration into State EOC planning and prioritization for site assessments. |
| 6. Maintained assessment team continuity for duration of operations. | 6. For the earliest site assessments, lack of integration with requirements owners reduced effectiveness. |
| 7. Established site assessment teams with effective composition of engineer disciplines, with cost engineer being a critical component. | 7. Sub-optimal integration and employment of deployed augmentee personnel. |
| 8. Leveraged local fire departments during assessments to validate building code and fire safety. | |

*Source:* Created by author.

Regarding Scope Success #1, the division successfully completed 100% of requested site assessments during the period of the study.[112] Regarding Scope Success #2, the division noted that its site assessments generated valuable reports for the State of California, with the information in these reports used to inform decisions to build-out with USACE support and also to inform build-out through the state independently.[113] The state of California ultimately contracted two ACF independently after receiving these USACE site assessment reports.[114] Regarding Scope Success #3, the division leveraged inter-district coordination to complete assessments. The Sacramento District commander noted that "Due to California's size, multiple SPD districts worked together seamlessly to accomplish the assessments."[115] This included "cross shared information and lessons learned and supplemented teams with additional skill sets and people as needed."[116] The Albuquerque District also notably conducted site assessments in coordination with the Omaha District.[117] Regarding Scope Success #4, the division noted that "prior PRT training or deployment experience contributed to the success" of its site assessment mission."[118] The division leveraged its "USACE Temporary Housing/Critical Public Facilities (CPF) Planning and Response Team (PRT) members to perform site assessments, evaluating the existence and suitability of existing utilities and infrastructure (e.g., electrical, water, HVAC, IT, sewer, etc.)."[119] Other PRT types were used as well, including Infrastructure Assessment PRT members.[120] The Los Angeles District responded to the site assessment mission by "[leveraging] the experience of members of our Temporary Housing Team in terms of their ability to rapidly incorporate the guidance from HNC and other sources to execute the site assessments."[121] Regarding Scope Success #5, Los Angeles District noted that, "The guidance and checklists that were developed by HNC and other greatly facilitated the ability of the site assessment teams to execute high quality assessments, and ask the right questions to determine feasibility of each site."[122] Regarding Scope Success #6, Albuquerque District's assessment teams

maintained team continuity for the duration of operations, which allowed these teams to be most effective at completing their assessment tasks proficiently.[123] Regarding Scope Success #7, Albuquerque District's New Mexico site assessment teams each had a cost estimator assigned, and "These cost estimators proved to be valuable assets to the team who provided accurate ROMs to enable to State's decision making process when selecting ACF sites."[124] The district further noted that, "Without cost estimators working with the assessment teams the contracting process would have taken significantly longer and definitization of contracts may have been more difficult."[125] Sacramento District also adopted this effective team composition with cost estimators assigned to each assessment team.[126] Regarding Scope Success #8, Sacramento District noted the best practice of, "Involvement of fire department during site assessments."[127]

Regarding Scope Challenge #1, the division stated that, during initial operations, occasionally site assessment teams did not have a cost estimator to support the assessment reports.[128] The Nevada Site assessment team, for example, initially did not have a cost estimator.[129] This resulted in less accurate ROM cost estimation when making ACF conversion decisions with state representatives.[130] Regarding Scope Challenge #2, the division noted that, for effective site assessments, "the state should be prepared to turn over routine maintenance, lead, asbestos, etc., . . . reports to USACE prior to the assessment team visit."[131] For Sacramento District's Porterville ACF build-out, the Performance Work Statement and cost estimate were technically sound, but without the contents of these reports, rapid-paced site assessments resulted in large gaps in scope—and resultingly high increases in cost.[132] Regarding Scope Challenge #3, Sacramento District's Porterville ACF site assessment was completed without equipment in operation because utilities were shut off at the time of assessment (including water and HVAC).[133] The campus maintenance POC stated that all equipment was operational, but ultimately he was incorrect.[134] The result was scope increases and cost increases when the project was constructed. Regarding Scope Challenge #4, Sacramento District noted that—due to the relatively short duration of emergency operations (i.e., with most districts only operating under FEMA MAs from March through June 2020)—digital solutions developed during operations were difficult to implement effectively. For example, the Survey 123 digital platform, developed and implemented during the course of operations, was only mission ready and valuable too late for Sacramento District to use it effectively.[135] Regarding Scope Challenge #5, the division noted that states would request site assessments without consideration of ability to staff the site or amount of time required to prepare it for healthcare use, which resulted in inefficient use of site assessment teams.[136] Regarding Scope Challenge #6, the division observed that initially "information about the intended usage of the facilities was unclear, such as whether the site would utilize FMS or ACS; COVID or non-COVID patients; and whether ICUs were needed, just open beds, or a combination."[137] San Francisco District specifically documented this issue during early operations.[138] Regarding Scope Challenge #7, the Sacramento District highlighted an instance in which augmentees were received from the U.S. Army 368th Forward Engineer Support Team. The augmentees were trained prior to arrival on site assessments for ACFs, but they arrived after all assessments had been completed.[139] With effective integration, the team could have served effectively in another location.

In terms of schedule specifically, the successes and challenges of the division's site assessment operations are highlighted in table 61 below.

Table 61. Site Assessment (Schedule) SPD Successes and Challenges

| South Pacific Division | |
|---|---|
| **Site Assessment (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| 1. Teams deployed and conducted assessments quickly. | 1. Inter-District coordination occasionally increased duration of writing and submitting reports. |
| 2. Inter-District coordination expedited site assessments. | 2. Site assessment ROM estimates on construction timeline occasionally caused issues with stakeholder expectation management. |
| 3. Inclusion of cost engineers on site assessment teams resulted in reduced duration for assessment reports and, later, Engineering and Design work. | |

*Source:* Created by author.

Regarding Schedule Success #1, the Albuquerque district mobilized assessment teams quickly, with the district commander describing the teams as "rapidly provided for field support."[140] Regarding Schedule Success #2, the Albuquerque District's inter-district coordination with Omaha District resulted in site assessments typically performed in less than 4 hours for a detailed physical inspection of an entire facility.[141] Regarding Schedule Success #3, the Albuquerque District noted that, "By working in parallel with the assessment teams, the cost estimators had accurate [Current Working Estimates] and [Independent Government Estimates] ready to enable the process from State site selection to contract award to go as quickly as possible."[142]

Regarding Schedule Challenge #1, the division noted that San Francisco District reliance on Sacramento District technical engineers to complete assessment teams did result in occasional post-field assessment delays in creating reports for submission to states.[143] Regarding Schedule Challenge #2, Sacramento District noted that site assessment report estimates on construction timelines caused issues with states when unforeseeable scope increases (i.e., things that would not reasonably be determined in a site inspection) resulted in increased construction timelines.[144]

In terms of cost specifically, the successes and challenges of the division's site assessment operations are highlighted in table 62 below.

Table 62. Site Assessment (Cost) SPD Successes and Challenges

| South Pacific Division | |
|---|---|
| **Site Assessment (Cost)** | |
| **Successes** | **Challenges/Issues** |
| 1. Inclusion of cost engineers on site assessment teams resulted in highly accurate ROM cost estimates for construction. | 1. Site assessment ROM cost estimates occasionally caused issues with stakeholder expectation management. |
| | 2. Scope increases related to lack of site plans and documentation resulted in cost increases. |
| | 3. Scope increases related to not independently verifying utilities and mechanical systems resulted in cost increases. |

*Source:* Created by author.

Regarding Cost Success #1, the division noted that Albuquerque District's inclusion of cost engineers resulted in providing "accurate ROMs to enable the State's decision making process when selecting ACF sites."[145]

Regarding Cost Challenge #1, the division observed that, "The initial assessment (because of the short timeframe) will not capture the exact cost, only a rough order of magnitude (ROM) cost, which could change dramatically once a contractor assesses the need more fully with the proposed design and Performance Work Statement."[146] Issues of expectation management occurred when states did not understand these estimates could increase substantially upon refined scope development. Regarding Cost Challenge #2, Sacramento District's lack of existing site plans and documentation for the Porterville ACF site resulted in "high increases in cost."[147] Regarding Cost Challenge #3, Sacramento District's inability to verify utilities and mechanical systems at the Porterville ACF resulted in "cost increases when the project was constructed."[148]

## Southwestern Division

Through the perspective of the Southwestern Division, the performance of site assessment services during COVID-19 response operations was very successful. The division documented several noteworthy successes in the areas of scope and schedule, while noting only a minor scope issue during early operations.

In terms of scope specifically, the successes and challenges of the division's site assessment operations are highlighted in table 63 below.

Table 63. Site Assessment (Scope) SWD Successes and Challenges

| **Southwestern Division** | |
|---|---|
| **Site Assessment (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Completed all requested site assessments (117). | 1. During early operations, lack of integration with local healthcare providers on site assessment planning and prioritization. |
| 2. Positive feedback from State elected officials on site assessments. | |
| 3. Refined completed assessment reports upon request by States for additional information. | |
| 4. Leveraged ESF #3 PRT Members to establish ACF site assessment teams. | |
| 5. Effective integration with state government for site assessment planning and prioritization. | |
| 6. Effective integration of Army National Guard to support site assessments. | |
| 7. Leveraged Survey123 digital platform for site assessments. | |

*Source:* Created by author.

Regarding Scope Success #1, the division successfully completed 100% of requested site assessments during the period of the study.[149] Regarding Scope Success #2, the division noted that the State of Oklahoma was satisfied with the conduct of USACE site assessments. On 02 April 2020, Governor Stitt of Oklahoma met with the Tulsa District commander regarding previous site assessments and the potential for follow-on construction, and following the meeting Governor Stitt requested additional assessments to be conducted outside the major metropolitan areas.[150] Regarding Scope

Success #2, Little Rock District site assessment teams, on request, provided additional support to the state of Arkansas by "working to refine the completed assessment reports so we can provide ADH some actionable information."[151] Regarding Scope Success #4, the division utilized its ESF #3 PRT members, including USACE Temporary Housing/Critical Public Facilities and Infrastructure Assessment, to establish its ACF site assessment teams.[152] Regarding Scope Success #5, in late March 2020, the division arranged "a meeting with all city, county, and state health organizations" in Oklahoma City "to even the playing field on various efforts."[153] The division noted that, "Stovepiping was occurring within site assessments."[154] Ultimately, the division noted that this coordination was essential for "creating a unified front, sharing information, and guiding the different health coalition as local, state, and national priorities continue to shift on a daily basis."[155] Regarding Scope Success #6, the division completed site assessments in coordination with the Army National Guard. The Fort Worth District provided training to the Texas Army National Guard and, subsequently, conducted oversight and technical review of 50 assessments physically conducted by these National Guard personnel.[156] The Fort Worth District commander noted that, "TX military personnel added the much needed manpower and data gathering resources, which was technically reviewed by the USACE engineers."[157] The Little Rock District coordinated with the Arkansas National Guard, with the end result being 10 Army National Guard personnel supporting Arkansas site assessments.[158] Regarding Scope Success #7, the division noted that its use of Survey123 was highly successful, allowing site assessment teams to instantly create digital records and enable quick sharing of information.[159] SWD noted that "paper product checklist being used on a clipboard, typed into a Word document and Photos attached is time and resource consuming."[160] The division also noted that, "Use of the Survey123 app on iphones has allowed the team to capture critical notes while interviewing facility managers and EM personnel. This ensures that the team spends less time once complete with a physical site assessment in capturing/consolidating pertinent data."[161]

Regarding Scope Challenge #1, the division noted that, "During the first few weeks of the COVID response, many local healthcare coalitions were doing their own site redundant assessments . . . each with their separate requirements and considerations."[162] The result was "an un-prioritized list of potential ACF locations across the state, many not viable from an engineering and construction point of view."[163] In Oklahoma specifically, the division noted that the Oklahoma Health Care Coalition, Oklahoma Hospital Association, Tulsa County, and Oklahoma County were all conducting redundant site assessments—independent of USACE and also independent of each other.[164]

In terms of schedule specifically, the successes and challenges of the division's site assessment operations are highlighted in table 64 below.

Table 64. Site Assessment (Schedule) SWD Successes and Challenges

| Southwestern Division | |
|---|---|
| **Site Assessment (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| 1. FEMA National MA (NAD-02) on 18 March 2020 expedited initiation of site assessment missions. | No significant observations reported. |
| 2. Integration of Army National Guard expedited site assessments and submission of reports. | |
| 3. Use of Survey123 digital platform reduced time to complete and submit reports. | |

*Source:* Created by author.

Regarding Schedule Success #1, the division observed that "Having a national MA in place for all states allowed USACE to begin the facility assessment much quicker than waiting on individual state to request a Mission Assignment. This allowed USACE to respond much quicker to begin assisting the states in assessments."[165] Regarding Schedule Success #2, the division noted that assessments in conjunction with Army National Guard served to "expedite the processing of the assessments."[166] Regarding Schedule Success #3, the division documented that, "Use of the Survey123 app on iphones has allowed the team to capture critical notes while interviewing facility managers and EM personnel."[167] Most significantly from the schedule perspective, the division found that, "This ensures that the team spends less time once complete with a physical site assessment in capturing/consolidating pertinent data."[168]

In terms of cost specifically, the division reported no significant observations.

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[1] U.S. Army Corps of Engineers (USACE), *COVID-19 Pandemic: Final After Action Report, 31 July 2020* (Washington, DC: Department of the Army, USACE), 46.

[2] Ibid., 34.

[3] Ibid., 30.

[4] Ibid., 30-31.

[5] Ibid., 106.

[6] Ibid., 103-104.

