Final Environmental Assessment

for the

Grace Hopper Bridge Embankment Repairs at Joint Base Charleston – Weapons Station

United States Air Force

Prepared for Department of the Air Force
Joint Base Charleston, South Carolina

May 2015

Report Documentation Page

Form Approved
OMB No. 0704-0188

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
06 JUL 2015	**Environmental Assessment**	**00-00-2012 to 00-00-2015**

4. TITLE AND SUBTITLE	5a. CONTRACT NUMBER
Final Environmental Assessment for the Grace Hopper Bridge Embankment Repairs at Joint Base Charleston Weapons Station, South Carolina	5b. GRANT NUMBER
	5c. PROGRAM ELEMENT NUMBER
6. AUTHOR(S)	5d. PROJECT NUMBER
	5e. TASK NUMBER
	5f. WORK UNIT NUMBER
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) **Untied States Air Force,Joint Base Charleston,Goose Creek,SC,29445**	8. PERFORMING ORGANIZATION REPORT NUMBER
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)
	11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION/AVAILABILITY STATEMENT
Approved for public release; distribution unlimited

13. SUPPLEMENTARY NOTES

14. ABSTRACT
Final Environmental Assessment for the Grace Hopper Bridge Embankment Repairs at Joint Base Charleston Weapons Station, South Carolina

15. SUBJECT TERMS

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON
a. REPORT	b. ABSTRACT	c. THIS PAGE			
unclassified	**unclassified**	**unclassified**	**Same as Report (SAR)**	**158**	

FINAL FINDING OF NO SIGNIFICANT IMPACT

and

FINDING OF NO PRACTICABLE ALTERNATIVE

Environmental Assessment for the Grace Hopper Bridge Embankment Repairs

Joint Base Charleston Weapons Station, South Carolina

Federal actions that potentially involve significant impacts on the environment must be reviewed in accordance with the National Environmental Policy Act (NEPA) and all other applicable laws. The United States Air Force (USAF) has completed an Environmental Assessment (EA) to address the potential environmental consequences associated with providing erosion protection for the Grace Hopper Bridge at Joint Base Charleston (JB CHS) Weapons Station (JB CHS-WS).

The Proposed Action is to provide erosion protection for the Grace Hopper Bridge from the eastward lateral migration of the stream channel along the east bank of Goose Creek. Repair is needed to prevent future erosion, as continued erosion could undermine the bridge abutments and ultimately cause the bridge to fail. The Proposed Action would stabilize the stream bank and provide protection to the embankment, which would prevent further degradation of the embankment. If the Grace Hopper Bridge were to be closed, an 8-mile detour would be required, which would result in increased traffic through other parts of JB CHS, increased fuel consumption and associated vehicle emissions, and increased costs for transport operations. There are no wetlands within the disturbance area of the Proposed Action, but work would occur within Goose Creek.

Three alternatives (Alternative 1, Alternative 2, and Alternative 3) determined to be reasonable and to meet the project objectives, along with the No Action Alternative that would not implement the Proposed Action, have been reviewed in accordance with NEPA as implemented by the regulations of the Council of Environmental Quality (CEQ) and USAF regulations in 32 Code of Federal Regulations (CFR) 989, Environmental Impact Analysis Process (EIAP). The analyses focus on the following environmental resources: noise, land use, air quality, geological resources, water resources, biological resources, cultural resources, socioeconomic resources and environmental justice, infrastructure, hazardous materials and waste, and safety. Details of the potential environmental consequences can be found in the attached EA.

Public Review and Comment

The NEPA process is designed to involve the public in the federal decision-making process. Formal notification and opportunities for public participation were provided during the preparation of this EA. Formal and informal coordination and consultation with government agencies and planners was also conducted.

The Draft EA and the Draft Finding of No Significant Impact (FONSI)/Finding of No Practicable Alternative (FONPA) were provided to federal, state, and local officials and other interested parties as identified in Appendix B of the EA. The Draft EA and the Draft FONSI/FONPA were made available for public review during 30-day comment periods at the Naval Support Activity Branch Library in Goose Creek, South Carolina and on the Joint Base Charleston public website. All relevant comments from the public and othergovernment agencies were addressed in the Final EA and this FONSI/ FONPA.