[7] Ibid.

[8] Ibid., 103.

[9] Ibid.

[10] Ibid.

[11] Ibid., 56.

[12] Ibid.

[13] Ibid., 46.

[14] Ibid., 108.

[15] Ibid.

[16] Great Lakes and Ohio River Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," 4.

[17] Ibid., 17.

[18] Ibid.

[19] Ibid., 20.

[20] Ibid.

[21] Ibid., 21.

[22] Ibid.

[23] Ibid., 46.

[24] Ibid.

[25] Ibid., 23.

[26] Ibid., 49.

[27] Ibid.

[28] Ibid., 37.

[29] Ibid.

[30] Ibid., 29.

[31] Ibid., 47.

[32] Ibid., 50.

[33] Ibid.

[34] Ibid., 49.

[35] Ibid., 29.

[36] Ibid., 46.

[37] Ibid.

[38] Ibid., 31.

[39] Ibid.

[40] Ibid., 29.

[41] Ibid., 47.

[42] U.S. Army Corps of Engineers Mississippi Valley Division, "COVID-19 Emergency Response Final After Action Report, 23 June 2020," (Vicksburg, MS, 2020), 1.

[43] Ibid, 10.

[44] Ibid.

[45] U.S. Army Corps of Engineers New Orleans District, Mississippi Valley Division, "COVID-19 Pandemic: After Action Report, 26 June 2020," (New Orleans, LA, 2020), 85.

[46] Ibid., 88.

[47] St. Paul District, Mississippi Valley Division, "COVID-19 Pandemic: Hotwash Comments, 09 April 2020."

[48] Ibid.

[49] Ibid.

[50] Ibid.

[51] New Orleans District, Mississippi Valley Division, "COVID-19 Pandemic: After Action Report, 26 June 2020," 88.

[52] St. Paul District, Mississippi Valley Division, "COVID-19 Pandemic: Hotwash Comments, 09 April 2020."

[53] Ibid.

[54] New Orleans District, Mississippi Valley Division, "COVID-19 Pandemic: After Action Report, 26 June 2020," 88.

[55] U.S. Army Corps of Engineers St. Louis District, Mississippi Valley Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," (St. Louis, MO, 2020), 18.

[56] New Orleans District, Mississippi Valley Division, "COVID-19 Pandemic: After Action Report, 26 June 2020," 85.

[57] Ibid., 54.

[58] St. Louis District, Mississippi Valley Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," 5.

[59] Ibid.

[60] USACE, *COVID-19 Pandemic: Final After Action Report, 31 July 2020*, 121.

[61] Ibid.

[62] New Orleans District, Mississippi Valley Division, "COVID-19 Pandemic: After Action Report, 26 June 2020," 54.

[63] USACE, *COVID-19 Pandemic: Final After Action Report, 31 July 2020*, 46.

[64] North Atlantic Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," F-1-16.

[65] New York District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," F-2.

[66] U.S. Army Corps of Engineers Norfolk District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," (Norfolk, VA, 2020), 12.

[67] Ibid.

[68] North Atlantic Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," F-1-16.

[69] Ibid.

[70] Ibid.

[71] New York District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," F-9.

[72] Ibid.

[73] North Atlantic Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," F-1-16.

[74] Ibid.

[75] New York District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," G-12.

[76] North Atlantic Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," F-1-16.

[77] Ibid.

[78] Baltimore District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 15 June 2020," 239.

[79] Ibid.

[80] North Atlantic Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," F-1-17.

[81] New York District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," G-20.

[82] North Atlantic Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," F-1-18.

[83] Norfolk District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," 12.

[84] Baltimore District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 15 June 2020," 179.

[85] North Atlantic Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," F-1-16.

[86] Baltimore District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 15 June 2020," 239.

[87] Ibid., 240.

[88] New England District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," A-52.

[89] Baltimore District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 15 June 2020," 240.

[90] U.S. Army Corps of Engineers Northwestern Division, "COVID-19 Pandemic: After Action Report, 17 July 2020," (Portland, OR, 2020), 17.

[91] U.S. Army Corps of Engineers Seattle District, Northwestern Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," (Seattle, WA, 2020), 4.

[92] Ibid.

[93] Ibid.

[94] Ibid.

[95] Ibid., 11.

[96] Northwestern Division, "COVID-19 Pandemic: After Action Report, 17 July 2020," 58.

[97] U.S. Army Corps of Engineers Omaha District, Northwestern Division, "COVID-19 Pandemic: After Action Report Presentation, 17 July 2020," (Omaha, NE, 2020), 3.

[98] Ibid.

[99] USACE, *COVID-19 Pandemic: Final After Action Report, 31 July 2020*, 46.

[100] Pacific Ocean Division, "COVID-19 Pandemic: After Action Report, 29 June 2020," 7.

[101] Ibid.

[102] Ibid.

[103] Ibid.

[104] Ibid.

[105] Ibid.

[106] USACE, *COVID-19 Pandemic: Final After Action Report, 31 July 2020*, 46.

[107] U.S. Army Corps of Engineers Wilmington District, South Atlantic Division, "COVID-19 Pandemic: After Action Report, 30 April 2020," (Wilmington, OH, 2020), 19.

[108] U.S. Army Corps of Engineers Mobile District, South Atlantic Division, "COVID-19 Pandemic: After Action Report, 10 July 2020," (Mobile, AL, 2020), 27.

[109] Wilmington District, South Atlantic Division, "COVID-19 Pandemic: After Action Report, 30 April 2020," 19.

[110] U.S. Army Corps of Engineers Savannah District, South Atlantic Division, "COVID-19 Pandemic: After Action Report, 06 July 2020," (Savannah, GA, 2020), 12.

[111] Wilmington District, South Atlantic Division, "COVID-19 Pandemic: After Action Report, 30 April 2020," 19.

[112] USACE, *COVID-19 Pandemic: Final After Action Report, 31 July 2020*, 46.

[113] South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 34.

[114] Ibid.

[115] Sacramento District, South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 137.

[116] Ibid.

[117] Albuquerque District, South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 5.

[118] South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 126.

[119] Ibid., 20-21.

[120] Ibid.

[121] U.S. Army Corps of Engineers Los Angeles District, South Pacific Division, "COVID-19 Pandemic: After Action Report, 04 July 2020," (Los Angeles, CA, 2020), 213.

[122] Ibid., 509.

[123] Albuquerque District, South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 5.

[124] Ibid., 374.

[125] Ibid.

[126] Sacramento District, South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 522.

[127] Ibid.

[128] Albuquerque District, South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 374.

[129] Ibid.

[130] USACE, *COVID-19 Pandemic: Final After Action Report, 31 July 2020*, 108.

[131] Sacramento District, South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 509.

[132] Ibid.

[133] Ibid., 510.

[134] Ibid.

[135] Ibid., 4.

[136] Ibid., 20.

[137] South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 123.

[138] U.S. Army Corps of Engineers San Francisco District, South Pacific Division, "COVID-19 Pandemic: After Action Report, 01 July 2020," (San Francisco, CA, 2020), 68.

[139] Sacramento District, South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 535.

[140] Albuquerque District, South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 5.

[141] Ibid.

[142] Ibid., 374.

[143] San Francisco District, South Pacific Division, "COVID-19 Pandemic: After Action Report, 01 July 2020," 11.

[144] Sacramento District, South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 544.

[145] Albuquerque District, South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 374.

[146] South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 27.

[147] Sacramento District, South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 509.

[148] Ibid., 510.

[149] Southwestern Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," 4.

[150] Ibid., 493.

[151] Ibid., 342.

[152] Ibid., 31-32.

[153] Ibid., 484.

[154] Ibid.

[155] Ibid.

[156] Ibid., 29.

[157] Southwestern Division, "COVID-19 Pandemic: Hotwash Presentation, 07 July 2020," 4.

[158] Southwestern Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," 329.

[159] Southwestern Division, "COVID-19 Pandemic: Hotwash Presentation, 07 July 2020," 28.

[160] Ibid.

[161] Ibid., 70.

[162] Southwestern Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," 72.

[163] Ibid.

[164] Ibid., 474.

[165] Ibid., 69.

[166] Southwestern Division, "COVID-19 Pandemic: Hotwash Presentation, 07 July 2020," 4.

[167] Ibid., 70.

[168] Ibid.

# APPENDIX B

# ENGINEERING AND DESIGN: INDIVIDUAL PERFORMANCE ASSESSMENT

## Overview

The following is a detailed description of the USACE performance of Engineering and Design services during COVID-19 response operations through the lens of USACE Headquarters and each subordinate USACE division.

## Headquarters

Through the perspective of USACE Headquarters, the USACE performance of Engineering and Design services during COVID-19 response operations was highly successful, with USACE openly distributing standardized ACF designs documentation and also providing site-specific designs upon request by individual states. The challenges and issues identified were minor and reflected small issues with Engineering and Design considerations that were resolved as they emerged.

In terms of scope specifically, the successes and challenges of USACE Engineering and Design services are highlighted in table 65 below.

Table 65. Engineering and Design (Scope) HQ Successes and Challenges

| **Headquarters, U.S. Army Corps of Engineers** | |
|---|---|
| **Engineering and Design (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. USACE developed and distributed 4 standardized designs for converting existing facilities to ACFs. | 1. Continuous improvements required regarding specific Engineering and Design considerations. |
| 2. Completed site-specific Engineering and Design for 38 ACFs contracted through USACE and 36 ACFs executed by states independently. | |
| 3. Effectively responded to state requests for design of COVID-positive facilities. | |
| 4. Successfully integrated with state government and medical planners to modify design scope to meet end-user needs. | |

*Source:* Created by author.

Regarding Scope Success #1, on 18 March 2020, FEMA National MA NAD-02 provided USACE authority and federal funding to begin "initial planning and engineering support to address possible medical facility shortages."[1] Within 2 days, the USACE Huntsville National Center's Medical Facilities Mandatory Center of Excellence developed 2 standardized designs for converting existing facilities into ACFs. USACE ultimately developed a total of 4 standardized designs—for converting hotels, arenas/convention centers, tent camps, and closed hospitals—that were subsequently distributed to states.[2] The standardized designs were intended to assist in "developing potential facilities for suitability as alternate care sites and to rapidly engage contractors to convert and prepare them for medical use."[3] The designs could facilitate subordinate USACE unit site-specific design activities in support of states or, alternately, they could

be "used by States and municipalities without USACE or HHS involvement providing them with greater flexibility."[4] Regarding Scope Success #2, USACE successfully completed site-specific Engineering and Design for 38 ACFs, representing 15,074 patient care spaces that were ultimately constructed through USACE contracting.[5] USACE also successfully completed site-specific Engineering and Design for 36 additional ACFs, representing 12,745 patient care spaces that were ultimately executed by states independently.[6] Regarding Scope Success #3, USACE's initial design recommendations focused on the use of ACFs for supporting the overflow of non-COVID patients from hospitals over maximum capacity due to the influx of COVID-positive patients.[7] In fact, USACE initially stated that, "A COVID open bay arena PWS was not developed as it does not include a primary engineering control, and is not recommended."[8] Responding to numerous state requests for ACFs capable of treating COVID-positive patients, however, "USACE Districts began implementing open patient bays . . . As a result interim guidance has been issued for open bay concept facilities."[9] Regarding Scope Success #4, USACE Headquarters noted that enterprise-wide it was successfully integrating with state government and medical planners to modify design scope to meet end-user needs. As one example, the responsibility for medical gas was initially considered a state responsibility. USACE—recognizing through collaboration with state medical planners that bottle oxygen was less effective for acute patients requiring ventilators—began providing Performance Work Statements with "hard piped medical gas systems for all acute COVID facilities as these systems need to be built as part of the infrastructure coordinating with all other utility systems."[10] Bottled oxygen and/or bulk oxygen tanks were still considered "supply component" for lease by states directly, with no USACE involvement.[11]

Regarding Scope Challenge #1, USACE Headquarters noted numerous minor Engineering and Design considerations that emerged as issues and were resolved (and documented) during the course of operations. A non-exhaustive list of some of these identified issues is the following:

1. Primary ventilation standard for healthcare facilities is ASHRAE STD 170, instead of ASHRAE 62.1. Exhaust discharge requirements specified in Plans and Specifications and other engineer documentation should be based on the ASHRAE STD 170 standard.[12] This is important to note, as during COVID-19 response operations, many engineers were designing medical facilities—who previously had no experience designing medical facilities.

2. To achieve negative pressure requirements in COVID positive containment areas (and/or patient spaces), increasing outside air to positively pressurize adjacent corridors is recommended, as opposed to increasing exhaust from these individual rooms.[13]

3. Engineer Zone Valve Boxes with area alarms for each block of 18 patient care spaces (pods), as opposed to 1 per patient space as USACE initial designs recommended. This is more in-line with actual hospital requirements and avoids "extensive procurement obstacles" expected with attempting to procure so many zone valve boxes.[14]

4. On-site pharmacies, when required, should be designed for placement outside the COVID-19 isolation zone whenever possible.[15] This alleviates "the logistical

challenge of preparing sterile IV drugs, which requires the workers to be clean and is difficult to do when they have to wear PPE."[16]

5. To design external exhaust from facilities, "utilize a door to exterior and custom fabricate sheet metal with filter panel for particulate and HEPA filter . . . This required no permanent facility modifications, and the doors can easily be reinstalled." A caveat is if "a door is pat of the existing means of egress (i.e., is marked with an EXIT sign), in which case Fire Code must be consulted prior to design.[17]

6. "Addition of exhaust fan VFD with differential pressure sensor/monitor and integration into existing BMS" is a best practice for achieving negative pressure requirements with aging HVAC systems.[18]

7. For O2 distribution systems, "recommend using wire cable trays, with unit strut strapped to the cable trays," to support medical gas piping as a "practical construction implementation solution."[19]

In terms of schedule specifically, the successes and challenges of USACE Engineering and Design services are highlighted in table 66 below.