Finding of No Practicable Alternative

Executive Order (EO) 11988, *Floodplain Management* (24 May 1977), requires Federal agencies to avoid to the maximum extent possible the long and short-term impacts associated with occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development if there is a practicable alternative. If it is found that there is no practicable alternative, the agency must minimize potential harm to the floodplain and circulate a notice explaining why the action is to be located in the floodplain prior to taking action. Finally, new construction in a floodplain must apply accepted flood-proofing and flood protection to include elevating structures above the base flood level rather than filling in land.

As noted in the attached EA, the Proposed Action will construct erosion protection for the Grace Hopper Bridge in the 100-year floodplain. As stated in the attached EA, practicable alternatives that would avoid work in the floodplain are not available for protection of the Grace Hopper Bridge. There would be no additional encroachment into the floodplain beyond what is necessary to provide adequate erosion protection. Impacts from constructing the Grace Hopper Bridge protection in a floodplain would be negligible to minor.

Pursuant to EO 11988, *Floodplain Management*, and the authority delegated by the Secretary of the Air Force Order 791.1, *Environment*, and taking the previous information in account, I find that there is no practicable alternative for the Proposed Action.

Finding of No Significant Impact

Based on the information and analysis presented in the EA conducted in accordance with the requirements of the NEPA, the CEQ regulations, and the USAF regulations as set forth in 32 CFR 989, (EIAP), as amended, and after a review of the agency comments submitted during the 30-day public comment period, I conclude that implementation of the Proposed Action, under any of the considered alternatives, will not have a significant impact on the quality of the human and natural environment and, therefore, an Environmental Impact Statement is not warranted. This decision has been made after taking into account all the submitted information, and after considering a full range of practicable alternatives that will meet project requirements and are within the legal authority of the USAF.

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Date

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Acronyms and Abbreviations

$\mu g/m^3$	microgram per cubic meter
ACAM	Air Force's Air Conformity Applicability Model
AICUZ	Air Installation Compatible Use Zone
AQCR	Air Quality Control Region
bgs	below ground surface
BMP	best management practice
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	*Code of Federal Regulations*
CO	carbon monoxide
CO_2	carbon dioxide
CO_{2e}	carbon dioxide equivalent
dB	decibel
dBA	A-weighted decibel
EA	Environmental Assessment
EFH	Essential Fish Habitat
FONPA	Finding of No Practicable Alternative
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act of 1981
GHG	greenhouse gases
JB CHS	Joint Base Charleston
JB CHS-WS	Joint Base Charleston Weapons Station
JD	Jurisdictional Determination
NA	not applicable
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NO_2	nitrogen dioxide
NO_x	nitrous oxide
NOA	Notice of Availability

NOAA	National Oceanic and Atmospheric Administration
NMFS	National Marine Fisheries Service
NRCS	Natural Resources Conservation Service
O_3	ozone
$PM_{2.5}$	particulate matter equal to or less than 2.5 microns in diameter
PM_{10}	particulate matter equal to or less than 10 microns in diameter
ppm	part per million
RCW	red-cockaded woodpecker
SAFMC	South Atlantic Fishery Management Council
SCDHEC	South Carolina Department of Health and Environmental Control
SCDNR	South Carolina Department of Natural Resources
SIP	State Implementation Plan
SO_2	sulfur dioxide
SPCCP	Spill Prevention, Control, and Countermeasures Plan
SSPP	Strategic Sustainability Performance Plan
SWMU	solid waste management unit
tpy	tons per year
USAF	United States Air Force
USEPA	United States Environmental Protection Agency
VOC	volatile organic compound

1.0 Purpose of and Need for Proposed Action

1.1 Background

Joint Base Charleston (JB CHS) is in the City of North Charleston in Charleston County, South Carolina, approximately 10 miles northwest of the City of Charleston. JB CHS consists of the JB CHS Air Base and Joint Base Charleston Weapons Station (JB CHS-WS) in Berkeley County, and the North Auxiliary Air Field in Orangeburg County.