Table 66. Engineering and Design (Schedule) HQ Successes and Challenges

| Headquarters, U.S. Army Corps of Engineers | |
|---|---|
| **Engineering and Design (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| No significant observations reported. | 1. During early operations, initial Performance Work Statements, with corresponding construction schedule estimates, underestimated the time required for low-voltage integration during ACF conversions. |

*Source:* Created by author.

Regarding Schedule Challenge #1, USACE Headquarters noted that some initial Performance Work Statements, created during early operations, underestimated the difficulty of low-voltage integration and the corresponding schedule duration required for contractors to resolve the issue.[20]

In terms of cost specifically, the successes and challenges of USACE Engineering and Design services are highlighted in table 67 below.

Table 67. Engineering and Design (Cost) HQ Successes and Challenges

| Headquarters, U.S. Army Corps of Engineers | |
|---|---|
| **Engineering and Design (Cost)** | |
| **Successes** | **Challenges/Issues** |
| 1. Through FEMA National MA (NAD-02), states received access to USACE standardized ACF designs at 100% federal cost, for use either with USACE site-specific Engineering and Design or independent state development. | 1. During early operations, initial Performance Work Statements, with corresponding construction cost estimates, underestimated the costs required for low-voltage integration during ACF conversions. |

*Source:* Created by author.

Regarding Cost Success #1, USACE provided states with a highly cost-effective ACF design resource by providing, at no cost to states, standardized ACF design documentation developed through authorization and 100% federal funding from FEMA National MA NAD-02.[21]

Regarding Cost Challenge #1, USACE Headquarters noted that some initial Performance Work Statements, created during early operations, underestimated the difficulty of low-voltage integration and the corresponding costs required for contractors to resolve the issue.[22]

## Great Lakes and Ohio River Division

Through the perspective of the Great lakes and Ohio River Division, the performance of Engineering and Design services during COVID-19 response operations was successful, with the division successfully executing site-specific ACF design for 15 facilities during the period of the study. The division did experience notable issues during early operations, however, as uncertainty for cost engineers resulted in construction costs far exceeding estimates used to inform the awarding of contracts.

In terms of scope specifically, the successes and challenges of the division's Engineering and Design services are highlighted in table 68 below.

Table 68. Engineering and Design (Scope) LRD Successes and Challenges

| **Great Lakes and Ohio River Division** | |
|---|---|
| **Engineering and Design (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Completed site-specific Engineering and Design for 8 ACFs contracted through USACE, 5 ACFs executed by states independently, and 2 ACFs not constructed. | No significant observations reported. |
| 2. Leveraged HNC/MX standard designs to mitigate Engineering and Design technical risk to Low Risk. | |
| 3. Effectively responded to state requests for design of COVID-positive facilities. | |
| 4. Successfully integrated with state government and medical planners to modify design scope to meet end-user needs. | |

*Source:* Created by author.

Regarding Scope Success #1, the division successfully executed site-specific Engineering and Design for eight ACFs that would ultimately be constructed through USACE contracting, five ACFs that would ultimately be executed by states independently, and 2 ACFs that were ultimately not constructed.[23] Regarding Scope Success #2, the division noted that the HNC/MX concept and standardized designs—adapting suitable existing facilities—mitigated the technical risk associated with the Engineering and Design work. It noted that, "This was fundamentally a site-adapt design that was easily applied to the chosen facility."[24] The division also commented that, "The technical risk . . . was minimal as the requirements were much simpler site-adapt designs than brand new construction of medical facilities."[25] Regarding Scope Success #3, the division noted that it "quickly determined in late March the States of Illinois and Michigan wanted their ACSs to be capable of handling COVID positive patients whereas the standard USACE designs called for only non-COVID use."[26] In response to this, "The Commanders quickly assessed this challenge, worked with their engineers and those at the project sites, and determined the feasibility of this additional capability."[27] Regarding Scope Success #4, the division stated that, "Every alternate care facility was built to the specifications of the medical plan that a mayor or governor requested."

Additionally, the division noted that, for its shuttered hospital ACF projects, it coordinated with the State of Illinois Department of Public Health and medical consultants "to prepare the levels of patient care being used at each shuttered hospital constructed as an ACS."[28]

In terms of schedule specifically, the successes and challenges of the division's Engineering and Design services are highlighted in table 69 below.

Table 69. Engineering and Design (Schedule) LRD Successes and Challenges

| Great Lakes and Ohio River Division | |
|---|---|
| **Engineering and Design (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| 1. Expedited Engineering and Design products to achieve aggressive contracting and construction timelines. | No significant observations reported. |

*Source:* Created by author.

Regarding Schedule Success #1, the Nashville District—as one example—designed the 67-bed ACF co-located with the Nashville General Hospital in only 3 days.[29] The Engineering and Design work was made simpler by the standard of existing utilities and mechanical systems due to presence of the existing hospital, but the speed of design was still remarkable.[30] It was "built to temporary building codes used in emergency circumstances; this is the only ACS facility built inside an operational hospital."[31]

In terms of cost specifically, the successes and challenges of the division's Engineering and Design services are highlighted in table 70 below.

Table 70. Engineering and Design (Cost) LRD Successes and Challenges

| Great Lakes and Ohio River Division | |
|---|---|
| **Engineering and Design (Cost)** | |
| **Successes** | **Challenges/Issues** |
| | |
| No significant observations reported. | 1. Cost Engineering efforts during PWS development for the first ACFs in the nation resulted in several ROM cost estimates that notably underestimated actual construction costs. |
| | 2. Cost inefficiencies resulted from "building to capacity" or "building to need," as opposed to "building to available staffing." |

*Source:* Created by author.

Regarding Cost Challenge #1, the division noted that cost engineering efforts during Performance Work Statement development for initial projects were negatively impacted by lack of parametric data on previous projects (as ACFs had never been constructed before) and limited understanding of ACF construction pitfalls.[32] During Engineering and Design work for the McCormick Place ACF (one of the first ACFs to be constructed in the nation), the division noted that, "Cost models for ROMs did not exist for ACS facilities and were developed in two days."[33] Ultimately, the actual construction costs for the project reached $64 million, as compared to the estimate at contract award of only $26 million.[34] The division stated that, "The significant difference between the ROM at $26 million and the final contract amount at $64 million was a better

understanding of the clinical requirements to care for up to 3,000 COVID-19 positive patients."[35] As another example, the division documented that the Metro South Hospital ACF's estimate of $7 million at contract award ultimately increased to actual construction costs of $14.3 million, due to uncertainty estimating the costs associated with low voltage telecommunications, medical gas infrastructure, and HVAC.[36] For each project, the increase in cost for the state of Illinois was relatively significant, even at a cost-share of 25%. Whether these cost increases impacted state decision-making is unclear: Illinois ultimately constructed additional ACFs through USACE, but each additional ACF project had reached the stage of signed FEMA MAs for construction prior to the significant cost increases at the McCormick Center and the Metro South Hospital.[37] As such, the state did not have time to react to terminate other contracts, if that contingency was a consideration. Regarding Cost Challenge #2, the division noted cost inefficiencies resulting from "building to capacity" or "building to need," which were initially criteria preferred by several states.[38] Using the Suburban Collection Showplace ACF as an example, the division noted issues associated with the state of Michigan initially choosing to build to facility capacity prior to COVID infection forecasts causing it to request de-scoping of the facility.[39] The division documented that this ACF "was originally built to the facility capacity then de-scoped 5 days into the 15 day build. This change impacted the sunk costs that could not be recovered."[40]

## Mississippi Valley Division

Through the perspective of the Mississippi Valley Division, the performance of Engineering and Design services during COVID-19 response operations was highly successful. The division documented several noteworthy successes and emerging best practices, while its documented issues were limited to early operations with most resolved internally during the course of mission execution.

In terms of scope specifically, the successes and challenges of the division's Engineering and Design services are highlighted in table 71 below.

Table 71. Engineering and Design (Scope) MVD Successes and Challenges

| **Mississippi Valley Division** | |
|---|---|
| **Engineering and Design (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Completed site-specific Engineering and Design for 2 ACFs contracted through USACE, 2 ACFs executed by states independently, and 1 ACF not constructed. | 1. During E and D for the first correctional facility ACF, initial lack of awareness of correctional facility regulatory standards resulted in PWS scoping issues and construction inefficiencies. |
| 2. Leveraged HNC/MX standard designs to execute site-specific Engineering and Design. | |
| 3. Effective Engineering and Design of ACF outside standard design criteria. | |
| 4. Provided states with Engineering technical support to inform ACF decision-making process. | |
| 5. Conducted Design Charrette to initiate successful Engineering and Design effort, integrated with all key stakeholders. | |
| 6. Successfully integrated with state government and medical planners to modify design scope to meet end-user needs. | |
| 7. Established Regional Knowledge Sharing Conference Call to synchronize Engineering and Design best practices for ACFs. | |

*Source:* Created by author.

Regarding Scope Success #1, the division successfully executed site-specific Engineering and Design for two ACFs that would ultimately be constructed through USACE contracting, two ACFs that would ultimately be executed by states independently, and one ACFs that was ultimately not constructed.[41] Regarding Scope Success #2, the division noted that it successfully leveraged the HNC/MX standardized designs to support states most effectively. The division stated that, "The plans and products developed by HNC for H2HC and A2HC were extremely helpful. These products enabled districts to quickly posture for support to states/FEMA."[42] Regarding Scope Success #3, the division noted that Memphis District engineers successfully conducted site-specific Engineering and Design for a relatively unique ACF that did not align well with any of the four standardized HNC/MX designs.[43] Of the Commercial Appeal ACF in Memphis, TN, the Memphis District commander stated that, "It is my contention that this was the most complicated ACF mission of the 38 executed by USACE. It was neither A2HC nor H2HC, but did require conversion of a large commercial office space and industrial space."[44] He continued by highlighting that, "Significant demolition and reconfiguration of architectural, structural, and mechanical systems was necessary. Additionally, it was a building from the 1970s that was not currently in use."[45] Regarding Scope Success #4, the division noted that, "FEMA and State counterparts acknowledged satisfaction with USACE responsiveness to technical questions that surfaced during FEMA's approval process."[46] Regarding Scope Success #5, the St. Louis District reported the highly effective best practice of a "Design Charrette to be conducted on site, participants should include USACE, the State, and the end user."[47] During the charrette, key decision-makers clearly defined "what is allowed per the scope and what are the end users current needs."[48] Regarding Scope Success #6, the division noted that its design teams integrated with stakeholders to ensure scope met end-user needs. When regulatory standards issues emerged with the Performance Work Statement for the Frank Lotter Building ACF, "The [Chicago District] Commander, Gilbane Project Director, State and County Correctional and Emergency Management Staff, and County Medical Staff successfully worked through design issues 1-4 May. Also important was the open lines of communication throughout the process."[49] Regarding Scope Success #7, the division noted that it established its own regional conference call to synchronize Engineering and Design best practices for ACFs. Describing this success, the division stated, "From the EC [Engineering and Construction] side, a recurring call was set up to compare notes across the region to bring all Districts to a common level of understanding of HNC guidance, regional best practices, etc."[50]

Regarding Scope Challenge #1, the division noted that Performance Work Statement scoping issues and construction inefficiencies occurred as a result of not initially determining the unique correctional facility regulatory standards for the Frank Lotter Building ACF. Of this issue, the Memphis District stated that this oversight, "had its greatest impact on PWS/ROM Development, Design."[51] Providing additional detail, the district stated that, "Obtaining the Wisconsin Department of Corrections Standard (DOC 350) information earlier would have benefited the team responsible for developing the initial PWS/ROM by measurably reducing the uncertainty."[52]

In terms of schedule specifically, the division reported no significant observations.

In terms of cost specifically, the successes and challenges of the division's Engineering and Design services are highlighted in table 72 below.

Table 72. Engineering and Design (Cost) MVD Successes and Challenges

| Mississippi Valley Division | |
|---|---|
| **Engineering and Design (Cost)** | |
| **Successes** | **Challenges/Issues** |
| No significant observations reported. | 1. Initial lack of awareness of correctional facility regulatory requirements resulted in additional Engineering and Design labor costs and, more significantly, underestimated ROM cost estimates for construction. |

*Source:* Created by author.

Regarding Cost Challenge #1, the division noted that its initial error regarding the unique regulatory requirements of the Frank Lotter Building resulted in increased Engineering and Design labor costs and underestimated construction cost estimates. The Memphis District stated that, "The USACE team was not aware of the DOC 350 correctional standard until after contract award. Early identification of the DOC 350 had potential to provide a more definitive initial PWS and a more realistic initial ROM cost estimate."[53]

## North Atlantic Division

Through the perspective of the North Atlantic Division, the performance of Engineering and Design services during COVID-19 response operations was extremely successful. The division completed significant volume of site-specific Engineering and Design in support of state-requested ACF conversions and pioneered several best practices. In terms of challenges and issues, the division noted only minor problems that were largely resolved internally during execution of operations.

In terms of scope specifically, the successes and challenges of the division's Engineering and Design services are highlighted in table 73 below.

Table 73. Engineering and Design (Scope) NAD Successes and Challenges

| North Atlantic Division | |
|---|---|
| **Engineering and Design (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Completed site-specific Engineering and Design for 11 ACFs contracted through USACE, 14 ACFs executed by states independently, and 5 ACFs not constructed. | 1. Initial lack of integration with medical planners and providers during Engineering and Design resulted in additional PWS re-work to meet end-user needs. |
| 2. Leveraged HNC/MX standard designs to execute site-specific Engineering and Design. | 2. Confusion surrounding the authoritative standard for medical terminology. |
| 3. Supported USACE Nationwide Conference Calls to Share ACF Lessons Learned in real-time. | 3. Continuous improvements required regarding specific Engineering and Design considerations. |
| 4. Leveraged inter-division collaboration to capture and incorporate ACF best practices in real-time. | |
| 5. Provided states with both "high end" and "low end" PWS estimates to enable state planners to conceptualize range of ACF solutions. | |
| 6. Successfully integrated with state government and medical planners to modify design scope to meet end-user needs. | |
| 7. Provided states with Engineering technical support to inform ACF decision-making process. | |
| 8. Successfully pioneered the Containerized Medical Solution pilot project, providing six modular ACFs for the State of Maryland. | |

*Source:* Created by author.

Regarding Scope Success #1, the division successfully executed site-specific Engineering and Design for 11 ACFs that would ultimately be constructed through USACE contracting, 14 ACFs that would ultimately be executed by states independently, and 5 ACFs that were ultimately not constructed.[54] Regarding Scope Success #2, the division noted that it successfully leveraged the HNC/MX standardized designs to support states most effectively. The division stated that, "The team collaborated with the USACE Medical Facilities Mandatory Center of Expertise on ACF design."[55] Conducting this collaboration, the division commented that, "The MCX provided invaluable feedback throughout the process."[56] Regarding Scope Success #3, the division both benefited from and supported USACE nationwide calls to share real-time Engineering and Design lessons learned. Volunteering to lead discussions on these enterprise-level conference calls, the division "expedited technical information" and provided technical subject matter experts from early ACF design successes to share best practices to improve the USACE enterprise Engineering and Design capabilities.[57] Regarding Scope Success #4, the division noted significant success with inter-division collaboration, particularly highlighting coordination with HNC/MX and the Great Lakes and Ohio River Division.[58] Regarding Scope Success #5, the New England District Engineering and Design teams provided states with both high and low bed count estimates in order to provide the state with more options for ACF conversion.[59] Regarding Scope Success #6, the New York District noted that, "Direct coordination between patient care providers and the USACE design team has been instrumental in quickly identifying needs and setting expectations."[60] Additionally, the district noted that its "local government LNO [has] facilitated such communication to great success."[61] Regarding Scope Success #7, the division documented that it provided, "technical assistance in reopening existing hospital facilities that have been previously closed."[62] Regarding Scope Success #8, the Baltimore District "led the experimental Containerized

Medical Facility (CMF) pilot program for USACE at the United Medical Center, in DC, which provided six modular critical care facilities for the local area hospital."[63]

Regarding Scope Challenge #1, the Baltimore District noted that, when medical planners were not integrated for Performance Work Statement development, re-work was required, whereas "where medical planners were directly engaged with USACE teams greater success was achieved with less rework to designs."[64] Regarding Scope Challenge #2, the New York District noted that "Understanding technical terminology continues to be challenging throughout the enterprise—COVID, non-COVID, COVID-positive, acute, non-acute, sub-acute, critical, convalescent, patient spaces, beds, cubicles, pods, high density, low density, etc."[65] The district, commenting on the impact, noted that, "This has affected communication, design assumptions, and messaging."[66] Regarding Scope Challenge #3, the division noted numerous minor Engineering and Design considerations that emerged as issues and were resolved (and documented) during the course of operations. One such example is the division's advisory on large tent usage based on experience with tent camp ACF conversions: Large tents are not recommended for ACFs; they cannot handle high wind ratings and retrofitting with fire protection systems only exacerbated this problem. If tents are an absolute necessity, a greater number of very small tents is the preferred solution.[67]

In terms of schedule specifically, the successes and challenges of the division's Engineering and Design services are highlighted in table 74 below.

Table 74. Engineering and Design (Schedule) NAD Successes and Challenges

| North Atlantic Division | |
|---|---|
| **Engineering and Design (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| 1. HNC/MX standard designs expedited PWS development. | No significant observations reported. |
| 2. Integration and direct collaboration with medical end-users reduced schedule delays resulting from unnecessary PWS re-work. | |
| 3. Acquired existing facility as-built drawings to reduce schedule duration required to produce conceptual layouts. | |

*Source:* Created by author.

Regarding Schedule Success #1, the division noted that the "HNC developed standard PWS expedited project PWS development."[68] Regarding Schedule Success #2, the New York District noted its success collaborating with end-users to save time. The district observed that, "Direct coordination between patient care providers and the USACE design team has been instrumental in quickly identifying needs and setting expectations."[69] Furthermore, the district noted that, "Direct and open collaboration between design staff and end users saves time and cost."[70] Regarding Schedule Success #3, the New York District observed that securing existing facility as-built information reduces the duration required to produce conceptual layouts.[71]

In terms of cost specifically, the successes and challenges of the division's Engineering and Design services are highlighted in table 75 below.

Table 75. Engineering and Design (Cost) NAD Successes and Challenges

| North Atlantic Division | |
|---|---|
| **Engineering and Design (Cost)** | |
| **Successes** | **Challenges/Issues** |
| 1. Cost Engineering practice of providing "high end" and "low end" cost estimates enabled state planners to identify cost-effective ACF solutions. | No significant observations reported. |
| 2. Integration and direct collaboration with medical end-users mitigated cost increases associated with PWS re-work and post-contract award modifications. | |

*Source:* Created by author.

Regarding Cost Success #1, the New England District Engineering and Design teams provided states with both high and low cost estimates in order to provide the state with more options for ACF conversion.[72] Commenting on this practice, the district stated that, "Since states may change their mind, we provided two bed counts and two cost estimates assuming the extremes . . . all ICU requiring negative pressure (and associated cost), or all convalescing and not in need of negative pressure (and associated cost."[73] Regarding Cost Success #2, the New York District noted that, "Ongoing collaboration has saved great time and cost, and provides the best product for patient care providers."[74] Additionally, the district noted that, "Direct and open collaboration between design staff and end users saves time and cost."[75]

## Northwestern Division

Through the perspective of the Northwestern Division, the performance of Engineering and Design services during COVID-19 response operations was successful, with no documented challenges or issues.

In terms of scope specifically, the successes and challenges of the division's Engineering and Design services are highlighted in table 76 below.

Table 76. Engineering and Design (Scope) NWD Successes and Challenges

| Northwestern Division | |
|---|---|
| **Engineering and Design (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Completed site-specific Engineering and Design for 3 ACFs contracted through USACE. | No significant observations reported. |

*Source:* Created by author.

Regarding Scope Success #1, the division successfully executed site-specific Engineering and Design for three ACFs that would ultimately be constructed through USACE contracting.[76] These were the Missouri ACF in Florissant, MO; the Eugene River Avenue ACF in Eugene, OR; and the Kalispell Regional Medical Center ACF in Kalispell, MT.[77]

In terms of schedule and cost, the division reported no significant observations.

## Pacific Ocean Division

Through the perspective of the Pacific Ocean Division, the performance of Engineering and Design services during COVID-19 response operations was satisfactory. The division successfully completed site-specific Engineering and Design for one ACF, but it documented noteworthy issues with the feasibility of the USACE standardized ACF designs for Hawaii and the Pacific island U.S. territories.

In terms of scope specifically, the successes and challenges of the division's Engineering and Design services are highlighted in table 77 below.

Table 77. Engineering and Design (Scope) POD Successes and Challenges

| **Pacific Ocean Division** | |
|---|---|
| **Engineering and Design (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Completed site-specific Engineering and Design for 1 ACF contracted through USACE. | 1. USACE standardized ACF designs were too robust for implementation in Hawaii and Pacific island U.S. territories. |

*Source:* Created by author.

Regarding Scope Success #1, the division successfully executed site-specific Engineering and Design for the Alaska Airlines Center ACF, which was ultimately constructed through USACE contracting.[78]

Regarding Scope Challenge #1, the division noted that USACE standardized ACF designs were "too robust" in scope for implementation in Hawaii and the Pacific island U.S. territories.[79] The division noted explicitly, "Mainland ACF plans required adaptations for use within the [Hawaii District] Area of Responsibility and were too expensive for implementation."[80] Highlighting a necessary improvement, the division stated, "It was important to recognize the needs and regional considerations within the Area of Responsibility and to provide design options."[81] The division further noted it needed to "Maintain flexibility to meet the temporary needs of our customers."[82]

In terms of schedule specifically, the division reported no significant observations.

In terms of cost specifically, the successes and challenges of the division's Engineering and Design services are highlighted in table 78 below.

Table 78. Engineering and Design (Cost) POD Successes and Challenges

| **Pacific Ocean Division** | |
|---|---|
| **Engineering and Design (Cost)** | |
| **Successes** | **Challenges/Issues** |
| No significant observations reported. | 1. USACE standardized ACF designs were too expensive for implementation in Hawaii and Pacific island U.S. territories. |

*Source:* Created by author.

Regarding Cost Challenge #1 (and corresponding with Scope Challenge #1 above), the division noted that USACE standardized ACF designs were "too expensive" for implementation in Hawaii and the Pacific island U.S. territories. As an example of the increased expenses, the division highlighted that, "When cost engineering brought that

over to Guam and Am [sic] Samoa, we were looking at $664,000 for nursing stations alone."[83]

## South Atlantic Division

Through the perspective of the South Atlantic Division, the performance of Engineering and Design services during COVID-19 response operations was successful, with no documented challenges or issues.

In terms of scope specifically, the successes and challenges of the division's Engineering and Design services are highlighted in table 79 below.

Table 79. Engineering and Design (Scope) SAD Successes and Challenges

| South Atlantic Division | |
|---|---|
| **Engineering and Design (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Completed site-specific Engineering and Design for 2 ACFs contracted through USACE and 4 ACFs executed by states independently. | No significant observations reported. |

*Source:* Created by author.

Regarding Scope Success #1, the division successfully executed site-specific Engineering and Design for two ACFs that would ultimately be constructed through USACE contracting.[84] These were the Miami Beach Convention Center ACF in Miami, FL and the 210th ARNG Regional Training Institute in St. Croix, USVI.[85] The division also successfully executed site-specific Engineering and Design for four ACFs that would ultimately be constructed through states independently.[86] These were the Northeast Georgia Medical Center ACF in Gainesville, GA; the Medical University of South Carolina ACF in Charleston, SC; the Georgia World Congress Center in Atlanta, GA; and the Miami Medical Center ACF in Miami, FL.[87]

In terms of schedule and cost, the division reported no significant observations.

## South Pacific Division

Through the perspective of the South Pacific Division, the performance of Engineering and Design services during COVID-19 response operations was highly successful. The division documented significant successes and best practices, while its challenges and issues were minor in nature.

In terms of scope specifically, the successes and challenges of the division's Engineering and Design services are highlighted in table 80 below.

Table 80. Engineering and Design (Scope) SPD Successes and Challenges

| South Pacific Division | |
|---|---|
| **Engineering and Design (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Completed site-specific Engineering and Design for 8 ACFs contracted through USACE and 10 ACFs executed by states independently. | 1. High frequency of changes to USACE enterprise-level templates and formats for PWS/CWE caused confusion and lack of consistency. |
| 2. Leveraged HNC/MX standard designs to execute site-specific Engineering and Design. | 2. Lack of formal PWS Review Process (with periodic reviews involving all stakeholders) resulted in unresolved scope issues until PWS was submitted for final review. |
| 3. Supported USACE Nationwide Conference Calls to Share ACF Lessons Learned in real-time. | 3. One district noted that too few engineers with vertical construction experience resulted in excessive labor hours for some Engineering and Design team personnel. |
| 4. Coordinated directly with Medical SMEs at HNC to understand technical requirements for common ACF scenarios. | |
| 5. Successfully integrated with state government and medical planners to modify design scope to meet end-user needs. | |

*Source:* Created by author.

Regarding Scope Success #1, the division successfully executed site-specific Engineering and Design for eight ACFs that would ultimately be constructed through USACE contracting and 10 ACFs that would ultimately be executed by states independently.[88] Regarding Scope Success #2, the division noted that it successfully employed the HNC/MX standardized designs to gain understanding of how to support states most effectively. The division stated that, "HQUSACE Standard Designs created shared vision and understanding throughout USACE and state/federal partners, and providing this adaptable, flexible, regularly updated, and openly accessible information on a publicly accessible webpage allowed for instant sharing."[89] Regarding Scope Success #3, the Sacramento District noted that, "By disseminating early design criteria and creating mutual understanding through coordination meetings, USACE understood the COVID-19 problem set better than our state partners and allowed us to conduct business without having to request more information from our partners."[90] Regarding Scope Success #4, the division stated that its Engineering and Design team "took the lead with communicating with the medical subject matter experts at HNC to understand the technical requirements for different ACF scenarios."[91] Regarding Scope Success #5, the division noted that it "worked with FEMA, HHS, and State partners to further refine the delivery of bed space to best accommodate the lifesaving needs for patients as well as for the protection of health care workers."[92]

Regarding Scope Challenge #1, the division stated that the USACE enterprise-level approved templates for Performance Work Statements and cost estimates changed too frequently during the course of a relatively short duration of operations to facilitate predictability and consistency. The division noted that, "The formats for . . . PWS/CWE were built and expanded as the mission developed. However, as the information requirements changed, the formats grew, building upon the original HQUSACE/HNC standard cover pages." The division noted that these templates should have been standardized to "[create] more consistency across teams, and across time."[93] Regarding Scope Challenge #2, the division noted that the lack of a formal Performance Work Statement review process, involving all key stakeholders, resulted in scope issues being unidentified and unresolved until the Performance Work Statement was submitted for

final review. On this topic, the division stated, "Without a regularly scheduled coordination call with stakeholders, these assumptions were unverified until the PWS was submitted for review."[94] Regarding Scope Challenge #3, the Los Angeles District commander stated, "One of our major challenges was the fact that our district has limited vertical construction design experience."[95] He noted that, as a result, "This meant that some key members of our district, especially in our Engineering Division, who had vertical construction experience, were required to work extremely long hours to develop the Performance of Work Statements and the Current Working Estimates."[96]

In terms of schedule specifically, the successes and challenges of the division's Engineering and Design services are highlighted in table 81 below.