JB CHS-WS is located along the Cooper River and is bisected by Foster Creek to the north and Goose Creek to the south (Figure 1-1). Some of the primary uses of JB CHS-WS include support of numerous tenant commands, including: Space and Naval Warfare Systems Command, Naval Consolidated Brig, Nuclear Power Training Unit, Naval Nuclear Power Training Command, Army Strategic Logistics Activity, and the Navy Munitions Command. Wilkinson Way is a main transportation route to the South Annex section of JB CHS-WS, and crosses Goose Creek within JB CHS-WS via the Grace Hopper Bridge (Bridge #2328).

Over time, the east embankment of the bridge has eroded, which has been monitored by JB CHS-WS. Results of inspections by the Naval Facilities Engineering Command indicated that the channel of Goose Creek was migrating laterally, causing erosion at the east embankment (Appendix A). This erosion has resulted in vertical cuts in the embankment and the undercutting of vegetation on the banks upstream and downstream of the bridge. The east embankment continues to erode due to stream and tidal flows, as well as wave action from wind and boat traffic.

1.2 Purpose of the Proposed Action

The purpose of the Proposed Action is to provide erosion protection for the Grace Hopper Bridge from the eastward lateral migration of the stream channel along the east bank of Goose Creek.

1.3 Need for the Proposed Action

Due to lateral migration of the channel, erosion along the east embankment has created vertical cuts in the embankment and the undercutting of vegetation upstream and downstream of the bridge. The east embankment continues to erode due to stream and tidal flows and wave action. Repair is needed to prevent further erosion, as continued erosion could undermine the bridge abutments and ultimately cause the bridge to fail. The Proposed Action would stabilize the stream bank and provide protection to the embankment, which would prevent further degradation of the embankment. If the Grace Hopper Bridge were to be closed, an 8-mile detour would be required, which would result in increased traffic through other parts of JB CHS, increased fuel consumption and associated vehicle emissions, and increased costs for transport operations. Appendix A provides the Engineering Study/Design.

1.4 Location of the Proposed Action

The Proposed Action would be located at the east embankment of Goose Creek at the Grace Hopper Bridge on Wilkinson Way in Berkeley County, South Carolina, within the boundaries of JB CHS-WS (Figure 1-2). There are no wetlands within the disturbance area of the Proposed Action, but work would occur within Goose Creek.

1.5 Public and Agency Involvement

The United States Air Force (USAF) provided initial scoping letters to federal and state agencies, and other interested parties on July 17, 2014 (Appendix B). These letters requested that any issues or concerns relevant to the Proposed Action be provided prior to completion of the Draft Environmental Assessment (EA). Each letter also included a notification that recipients could continue to comment throughout the development of the EA and during the public review period. Comments received in response to the initial scoping letters are provided in Appendix B. As appropriate, scoping comments have been addressed in this EA. JB CHS executed consultations with applicable Native American tribes and federal/state natural/cultural resource trustee agencies (Appendices B and D).

The USAF published a NOA for the draft EA Finding of No Significant Impact (FONSI)/Finding of No Practicable Alternative (FONPA) for this Proposed Action in the *Charleston Post and Courier*. The public comment period lasted 30 days. Copies of the draft EA and FONSI/FONPA were sent to federal, state, local agencies, and Native American tribes that responded to the scoping letter. The NOA, distribution list, comments received, and responses to comments are provided in Appendix B.

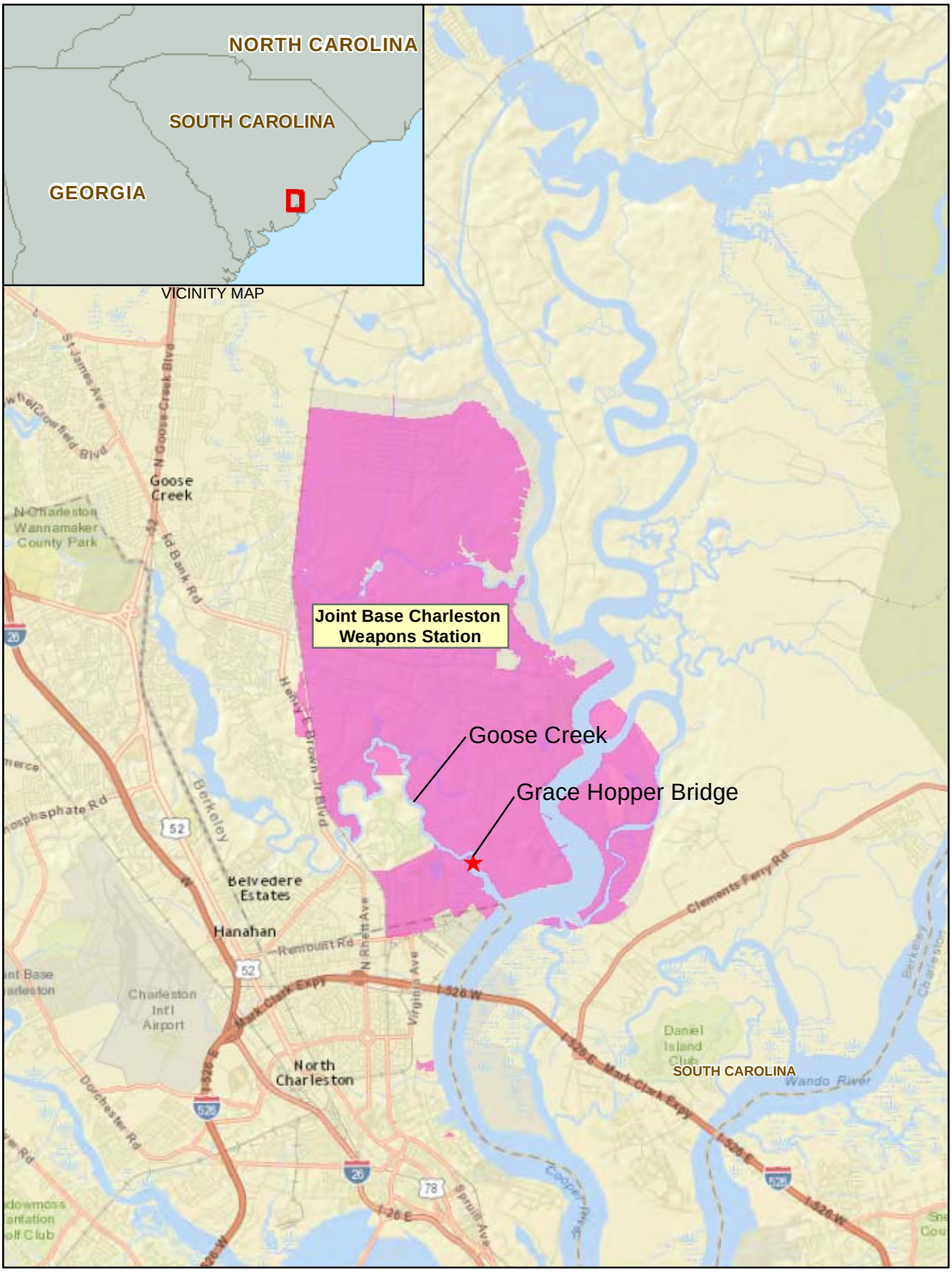

FIGURE 1-1
Vicinity Map
Grace Hopper Bridge Environmental Assessment
Joint Base Charleston - Weapons Station

FIGURE 1-2
Project Location Map
Grace Hopper Bridge Environmental Assessment
Joint Base Charleston - Weapons Station

1.6 RESOURCE AREAS ELIMINATED FROM FURTHER ANALYSIS

This EA focuses on those resource areas potentially affected by the Proposed Action that are relevant to the decision to be made. Resource areas that would not be affected by the Proposed Action were eliminated from further analysis and are discussed as follows.

Land Use/Air Installation Compatible Use Zone (AICUZ) – There would be no changes in land use as a result of the Proposed Action. The Proposed Action would not alter established noise contours and would not affect the AICUZ.

Geology and Topography – Construction activities to protect the east embankment from erosion would not alter subsurface geology or surface topography. No impacts to geology or topography would result from the Proposed Action.