Table 81. Engineering and Design (Schedule) SPD Successes and Challenges

| South Pacific Division | |
|---|---|
| **Engineering and Design (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| 1. Fast execution of Engineering and Design work enabled rapid construction and delivery of state-requested ACFs. | 1. Lack of formal PWS Review Process (with periodic reviews involving all stakeholders) resulted in increased Engineering and Design schedule duration due to PWS revisions. |

*Source:* Created by author.

Regarding Schedule Success #1, the division commented on its quick delivery of Engineering and Design Performance Work Statements. It stated that, "Once FEMA and the States agreed to a cost-shared Direct Federal Assistance (DFA) mission assignment, the quick . . . development of Performance Work Statements resulted in rapid construction and delivery of the ACFs to the state-selected sites."[97]

Regarding Schedule Challenge #1, the division noted that its lack of a formal Performance Work Statement review process resulted in late revisions and increased durations of Engineering and Design. To this end, the division commented that, "The absence of a PWS review process with involvement from USACE, FEMA, State Agencies, and the customer extends the timeframe to complete the PWS."[98]

In terms of cost specifically, the successes and challenges of the division's Engineering and Design services are highlighted in table 82 below.

Table 82. Engineering and Design (Cost) SPD Successes and Challenges

| South Pacific Division | |
|---|---|
| **Engineering and Design (Cost)** | |
| **Successes** | **Challenges/Issues** |
| No significant observations reported. | 1. Lack of formal PWS Review Process (with periodic reviews involving all stakeholders) resulted in increased Engineering and Design labor costs due to PWS revisions and less accurate construction cost estimates for state planner decision-making. |

*Source:* Created by author.

Regarding Cost Challenge #1, the division observed that its lack of a formal Performance Work Statement review process resulted in increased Engineer and Design labor costs due to unnecessary revisions and less accurate construction cost estimates. To combat this, the division suggested that establishing such a formal review process "will

aid in reducing the number of PWS revisions and creating a more accurate cost estimate."[99]

## Southwestern Division

Through the perspective of the Southwestern Division, the performance of Engineering and Design services during COVID-19 response operations was highly successful. The division documented several successes, while noting only a minor scope issue regarding medical terminology confusion.

In terms of scope specifically, the successes and challenges of the division's Engineering and Design operations are highlighted in table 83 below.

Table 83. Engineering and Design (Scope) SWD Successes and Challenges

| **Southwestern Division** | |
|---|---|
| **Engineering and Design (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Completed site-specific Engineering and Design for 3 ACFs contracted through USACE and 1 ACF executed by a state independently. | 1. Confusion surrounding the authoritative standard for medical terminology. |
| 2. Leveraged HNC/MX standard designs to execute site-specific Engineering and Design. | |
| 3. Distributed HNC/MX standard designs to enable states to conduct independent ACF operations. | |
| 4. Cost Engineering provided refined cost estimates, on demand, to inform state decision-making on ACF conversions. | |
| 5. Provided states with Engineering technical support to inform ACF decision-making process. | |
| 6. USACE enterprise Best Practice of "Medical SME Sharing" assisted Engineering and Design team with effective production of PWS/CWE. | |

*Source:* Created by author.

Regarding Scope Success #1, the division successfully executed site-specific Engineering and Design for three ACFs that would ultimately be constructed through USACE contracting and one ACF that would ultimately be executed by a state independently.[100] Regarding Scope Success #2, the division noted its great success leveraging HNC/MX standardized design to execute site-specific Engineering and Design in support of state requests. To highlight this, the division commented that, "State and local governments across the country have continued to request variations of the original concept documents developed by HNC national team (e.g., converting non-COVID, low acuity arena concept to COVID)."[101] The division also noted that HNC/MX "has done an extraordinary job developing technical requirements getting updates out to the field quickly for new variations of the concepts."[102] Regarding Scope Success #3, the division noted its success distributing HNC/MX standardized designs to enable states to conduct ACF planning and operations independently. Describing how it disseminated a "playbook" of the USACE standardized ACF designs to the state of Oklahoma, the division stated, "While federal assistance on ACFs are currently not requested, the designs and considerations contained in the playbook should help with state led efforts to convert dormitory space . . . , as well as any other efforts the state may be planning under their own direction."[103] Regarding Scope Success #4, the division noted that it

successfully supported state decision-making on ACF conversions through refined cost engineering estimates, on demand, even after initial site assessment cost estimates. In Oklahoma, the division noted that, "State requests for refined cost estimates for COVID care retrofitting are being met, and is understood that cost is a major consideration for the state and is essentially a tollgate before Oklahoma state officials designate a mission assignment for SWT."[104] A refined cost estimate, with significantly decreased total construction costs due to updated assessments of electrical, mechanical, and architectural systems for the Integris Baptist Medical Center resulted in the state of Oklahoma accepting the Engineering and Design Performance Work Statement and deciding to advance to contracting and construction.[105] Regarding Scope Success #5, the division noted that it provided effective engineering technical support to states. In support of the "Alternate Care Facility Working Group" established by the state of Arkansas, the division noted that, "We are providing some technical expertise to their engineering sub group with two engineers from [Little Rock District]. This working group is established to select, construct, outfit, and staff alternate care facilities…"[106] Regarding Scope Success #6, the division documented that it was highly successful leveraging USACE enterprise efforts to share knowledge to improve Engineering and Design capabilities. In particular, the division noted that the best practice of "Medical SME Sharing" assisted ACF design PDTs with "known costs, duration, timeframes, best practices, and challenges."[107]

Regarding Scope Challenge #1, the division noted that, "It appears USACE used internal Medical Programs folks as SMEs initially before really consulting HHS and their SMEs. As a result, there has been a disconnect with terminology and standards, resulting in changes in the field that could have been avoided."[108] While USACE-internal medical programs subject matter experts are well-trained professionals, their terminology—regularly employed for the construction of Department of Defense medical facilities—was not consistent with the terminology employed by the Department of Health and Human Services, which was the lead federal agency on COVID-19 response operations.

In terms of schedule specifically, the successes and challenges of the division's Engineering and Design services are highlighted in table 84 below.

Table 84. Engineering and Design (Schedule) SWD Successes and Challenges

| **Southwestern Division** | |
|---|---|
| **Engineering and Design (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| | |
| 1. USACE Best Practice of "Medical SME Sharing" expedited Engineering and Design work enabling rapid construction and delivery of state-requested ACFs. | No significant observations reported. |

*Source:* Created by author.

Regarding Schedule Success #1, the division observed that, "[Huntsville National Center, the Great Lakes and Ohio River Division, and the North Atlantic Division] were more than willing to share data," and that this allowed it to be "postured for expedient award and execution to support mission orders for the ACF build out."[109]

In terms of cost specifically, the division reported no significant observations.

[1] USACE, *COVID-19 Pandemic: Final After Action Report, 31 July 2020*, 17.

[2] Ibid., 96.

[3] Ibid., M-3.

[4] Ibid.

[5] Ibid., G-2.

[6] Ibid.

[7] Ibid., 101.

[8] Ibid.

[9] Ibid.

[10] Ibid., 102.

[11] Ibid.

[12] Ibid., 99.

[13] Ibid., 100.

[14] Ibid., 101.

[15] Ibid., 104.

[16] Ibid., 105.

[17] Ibid.

[18] Ibid., 105-106.

[19] Ibid., 106.

[20] Ibid., 107.

[21] Ibid., 17.

[22] Ibid., 107.

[23] Ibid., G-2 – G-3.

[24] Great Lakes and Ohio River Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," 36.

[25] Ibid., 35.

[26] Ibid., 6.

[27] Ibid.

[28] Ibid., 22.

[29] Ibid., 15-16.

[30] Ibid.

[31] Ibid.

[32] Ibid., 30.

[33] Ibid.

[34] Ibid., 32.

[35] Ibid.

[36] Ibid., 31.

[37] USACE, *COVID-19 Pandemic: Final After Action Report, 31 July 2020,* G-2 – G-6.

[38] Great Lakes and Ohio River Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," 49.

[39] Ibid.

[40] Ibid.

[41] USACE, *COVID-19 Pandemic: Final After Action Report, 31 July 2020,* G-2 – G-3.

[42] Mississippi Valley Division, "COVID-19 Emergency Response Final After Action Report, 23 June 2020," 37.

[43] Memphis District, Mississippi Valley Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," 10.

[44] Ibid.

[45] Ibid.

[46] Ibid., 40.

[47] St. Louis District, Mississippi Valley Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," 30.

[48] Ibid.

[49] Memphis District, Mississippi Valley Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," 41.

[50] New Orleans District, Mississippi Valley Division, "COVID-19 Pandemic: After Action Report, 26 June 2020," 86.

[51] Memphis District, Mississippi Valley Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," 43.

[52] Ibid., 42.

[53] Ibid., 43.

[54] USACE, *COVID-19 Pandemic: Final After Action Report, 31 July 2020*, G-2 – G-3.

[55] New York District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," F-2.

[56] Ibid.

[57] North Atlantic Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," F-1-2.

[58] Ibid.

[59] New England District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," 131.

[60] New York District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," F-3.

[61] Ibid.

[62] North Atlantic Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," 5.

[63] Baltimore District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 15 June 2020," 179.

[64] Ibid., 240.

[65] New York District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," F-7.

[66] Ibid.

[67] Ibid., G-10.

[68] North Atlantic Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," F-1-2.

[69] New York District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," F-3.

[70] Ibid.

[71] Ibid., G-6.

[72] New England District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," 131.

[73] Ibid.

[74] New York District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," F-3.

[75] Ibid.

[76] USACE, *COVID-19 Pandemic: Final After Action Report, 31 July 2020*, G-2 – G-3.

[77] Ibid.

[78] Ibid.

[79] Pacific Ocean Division, "COVID-19 Pandemic: After Action Report, 29 June 2020," 36.

[80] Ibid., 35.

[81] Ibid., 36.

[82] Ibid.

[83] Ibid.

[84] USACE, *COVID-19 Pandemic: Final After Action Report, 31 July 2020,* G-2 – G-3.

[85] Ibid.

[86] Ibid., G-5 – G-6.

[87] Ibid.

[88] Ibid., G-2 – G-3.

[89] Albuquerque District, South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 470.

[90] Sacramento District, South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 511.

[91] South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 5.

[92] Ibid.

[93] Sacramento District, South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 538.

[94] South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 123.

[95] Los Angeles District, South Pacific Division, "COVID-19 Pandemic: After Action Report, 04 July 2020," 213.

[96] Ibid.

[97] South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 5.

[98] Ibid., 124.

[99] Ibid., 123.

[100] USACE, *COVID-19 Pandemic: Final After Action Report, 31 July 2020,* G-2 – G-3.

[101] Southwestern Division, "COVID-19 Pandemic: Hotwash Presentation, 07 July 2020," 7.

[102] Ibid.

[103] Southwestern Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," 502.

[104] Ibid., 583.

[105] Ibid.

[106] Ibid., 342.

[107] Southwestern Division, "COVID-19 Pandemic: Hotwash Presentation, 07 July 2020," 12.

[108] Ibid., 24.

[109] Ibid., 12.

# APPENDIX C

# CONTRACTING: INDIVIDUAL PERFORMANCE ASSESSMENT

## Overview

The following is a detailed description of the USACE performance of Contracting services during COVID-19 response operations through the lens of USACE Headquarters and each subordinate USACE division.

## Headquarters

Through the perspective of USACE Headquarters, the USACE performance of Contracting services during COVID-19 response operations was highly successful, with USACE successfully executing contract award and construction oversight for 38 ACFs under expedited construction timelines to meet state requirements for pandemic response. The challenges and issues identified were relatively minor in nature, although concerns with cost must be addressed.

In terms of scope specifically, the successes and challenges of USACE Contracting services are highlighted in table 85 below.

Table 85. Contracting (Scope) HQ Successes and Challenges

| **Headquarters, U.S. Army Corps of Engineers** | |
|---|---|
| **Contracting (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. USACE successfully executed contract award and construction oversight for 38 ACFs, providing a total of 15,074 patient care spaces across the United States. | 1. Availability of CORs impacted some project operations. |
| 2. USACE established a COVID-19 Contracting SharePoint repository to integrate and synchronize enterprise performance. | |
| 3. USACE Directorate of Contracting developed a "Contracting Pandemic Response Desk Guide." | |

*Source:* Created by author.