Groundwater Resources – The proposed work would occur along the bank of the channel of Goose Creek, which is tidally influenced at the project site. Construction of erosion protection would not encounter groundwater and the Proposed Action would not affect groundwater resources.

Drinking Water Supply – Goose Creek is not a drinking water source in the tidally influenced reach at the Grace Hopper Bridge. The drinking water supply of JB CHS-WS and the nearby metropolitan areas would not be affected by the Proposed Action.

Cultural Resources – Grace Hopper Bridge is not considered culturally or historically significant. Cultural surveys conducted during the construction of the Grace Hopper Bridge did not identify any cultural materials or properties of cultural significance (Navy, 1989). In 2002, a separate cultural resource survey was conducted that included the proposed project area. This 2002 survey found the area to be highly disturbed by prior construction and classified the area of potential effect as not containing any properties eligible for inclusion in the National Register (Brockington and Associates, 2002). The State Historic Preservation Office provided concurrence on this report in 2002. Government-to-Government consultation with applicable federally recognized Native American Tribes for all JB CHS managed property and follow-up consultation for the Grace Hopper Bridge Erosion Repair area of potential effects was executed. There will be no impacts to cultural resources as a result of the Proposed Action. Appendix B provides copies of supporting correspondence.

Socioeconomics – The Proposed Action would not adversely impact the local economy. Negligible short-term benefits to the regional economy would be expected from purchasing materials and construction workers wages.

Environmental Justice and Protection of Children – The Proposed Action is entirely confined within the boundaries of JB CHS-WS in an industrial and ordnance storage area of the installation. There are no residences, schools, or hospitals in the vicinity of the bridge. There are no minority or low-income populations in the vicinity of the bridge that could be affected by the Proposed Action; therefore, there would be no disproportionately high and adverse human health or environmental effects to minority or low-income populations. Likewise, there are no children or places where children may gather in concentrated numbers, such as schools, that could be affected by the Proposed Action. Potential access to the project area from boaters, including juvenile boaters, is addressed in the Transportation Section (see Section 3.6 and 4.6). Use of the bridge is restricted from the general public and is only used by JB CHS-WS staff or authorized personnel. There would be no impacts to minority and low-income populations or children as a result of the Proposed Action.

Utilities – Construction activities would not require the use of utilities and would not impact the utility infrastructure of JB CHS-WS. The Proposed Action would not affect utilities on JB CHS-WS or the surrounding counties.

Airspace – Construction activities would not conflict with air operations at JB CHS. The Proposed Action would not have any effect on JB CHS or in the region.

2.0 Description of the Proposed Action and Alternatives

2.1 SELECTION STANDARDS

The National Environmental Policy Act (NEPA) requires the development and analysis of reasonable alternatives to the Proposed Action. The Proposed Action and reasonable alternatives for this EA focus on providing erosion protection for the Grace Hopper Bridge.

Selection criteria for the Proposed Action and alternatives for bank stabilization measures at the Grace Hopper Bridge include:

- Minimize impacts to waters of the United States and floodplains
- Minimize cost and long-term maintenance needs

2.2 PROPOSED ACTION

The Proposed Action is to repair and provide erosion protection along the east bank of Goose Creek at the Grace Hopper Bridge that would not alter the ability of boat traffic to pass beneath the bridge. Three alternatives were determined to be reasonable to meet the project objectives, and these alternatives are carried forward, along with the No Action Alternative, for detailed analysis in the EA. The considered Proposed Action and alternatives consist of different methods to provide bank stabilization and erosion protection without construction or modification to Grace Hopper Bridge.