Regarding Scope Success #1, USACE executed successful contract award and construction oversight for 38 ACFs, providing a total of 15,074 patient care spaces across the United States.[1] Regarding Scope Success #2, USACE successfully implemented a COVID-19 Contracting SharePoint repository during execution of ACF operations to disseminate information and synchronize Contracting performance across the enterprise. The repository contained, "UCA Lessons Learned, Templates, Policy, and Market Research information."[2] Regarding Scope Success #3, midway through execution, "The USACE Directorate of Contracting developed a Pandemic Response Desk Guide for the Alternate Care Site mission based on contracting-specific lessons learned during the COVID-19 event."[3] USACE Headquarters noted that this guide achieved its purpose, "to collect and link all documented resources, tools, and templates from the USACE COVID-19 Pandemic Response into a single accessible entry point."[4]

Regarding Scope Challenge #1, USACE Headquarters noted that "Project operations can be impacted by lack of available CORs."[5]

In terms of schedule specifically, the successes and challenges of USACE Contracting services are highlighted in table 86 below.

Table 86. Contracting (Schedule) HQ Successes and Challenges

| Headquarters, U.S. Army Corps of Engineers | |
|---|---|
| **Contracting (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| 1. USACE successfully completed 36 of 38 projects on-schedule (with 19 finished ahead of schedule), with 2 projects finished 1-2 days behind schedule with no impact to state requirements. | No significant observations reported. |

*Source:* Created by author.

Regarding Schedule Success #1, USACE achieved construction completion in an average duration of 18.4 days per ACF, with completion in as few as 4 days and maximum of 50 days.[6] USACE finished ahead of schedule on 19 of its 38 ACF projects.[7] USACE finished behind schedule on only 2 projects, exceeding contractual completion by 2 days for SUNY Stony Brook ACF in New York, NY with no negative impact to New York state requirements and by 1 day for St. Francis Hospital in Trenton, NJ with no negative impact to New Jersey state requirements.[8]

In terms of cost specifically, USACE as an enterprise managed total construction contract costs of $715 million, with an average cost of $18.8 million per ACF and an average cost per patient care space of $47,000.[9] The successes and challenges of the division's Contracting services are highlighted in table 87 below.

Table 87. Contracting (Cost) HQ Successes and Challenges

| Headquarters, U.S. Army Corps of Engineers | |
|---|---|
| **Contracting (Cost)** | |
| **Successes** | **Challenges/Issues** |
| No significant observations reported. | 1. Risk of sub-optimal contractor cost bids due to limited competition. |
| | 2. Articulation of "Not to Exceed" Cost to Stakeholders |

*Source:* Created by author.

Regarding Cost Challenge #1, USACE Headquarters noted the risk of sub-optimal contractor cost bids for ACF construction due to limited contractor availability—and thus limited competition. It noted that, "During a national declared emergency or pandemic it is expected that other than full and open competition requirements are likely to be instituted in order to meet the unusual and compelling urgency of some mission objectives."[10] Regarding Cost Challenge #2, USACE Headquarters noted issues with stakeholders understanding the meaning of "Not to Exceed" costs included in construction contracts. It noted that, "If scope changes occur after the contract award, the 'not to exceed' cost will no longer be accurate. Costs are based on the scope provided for contract award."[11]

## Great Lakes and Ohio River Division

Through the perspective of the Great lakes and Ohio River Division, the performance of Contracting services during COVID-19 response operations was highly successful. The division developed effective emergency contract processes that ultimately allowed it to expedite successful completion of eight ACFs, representing 5,977 patient care spaces. The division did note, however, cost concerns associated with the use of UCAs.

In terms of scope specifically, the successes and challenges of the division's Contracting services are highlighted in table 88 below.

Table 88. Contracting (Scope) LRD Successes and Challenges

| Great Lakes and Ohio River Division | |
|---|---|
| Contracting (Scope) | |
| **Successes** | **Challenges/Issues** |
| 1. Successfully executed contract award and construction oversight for 8 ACFs, providing a total of 5,977 patient care spaces. | No significant observations reported. |
| 2. Improvisation of emergency contracting systems. | |
| 3. Employment of UCAs. | |
| 4. Effective contractor selection methods. | |
| 5. Effective responses to state requests to de-scope or suspend/cancel contracts. | |
| 6. Effective staffing for construction oversight. | |

*Source:* Created by author.

Regarding Scope Success #1, the division executed successful contract award and construction oversight for 8 ACFs, providing a total of 5,977 patient care spaces.[12] Regarding Scope Success #2, the division noted its success in developing effective emergency contracting systems to address the short-duration requirements of the ACF mission. It noted, "Due to the lack of LRD experience in these rapid construction mission for FEMA, the LRD Regional Business Director led a team to determine a project delivery method. This ensured the contracting teams were prepared and leaning forward."[13] Regarding Scope Success #3, the division noted its success with the employment of UCAs. Highlighting how these contract vehicles allowed for abbreviated scope development prior to contracts beginning construction, it stated, "The use of the UCA delivery method mitigated this risk [of not including necessary scope items] by enabling all stake holders to define scope clearly by the time the contract was definitized."[14] Additionally, the division noted that, "All other acquisition alternative of fulfilling these requirements were considered, but no other alternative would allow for performance to begin immediately, as efficiently, and as tailored for each individual temporary medical facility."[15] Regarding Scope Success #4, the division noted its effective contractor selection methods: First, it employed "Market research to determine a pre-selected pool of prime contractors."[16] Then, "The selection process considered past performance efforts of the contractors thereby reducing risk of award to a firm that has less than a satisfactory history of successful performance."[17] Regarding Scope Success #5, the division noted that it responded effectively to state requests to de-scope, suspend, and/or cancel contracts. For example, when the State of Tennessee identified that its

COVID infection rate had already peaked and the under-construction Music City Center ACF in Nashville, TN would no longer be required, USACE responded quickly by canceling the contract—the very same day—to avoid unnecessary costs to the state.[18] Regarding Scope Success #6, the division highlighted its effective staffing for construction oversight through development of a "COVID Task Force" structure. It stated that, "Each mission assignment task order was assigned a 'Task Force' comprised of a lead coordinator, project manager, design lead, and construction lead with subordinate supporting staff and engineers."[19] The division noted that, "This model was chosen in order to facilitate the high demand of stakeholder coordination and integration into the decision making process in order to streamline and accommodate the time demand required to execute quickly."[20]

In terms of schedule specifically, the successes and challenges of the division's Contracting services are highlighted in table 89 below.

Table 89. Contracting (Schedule) LRD Successes and Challenges

| Great Lakes and Ohio River Division | |
|---|---|
| **Contracting (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| 1. Successfully completed all 8 projects on-schedule (with 4 ahead of schedule). | No significant observations reported. |
| 2. Regional Business Director led a team to expedite contract awards. | |
| 3. Emergency contracting vehicles expedited project delivery. | |
| 4. Mitigation of schedule risk. | |

*Source:* Created by author.

Regarding Schedule Success #1, the division achieved construction completion in an average duration of 21.1 days per ACF, with completion in as few as 10 days and no greater than 28 days.[21] The division finished on schedule for each ACF project, with 4 of its 8 ACF projects completed ahead of schedule.[22] Regarding Schedule Success #2, the division's regional business director led a team to select contracting vehicles to ensure quick contract award and project delivery. The division highlighted the effectiveness of this system by nothing that, "In this manner, the contracting teams were able to award contracts as quickly as six hours after receipt of a FEMA MA."[23] Regarding Schedule Success #3, the division noted its success employing emergency contracting vehicles to expedite project delivery. Primarily utilizing UCAs, the division stated that, "Award and construction of [surge capacity] was expedited to the greatest extent possible." The division also worked to provide "earlier deliveries of portions of the ACS projects so space could be utilized as it became available."[24] Regarding Schedule Success #4, the division noted that it was effective at mitigating schedule risk. To do this, the division focused on "Adherence to the milestone plan to mitigate risk to contract award."[25] Commenting further, the division documented that, "The COR was responsible for the coordination and monitoring of the schedule and involved all stakeholders in the process to the fullest extent. This monitoring process enabled the government to anticipate possible delays and take a proactive approach in providing an expeditious solution."[26]

In terms of cost specifically, the division managed total construction contract costs of $194 million, with an average cost of $24.24 million per ACF and an average

cost per patient care space of $32,500.[27] The successes and challenges of the division's Contracting services are highlighted in table 90 below.

Table 90. Contracting (Cost) LRD Successes and Challenges

| Great Lakes and Ohio River Division | |
|---|---|
| Contracting (Cost) | |
| **Successes** | **Challenges/Issues** |
| 1. Effective contracting protocols to ensure contract costs were fair, even while employing UCAs. | 1. UCAs carried greater risk of contract award cost estimates being inaccurate compared to final costs. |
| | 2. Irrecoverable costs from de-scoping contracts mid-execution. |

*Source:* Created by author.

Regarding Cost Success #1, the division noted that it employed effective contracting protocols to ensure contract costs were fair, even while employing emergency contracting vehicles such as UCAs. With the primary goal of "contract awards at fair and reasonable prices in response to the COVID-19 pandemic," the division stated that, "Price analysis were used to determine price reasonableness for individual contracts . . . The Government obtained appropriate data on the prices of similar medical renovations and costs to create additional temporary medical facilities."[28] Additionally, to aid in negotiations with contractors to ensure fair pricing, "independent government estimates were prepared for the cost negotiations with the general contractor at definitization."[29] These estimates were, "prepared independently, using locally obtained subcontractor quotes, expert elicitation, labor quotes, the RS MEANS database, EM 1110-2-1304 (equipment database) and Cost Engineering judgment."[30]

Regarding Cost Challenge #1, the division noted that the employment of UCAs carried high risk of construction costs ultimately exceeding contract award cost estimates. The division stated explicitly that, "Cost risk is high," considering that, "there was less time to prepare the IGE and solicit subcontractors or develop a 'bottoms up' estimates (labor, material, and equipment based on a conceptual or real design)."[31] Regarding Cost Challenge #2, the division noted that it was fully capable of supporting state requests to de-scope ACF contracts mid-execution, but these changes "impacted the sunk costs that could not be recovered."[32] As such, it became important for USACE leadership to stress the importance of making timely decisions on scope changes to avoid unnecessary costs to the state.[33] For the cancellation of the Music City Center ACF contract, as an example, over $2 million in construction costs were irrecoverable at the time of cancellation.[34]

## Mississippi Valley Division

Through the perspective of the Mississippi Valley Division, the performance of Contracting services during COVID-19 response operations was successful, with successful completion of both its ACF construction projects. Its documented challenges and issues warrant enterprise-level consideration, but ultimately these challenges were not impactful to the execution of operations.

In terms of scope specifically, the successes and challenges of the division's Contracting services are highlighted in table 91 below.

Table 91. Contracting (Scope) MVD Successes and Challenges

| Mississippi Valley Division | |
|---|---|
| **Contracting (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Successfully executed contract award and construction oversight for 2 ACFs, providing a total of 650 patient care spaces. | 1. Definitization process for UCAs. |
| 2. Effective staffing for construction oversight. | 2. Knowledge and preparedness to employ emergency contracting vehicles. |
| 3. Effective construction project kick-off. | |
| 4. Effective construction project close-out. | |
| 5. Hiring A-Es with experience constructing hospitals. | |

*Source:* Created by author.

Regarding Scope Success #1, the division executed successful contract award and construction oversight for 2 ACFs, providing a total of 650 patient care spaces.[35] Regarding Scope Success #2, the division noted that it employed effective staffing for oversight of ACF construction, specifically noting its best practice of ensuring "around the clock" coverage. The division noted that, "[Assistant Contracting Officer] should be on site each day as well as a COR for each shift. Lead Project Engineer/WA to provide communication and oversight of QAs."[36] It noted further that, based on its efforts, it recommends, "staffing 1 QA per floor depending on the size of hotel. This may be reduced to 1 per 2 floors for overnight work depending on tasks performed."[37] Regarding Scope Success #3, the division credited effective project kick-off procedures with facilitating its success in ACF operations. St. Louis District specifically ensured a "Contractor Kickoff Meeting" was conducted on site.[38] "The requirements identified during the charrette, initial scope, and lessons learned will be discussed with the contractor as well as an inspection of the site."[39] Regarding Scope Success #4, the division then credited effective project close-out as another key to success. The Memphis District noted successful project close-out for the Frank Lotter Building ACF, stating that "Through collaboration with FEMA, State, County, and City of Franklin counterparts, the team completed all inspections and acceptance documents prior to the opening ceremony."[40] Regarding Scope Success #5, the division noted its success with hiring Architect-Engineer contractors with experience constructing hospitals. The New Orleans District highlighted that, "Bringing in experienced A-Es with hospital experience allowed for quick "spin-up" . . . We also had the right people plugged into the pre-work meeting, which gave the A-Es context, training, and clear instruction."[41]

Regarding Scope Challenge #1, the division noted challenges with executing the definitization process for UCAs. Commenting on unfamiliarity with the process and the lack of established systems, the Memphis District specifically stated the need to, "Structure the definitization process more formally. Because it significantly diverges from the norm, USACE should consider a more deliberate and formal process."[42] Regarding Scope Challenge #2, the division noted that districts without an enduring Military Construction mission were not well-prepared, in terms of contracting knowledge or experience, to employ emergency contracting vehicles. The Rock Island District noted, "Adjacent Districts with MILCON missions were well-suited to respond very quickly as they had contracting instruments already developed and in place. Districts that have Civil Works missions did not have the contracting instruments in place to immediately perform

the ACF mission."[43] The division continued by stating, "USACE should regionally/nationally develop a plan for how Districts should approach sharing of these contracting assets . . . so that each District doesn't have to figure out how they would accomplish this type of mission on the fly."[44]

In terms of schedule specifically, the successes and challenges of the division's Contracting services are highlighted in table 92 below.

Table 92. Contracting (Schedule) MVD Successes and Challenges

| Mississippi Valley Division | |
|---|---|
| Contracting (Schedule) | |
| **Successes** | **Challenges/Issues** |
| 1. Successfully completed each of its 2 projects on-schedule (with 1 ahead of schedule). | No significant observations reported. |

*Source:* Created by author.

Regarding Schedule Success #1, the division achieved construction completion in an average duration of 13.5 days per ACF, with completion in as few as 10 days and no greater than 17 days.[45] The division finished on schedule for each ACF project, with 1 of its 2 ACF projects completed ahead of schedule.[46]

In terms of cost specifically, the division managed total construction contract costs of $19.37 million, with an average cost of $9.68 million per ACF and an average cost per patient care space of $29,800.[47] In terms of successes and challenges, however, the division reported no significant observations.

## North Atlantic Division

Through the perspective of the North Atlantic Division, the performance of Contracting services during COVID-19 response operations was extremely successful. The division pioneered enterprise emergency contracting methods to enable expedited delivery of 11 ACFs and 5,326 patient care spaces. With that said, the division observed and documented numerous challenges and issues that warrant enterprise attention and solutions.

In terms of scope specifically, the successes and challenges of the division's Contracting services are highlighted in table 93 below.

Table 93. Contracting (Scope) NAD Successes and Challenges

| North Atlantic Division | |
|---|---|
| **Contracting (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Successfully executed contract award and construction oversight for 11 ACFs, providing a total of 5,326 patient care spaces. | 1. Enterprise-level guidance on acquisition strategy and contracting vehicles. |
| 2. Pioneered "Expeditionary Contracting" to achieve state requirements for expedited project delivery. | 2. Not all Contracting Officers trained or experienced with emergency contracting. |
| 3. Leveraged expansive suite of emergency contracting vehicles. | 3. Evaluating contractors with limited time available. |
| 4. Effective responses to state requests to de-scope or suspend/cancel contracts. | 4. Project close-out complicated by defining transition from Construction phase to Operations and Maintenance phase. |
| 5. Established a COVID-19 Contracting SharePoint repository that was leveraged by adjacent USACE divisions. | 5. State preference for use of local contractors. |
| 6. Supported USACE-enterprise Knowledge Sharing calls to integrate and synchronize Contracting techniques. | 6. Continuous improvements required regarding specific Contracting practices and considerations. |

*Source:* Created by author.

Regarding Scope Success #1, the division executed successful contract award and construction oversight for 11 ACFs, providing a total of 5,326 patient care spaces.[48] Regarding Scope Success #2, the division noted that it pioneered COVID-19 ACF emergency contracting solutions for the USACE enterprise. The New York District in particular noted that it had "no experience/guidance for awarding emergency contracts in a pandemic."[49] Still, the district "established procedures for expediting contract time frames, received multiple waivers for normal contract procedures, and did all of this successfully in a virtual/maximum telework environment."[50] The district, collaborating with the USACE Headquarters Procurement Office of Counsel, pioneered the specific contracting vehicle that would become known simply as the "Undefinitized Contract Action" during operations.[51] Regarding Scope Success #3, the division leveraged the expansive suite of emergency contracting vehicles available across the USACE enterprise. The use of the Undefinitized Contract Action was of course prevalent, with the division noting that it "allowed for relatively quick and flexible contracting actions."[52] The division also noted consideration of the LOGCAP instrument, which it described as "a pre-existing Army Contracting Tool which USACE can utilize, as it is operated by the Army Sustainment Command (ASC) with the authority of Army G4."[53] It further noted that, "The contracting tool enables immediate execution, with prime and sub-contractors in place and provides capability to quickly get a workforce on site to scope site requirements."[54] Additionally, the division noted the success of the Rapid Disaster Infrastructure instrument as "an existing contracting tool managed at the Omaha District and is available to USACE Districts."[55] Regarding Scope Success #4, the division noted the quick execution of de-scoping for the Washington, D.C. Convention Center ACF, upon request.[56] Regarding Scope Success #5, the division, "established a SharePoint site that had samples of all the documents used to get these contracts approved that other Districts have used and that we can use in the future for any other catastrophic events."[57] Regarding Scope Success #6, the division noted the, "Immediate need for oral communication with MSC and Districts."[58] As a result, it provided significant support to the USACE-enterprise "Knowledge Sharing" conference calls, with contributions by its "District Contracting [Subject Matter Experts]" and the "NAD Chief of Contracting."[59]

Regarding Scope Challenge #1, the division noted that "HQ/MSC buy-in on procurement method" would be beneficial for any future pandemic response operations requiring contracting services.[60] The division—and other divisions—developed effective systems and leveraged existing USACE contracting vehicles towards the ACF mission set, but these were "ground-up" field-expedient solutions without significant USACE Headquarters guidance or direction. Regarding Scope Challenge #2, the division emphasized that not all Contracting Officers were trained or experienced with emergency contracting. In fact, the lack of familiarity by some Contracting Officers towards emergency contracting mechanisms resulted in inappropriate "time restrictions for expending funds. The timeline for the contractor to place enough work expend all the funds does not allow for any float to the schedule."[61] The division noted that many Contracting Officers required additional training on "emergency contracting procedures and requirements."[62] Regarding Scope Challenge #3, the division noted challenges with evaluating contractors for ACF construction with such limited time available. It stated, "Collecting past performance information for Contractors to submit with their proposal within a 24 hour period was a difficult task of proposed Contractors."[63] Additionally, the division noted that, "Usually contractors send out past performance questionnaires to their customers to fill out . . . During this quick Contractor response period, it was not possible to complete such an in-depth past performance collection and review."[64] Regarding Scope Challenge #4, the division noted that project close-out was complicated by poorly defined requirements for transition from Construction phase to Operations and Maintenance phase.[65] It stated that these issues included leased equipment needing to be demobilized and FEMA/state-purchased equipment needing to be formally transferred.[66] Regarding Scope Challenge #5, the division noted the preference of states for using local contractors for ACF construction. Baltimore District, for example, noted that for potential ACF build-outs in Maryland, the "State wants to use local state contractors to greatest extent possible."[67] This is not necessarily a problem for USACE as the use of local contractors is authorized and occasionally mandated by rule, but it does represent a challenge to be addressed and managed because preferred local contractors may not meet federal and/or USACE requirements and qualifications. Regarding Scope Challenge #6, the division maintained a running list of Contracting considerations that were identified (and often immediately rectified/improved) during the course of operations. These considerations included the best practice of mandating "CORs to document activity with photos and video for future reference."[68]

In terms of schedule specifically, the successes and challenges of the division's Contracting services are highlighted in table 94 below.

Table 94. Contracting (Schedule) NAD Successes and Challenges

| **North Atlantic Division** | |
|---|---|
| **Contracting (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| 1. Successfully completed 9 of 11 projects on-schedule (with 3 finished ahead of schedule), with 2 projects finished 1-2 days behind schedule with no impact to state requirements. | 1. Rights of Entry requirements risked delays to ACF schedule. |
| 2. Emergency contracting vehicles expedited project delivery. | |

*Source:* Created by author.

Regarding Schedule Success #1, the division achieved construction completion in an average duration of 20.0 days per ACF, with completion in as few as 12 days and maximum of 29 days.[69] The division finished ahead of schedule on 3 of its 11 ACF projects.[70] The division finished behind schedule on 2 projects, exceeding contractual completion by 2 days for SUNY Stony Brook ACF in New York, NY with no negative impact to New York state requirements and by 1 day for St. Francis Hospital in Trenton, NJ with no negative impact to New Jersey state requirements.[71] Regarding Schedule Success #2, the New York District noted that the use of emergency contract vehicles, "expedited contract timeframes."[72] It noted that, in one instance, it "awarded a contract in 3 days that would normally take at least 180 days."[73] When developing the UCA vehicle early in COVID-19 emergency operations, the division noted that it, "allows for a much shorter acquisition duration. Considering the significant increase of infected individuals with COVID-19, any time savings is critical."[74]

Regarding Schedule Challenge #1, the division noted that USACE real estate personnel required additional training to understand the requirements of real estate in emergency contracting. Specifically, the division commented that USACE, "Must have real estate and right of entry agreements before construction but cannot begin executing work prior to mission assignment and funds authority."[75] It further noted that real estate personnel must "understand work in emergency response needs to be expedited, completed in hours not days."[76]

In terms of cost specifically, the division managed total construction contract costs of $389 million, with an average cost of $35.40 million per ACF and an average cost per patient care space of $73,000.[77] The successes and challenges of the division's Contracting services are highlighted in table 95 below.

Table 95. Contracting (Cost) NAD Successes and Challenges

| North Atlantic Division | |
|---|---|
| **Contracting (Cost)** | |
| **Successes** | **Challenges/Issues** |
| 1. Sharing of ACF parametric cost data and best practices within division and across the USACE-enterprise. | 1. UCAs carried greater risk of contract award cost estimates being inaccurate compared to final costs. |
| | 2. Cost of construction contract noted as one of state justifications for potentially choosing not to award construction contract through USACE. |

*Source:* Created by author.

Regarding Cost Success #1, the New England District reported that the division was, "very helpful in refining cost estimate templates for others to develop . . . IGEs. These estimates, along with lessons learned from those who have gone through construction and are starting to go through the definitization process, are also being posted online."[78] The division noted further that, "All of this information is being shared across USACE via the TRACES (Tri-Service Automated Cost Engineering System) portal and is specific to the Cost Community of Practice."[79]

Regarding Cost Challenge #1, the division noted that, with the risk of increased construction costs inherent to the UCA vehicle, a required improvement is to, "Ensure cost engineering is fully engaged in the ACF process as projects move from assessment

and into construction."[80] The division additionally recommended that it should, "Consider EVM Management practices for UCA contract actions."[81] Regarding Cost Challenge #2, the Baltimore District documented that three states in its area of responsibility had conducted site assessments and site-specific Engineering and Design but were waiting to decide on "either state contract build out or USACE build out to be determined after Design/PWS and cost estimates are provided."[82] Although this is certainly not explicit, the fact that "cost estimates" were a noted consideration for whether to contract with USACE or construct independently communicates that the costs of USACE construction contracts were a state concern.

## Northwestern Division

Through the perspective of the Northwestern Division, the performance of Contracting services during COVID-19 response operations was successful, with no documented challenges or issues.

In terms of scope specifically, the successes and challenges of the division's Contracting services are highlighted in table 96 below.

Table 96. Contracting (Scope) NWD Successes and Challenges

| **Northwestern Division** | |
|---|---|
| **Contracting (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Successfully executed contract award and construction oversight for 3 ACFs, providing a total of 260 patient care spaces. | No significant observations reported. |
| 2. Employment of Rapid Disaster Infrastructure contracting vehicle. | |

*Source:* Created by author.

Regarding Scope Success #1, the division executed successful contract award and construction oversight for 3 ACFs, providing a total of 260 patient care spaces.[83] Regarding Scope Success #2, the division successfully leveraged the Omaha District's "Rapid Disaster Infrastructure" contract vehicle to expedite its ACF construction contracts. The division noted, "The [Omaha District's] Rapid Disaster Infrastructure contract proved to be a valuable tool to construct temporary facilities in a timely manner. Without this tool, many of the projects in NWD and SPD would have taken significantly longer to construct."[84]

In terms of schedule specifically, the successes and challenges of the division's Contracting services are highlighted in table 97 below.

Table 97. Contracting (Schedule) NWD Successes and Challenges

| **Northwestern Division** | |
|---|---|
| **Contracting (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| 1. Successfully completed all 3 of its projects ahead of schedule. | No significant observations reported. |

*Source:* Created by author.

Regarding Schedule Success #1, the division achieved construction completion in an average duration of 17 days per ACF, with completion in as few as 4 days and no greater than 26 days.[85] The division finished on schedule for each ACF project, with 3 of its 3 ACF projects completed ahead of schedule.[86]

In terms of cost specifically, the division managed total construction contract costs of $6.1 million, with an average cost of $2.04 million per ACF and an average cost per patient care space of $23,500.[87] In terms of successes and challenges, however, the division reported no significant observations.

## Pacific Ocean Division

Through the perspective of the Pacific Ocean Division, the performance of Contracting services during COVID-19 response operations was successful, with no documented challenges or issues.

In terms of scope specifically, the successes and challenges of the division's Contracting services are highlighted in table 98 below.

Table 98. Contracting (Scope) POD Successes and Challenges

| Pacific Ocean Division | |
|---|---|
| **Contracting (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Successfully executed contract award and construction oversight for 1 ACF, providing a total of 51 patient care spaces. | No significant observations reported. |

*Source:* Created by author.

Regarding Scope Success #1, the division executed successful contract award and construction oversight for one ACF, providing a total of 51 patient care spaces.[88]

In terms of schedule specifically, the successes and challenges of the division's Contracting services are highlighted in table 99 below.

Table 99. Contracting (Schedule) POD Successes and Challenges

| Pacific Ocean Division | |
|---|---|
| **Contracting (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| 1. Successfully completed its ACF project on-schedule. | No significant observations reported. |

*Source:* Created by author.

Regarding Schedule Success #1, the division achieved construction completion in 9 days, finishing on schedule.[89]

In terms of cost specifically, the division managed total construction contract costs of $1.26 million, with an average cost per patient care space of $24,700.[90] In terms of successes and challenges, however, the division reported no significant observations.

## South Atlantic Division

Through the perspective of the South Atlantic Division, the performance of Contracting services during COVID-19 response operations was successful, with its two

state-requested ACF projects completed ahead of schedule and no documented challenges or issues.

In terms of scope specifically, the successes and challenges of the division's Contracting services are highlighted in table 100 below.

Table 100. Contracting (Scope) SAD Successes and Challenges

| South Atlantic Division | |
|---|---|
| **Contracting (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Successfully executed contract award and construction oversight for 2 ACFs, providing a total of 474 patient care spaces. | No significant observations reported. |
| 2. Leveraged USACE-enterprise Knowledge Sharing calls to integrate and synchronize Contracting techniques. | |

*Source:* Created by author.

Regarding Scope Success #1, the division executed successful contract award and construction oversight for 2 ACFs, providing a total of 474 patient care spaces.[91] Regarding Scope Success #2, the division successfully leveraged USACE enterprise "Knowledge Sharing" calls to increase its capability, noting that it developed "contracting solutions based on lessons learned from NAD and SPD."[92]

In terms of schedule specifically, the successes and challenges of the division's Contracting services are highlighted in table 101 below.

Table 101. Contracting (Schedule) SAD Successes and Challenges

| South Atlantic Division | |
|---|---|
| **Contracting (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| 1. Successfully completed each of its 2 projects ahead of schedule. | No significant observations reported. |

*Source:* Created by author.

Regarding Schedule Success #1, the division achieved construction completion in an average duration of 13.5 days per ACF, with completion in as few as 12 days and no greater than 15 days.[93] The division finished on schedule for each ACF project, with 2 of its 2 ACF projects completed ahead of schedule.[94]

In terms of cost specifically, the division managed total construction contract costs of $32.34 million, with an average cost of $16.2 million per ACF and an average cost per patient care space of $68,200.[95] In terms of successes and challenges, however, the division reported no significant observations.

## South Pacific Division

Through the perspective of the South Pacific Division, the performance of Contracting services during COVID-19 response operations was highly successful. The division expedited successful completion of eight ACFs, representing 2,285 patient care spaces. The division did note, however, cost concerns associated with the use of UCAs.

In terms of scope specifically, the successes and challenges of the division's Contracting services are highlighted in table 102 below.

Table 102. Contracting (Scope) SPD Successes and Challenges

| South Pacific Division | |
|---|---|
| **Contracting (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Successfully executed contract award and construction oversight for 8 ACFs, providing a total of 2,285 patient care spaces. | 1. Knowledge and preparedness to employ emergency contracting vehicles. |
| 2. Leveraged expansive suite of emergency contracting vehicles. | 2. Continuous improvements required regarding specific Contracting practices and considerations. |
| 3. Leveraged Local 8(a) contractors. | |
| 4. Effective responses to state requests to de-scope or suspend/cancel contracts. | |
| 5. Leveraged USACE-enterprise knowledge sharing of emergency contracting best practices. | |

*Source:* Created by author.

Regarding Scope Success #1, the division executed successful contract award and construction oversight for 8 ACFs, providing a total of 2,285 patient care spaces.[96] Regarding Scope Success #2, the division noted that USACE's "expansive contracting toolkit provided many good options for states, FEMA."[97] Employing UCAs, the division noted that, "This strategy allowed the contracts to be issues and the Contractor to begin work quickly. It also allowed USACE, the State, and the Contractor the flexibility to adjust the contract deliverables as requirements and available materials changed in a dynamic emergency environment."[98] Employing the Rapid Disaster Infrastructure contracting vehicle, the division noted that the Los Angeles District, "leveraged the RDI Contract Vehicle from Omaha District to executed the lone construction contract for St. Luke's Hospital in Phoenix. Overall, this contract vehicle worked well."[99] Regarding Scope Success #3, the division noted that, for operations in New Mexico, it "used local 8(a) contractors to execute the two ACFs for NM and the two ACFs for Navajo Nation. The local 8(a) contractors had the experience working with the Resident Office, had access to local subcontractors and vendors, had the ability to quickly definitize the UCA, and were successful in the execution of the work."[100] Regarding Scope Success #4, the division stated that it successfully de-scoped the Denver Convention Center ACF from 2,000 spaces to 1,200 spaces and the Laramie County Ranch Complex ACF from 1,600 spaces to 200 spaces, in response to state requests.[101] Regarding Scope Success #5, the Albuquerque District in particular noted that, "At the outset of the effort to award contracts for emergency Alternate Care Facilities, HQ did an excellent job of disseminating information after-the-fact about the contracting method chosen for the first project at the Javits Center."[102] The Sacramento District likewise noted that, "From the beginning of the pandemic, Headquarters USACE began sharing information and training materials for how to complete Undefinitized Contract Actions (UCAs), Centers of Excellence (COE) lessons learned, as well as tools available for rapid response."[103]

Regarding Scope Challenge #1, the division stated that, despite USACE enterprise distribution of contracting solutions during emergency response, "this was the first that Districts not working on [the Javits Center ACF] learned not only about that newly

developed emergency contracting method, but also about other existing already awarded MATOCs at Omaha District and Huntsville District that could also have been used for the effort."[104] Regarding Scope Challenge #2, the division maintained a running list of Contracting considerations that were identified (and often immediately rectified/improved) during the course of operations. One such comment was the best practice that, "All relevant parties participate in the early engagement teleconferences with customers."[105]

In terms of schedule specifically, the successes and challenges of the division's Contracting services are highlighted in table 103 below.

Table 103. Contracting (Schedule) SPD Successes and Challenges

| South Pacific Division | |
|---|---|
| **Contracting (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| 1. Successfully completed all 8 projects on-schedule (with 4 ahead of schedule). | 1. Rights of Entry requirements risked delays to ACF schedule. |
| 2. Emergency contracting vehicles expedited project delivery. | 2. Initial construction oversight staffing not sufficient to support short duration project delivery timeline. |

*Source:* Created by author.

Regarding Schedule Success #1, the division achieved construction completion in an average duration of 19.75 days per ACF, with completion in as few as 14 days and no greater than 50 days.[106] The division finished on schedule for each ACF project, with 4 of its 8 ACF projects completed ahead of schedule.[107] Regarding Schedule Success #2, the Sacramento District noted that emergency contracting vehicles such as the Rapid Disaster Infrastructure tool "allowed for rapid responses."[108] Of UCAs, it additionally emphasized that it could complete "award of sole-source Undefinitized Contract Actions (UCA) in days."[109]

Regarding Schedule Challenge #1, the division documented that, when contracting for the Porterville ACF, USACE real estate personnel, "didn't appear to understand the procedures for obtaining the proper ROE for this facility. Once CT raised the flag, OC and RE worked together to develop a process to allow CT to award a contract."[110] Regarding Schedule Challenge #2, the division noted that, for the Porterville ACF, "Initially a COR wasn't going to be on site full time. Having 3 QA, a full time COR, and a dedicated ACO is crucial for a short POP of 14 days."[111]

In terms of cost specifically, the division managed total construction contract costs of $63 million, with an average cost of $7.87 million per ACF and an average cost per patient care space of $27,500.[112] The successes and challenges of the division's Contracting services are highlighted in table 104 below.

Table 104. Contracting (Cost) SPD Successes and Challenges

| South Pacific Division | |
|---|---|
| **Contracting (Cost)** | |
| **Successes** | **Challenges/Issues** |
| No significant observations reported. | 1. Cost of construction contract noted as one of state justifications for reducing scope of ACF. |
| | 2. Managing state expectations on risk of construction cost increases as compared to the contract award estimate. |
| | 3. UCAs carried greater risk of contract award cost estimates being inaccurate compared to final costs. |

*Source:* Created by author.

Regarding Cost Challenge #1, the division observed that cost of construction was a factor in states reducing scope for ACFs. For the Laramie Country Ranch Complex ACF, the Albuquerque District noted that "reducing immediate costs" was a partial factor in reducing the scope of the ACF from 1,600 patient care spaces to approximately 200 patient care spaces. Regarding Cost Challenge #2, the division noted issues with managing state expectations of the risk of contract-award cost estimates increasing during construction. The division noted that states, "were provided Current Working Estimates (CWEs) throughout the process, but several customers did not realize that these estimates could change and that they were likely to increase as more issues and challenges were discovered by both USACE and contractors."[113] Additionally, the division noted that, "We need to convey to the customer the costs of the acquisition tool selected and that for an undefinitized contract costs are likely to increase once the contractor makes a full investigation of the facility."[114] Regarding Cost Challenge #3, the division noted that, although UCAs facilitate expedited project delivery, "the costs of the selected acquisition tools may increase once a contractor is on site and conducts a full site investigation."[115] The division further noted that the contract-award cost estimate, "could change dramatically once a contractor assesses the need more fully with the proposed design and Performance Work Statement."[116]

## Southwestern Division

Through the perspective of the Southwestern Division, the performance of Contracting services during COVID-19 response operations was successful, with only a minor challenge noted.

In terms of scope specifically, the successes and challenges of the division's Contracting services are highlighted in table 105 below.

Table 105. Contracting (Scope) SWD Successes and Challenges

| Southwestern Division | |
|---|---|
| **Contracting (Scope)** | |
| **Successes** | **Challenges/Issues** |
| 1. Successfully executed contract award and construction oversight for 3 ACFs, providing a total of 243 patient care spaces. | 1. State preference for local contractors. |

*Source:* Created by author.

Regarding Scope Success #1, the division executed successful contract award and construction oversight for 3 ACFs, providing a total of 243 patient care spaces.[117]

Regarding Scope Challenge #1, the division noted the preference by states for using local contractors for ACF construction. The Tulsa District reported on 22 April 2020 that, for the OSU Medical Center in Tulsa, OK and Integris Baptist Portland Campus in Oklahoma City, OK, "It is anticipated that State representatives will request to see who the contractors bidding on the contract will be . . . They have expressed a desire to include in-state construction companies during the bidding process if possible."[118] This is not necessarily a problem for USACE as the use of local contractors is authorized and occasionally mandated by rule, but it does represent a challenge to be addressed and managed because preferred local contractors may not meet federal and/or USACE requirements and qualifications.

In terms of schedule specifically, the successes and challenges of the division's Contracting services are highlighted in table 106 below.

Table 106. Contracting (Schedule) SWD Successes and Challenges

| **Southwestern Division** | |
|---|---|
| **Contracting (Schedule)** | |
| **Successes** | **Challenges/Issues** |
| 1. Successfully completed all 3 projects on-schedule (with 2 ahead of schedule). | No significant observations reported. |

*Source:* Created by author.

Regarding Schedule Success #1, the division achieved construction completion in an average duration of 12.3 days per ACF, with completion in as few as 11 days and no greater than 14 days.[119] The division finished on schedule for each ACF project, with 2 of its 3 ACF projects completed ahead of schedule.[120]

In terms of cost specifically, the division managed total construction contract costs of $9.70 million, with an average cost of $3.23 million per ACF and an average cost per patient care space of $39,900.[121] In terms of successes and challenges, however, the division reported no significant observations.

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[1] USACE, *COVID-19 Pandemic: Final After Action Report, 31 July 2020*, F-1 – F-39.

[2] Ibid., K-1-3.

[3] Ibid., 32.

[4] Ibid.

[5] Ibid., 98.

[6] Ibid., F-1 – F-39

[7] Ibid.

[8] Ibid.

[9] Ibid.

[10] Ibid., K-10.

[11] Ibid., 98.

[12] Ibid., F-1 – F-39

[13] Great Lakes and Ohio River Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," 6.

[14] Ibid., 29-30.

[15] Ibid., 33.

[16] Ibid., 18.

[17] Ibid., 36.

[18] Ibid., 7.

[19] Ibid., 21.

[20] Ibid.

[21] USACE , *COVID-19 Pandemic: Final After Action Report, 31 July 2020*, F-1 – F-39.

[22] Ibid.

[23] Great Lakes and Ohio River Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," 6.

[24] Ibid., 34.

[25] Ibid., 36.

[26] Ibid.

[27] USACE, *COVID-19 Pandemic: Final After Action Report, 31 July 2020*, F-1 – F-39.

[28] Great Lakes and Ohio River Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," 35.

[29] Ibid., 29-30.

[30] Ibid.

[31] Ibid., 30.

[32] Ibid., 49.

[33] Ibid.

[34] USACE, *COVID-19 Pandemic: Final After Action Report, 31 July 2020*, 45.

[35] Ibid., F-1 – F-39.

[36] St. Louis District, Mississippi Valley Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," 30.

[37] Ibid.

[38] Ibid.

[39] Ibid.

[40] Memphis District, Mississippi Valley Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," 43.

[41] New Orleans District, Mississippi Valley Division, "COVID-19 Pandemic: After Action Report, 26 June 2020," 86.

[42] Memphis District, Mississippi Valley Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," 41.

[43] Rock Island District, Mississippi Valley Division, "COVID-19: MVR Regional AAR Comments, 23 April 2020," 4.

[44] Ibid.

[45] USACE, *COVID-19 Pandemic: Final After Action Report, 31 July 2020*, F-1 – F-39.

[46] Ibid.

[47] Ibid.

[48] Ibid.

[49] New York District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," G-5.

[50] Ibid.

[51] North Atlantic Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," F-1-3.

[52] New York District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," F-3.

[53] Ibid., G-15.

[54] Ibid.

[55] Ibid.

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[57] New York District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," G-14.

[58] North Atlantic Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," F-1-2.

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[60] New York District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," G-5.

[61] North Atlantic Division, "COVID-19 Pandemic: After Action Report, 07 July 2020," F-7-19.

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[63] Ibid., F-6-2.

[64] Ibid.

[65] New York District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," G-15.

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[72] New York District, North Atlantic Division, "COVID-19 Pandemic: After Action Report, 23 June 2020," G-5.

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[103] Sacramento District, South Pacific Division, "COVID-19 Pandemic: After Action Report, 20 June 2020," 538.

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