2.2.1 Alternative 1

Alternative 1 would consist of placing grout-filled mattresses along the bank from beneath the mean low water elevation to the 100-year flood elevation (Appendix A). The mattresses would be buried below the mean low water elevation and would extend from 50 feet north of the bridge to 30 feet south of the bridge, for a total length of approximately 120 feet (Figure 2-1). Laterally, the mattresses would extend approximately 30 feet from the high point on the bank into the water. The work area, including access and staging areas, would encompass approximately 1 acre, with approximately 0.1 acre associated with the proposed erosion protection. Prior to placement of the mattresses, sand and gravel would be placed as backfill in eroded areas, where needed, to create a proper slope. The mat will be anchored by keying some or all of the mat edges into the substrate, which would prevent the mats from being undermined. The site design avoided impacts to wetlands and minimized impacts to floodplains and waters of the U.S. A water borne work platform (such as a barge, boat, or floating dock) could be staged in Goose Creek to serve as a work platform. Other construction equipment would likely include a trackhoe, flatbed truck, and a crane that could be operated from the bank or the bridge. Construction activities would be confined to the designated work areas. It may be necessary to temporarily close sections of the bridge during construction, if it is necessary to operate equipment from the bridge. Flaggers would be used to safely maintain traffic flow during such work. There would be limited disruption of traffic on Wilkinson Way and the bridge would generally remain open to traffic.

The grout-filled mattresses consist of a double layer of synthetic fabric divided into individual compartments that are connected internally. Grout is pumped into each compartment and is reinforced by cables. The cables are installed between the two layers of fabric and run through the ducts that connect them. Multiple mattresses would be interconnected to provide uniform coverage.

The primary construction staging area would be at an asphalt turn-around by the guard shack on Wilkinson Way. There is an unimproved field road paralleling the south side of Wilkinson Way that connects the primary staging area with the proposed worksite. Crushed rock would be placed in this road to fill low spots and facilitate site access. A cleared grassy area near the proposed work area along the field road would be used as a secondary staging area (Figure 2-1).

Construction is anticipated to begin in 2015 and would take approximately 6 months to complete. The site design avoided impacts to wetlands and minimized impacts to floodplains and waters of the U.S.

2.2.2 Alternative 2

Alternative 2 would be similar to Alternative 1, except that rock-fill gabions and rock mattress gabions of varying sizes would be used to stabilize the stream bank and stream bed instead of grout-filled mattresses (Appendix A). Alternative 2 would employ a similar work area, access, extent of erosion protection, and work approach that would be implemented under Alternative 1. Prior to placement of the gabions, the grade would be properly prepared, which could require minor excavation to provide level areas for placement of gabions or backfill of sand or road-base material. Construction equipment, including the water borne work platform, crane, and trackhoe, would be the same as described in Alternative 1. Gabions consist of connected wire mesh cages filled with rock that are stacked to create a wall or cover the stream bed. The gabions would be keyed into the banks and stream beds and would extend for a total length of approximately 100 feet. However, unlike Alternative 1, installation of the gabions would likely require construction equipment working in concert to manipulate the gabions into place. As with Alternative 1, there would be limited disruption of traffic on Wilkinson Way and flaggers would be used to safely maintain traffic flow during temporary lane closures. The bridge would generally remain open to traffic. Construction would begin in 2015 and would take approximately 6 months to complete.

FIGURE 2-1
Work Space and Construction Area
Grace Hopper Bridge Environmental Assessment
Joint Base Charleston - Weapons Station

2.2.3 Alternative 3

Alternative 3 would also be similar to Alternative 1, but would use an articulating concrete block system for erosion protection instead of grout-filled mattresses (Appendix A). Alternative 3 would employ a similar work area, access, extent of erosion protection, and work approach that would be implemented under Alternative 1; however, additional grading and backfill would likely be required. Prior to placement of the articulating concrete blocks, the grade would be sloped properly, which could require backfill of sand or road-base material. Construction equipment, including the water borne work platform, crane, and trackhoe, would be the same as described for Alternative 1. Articulating concrete block systems consist of individual blocks that form a continuous blanket by interlocking, binding together by cables, or a combination of both. The blocks are connected by cables that are secured at the corners of the system by soil anchors placed approximately 3 to 4 feet into the soil.

As with Alternative 1, there would be limited disruption of traffic on Wilkinson Way and flaggers would be used to safely maintain traffic flow during temporary lane closures. The bridge would generally remain open to traffic. Construction would begin in 2015 and would take approximately 6 months to complete.

2.3 NO ACTION ALTERNATIVE

The No Action Alternative represents no change from current conditions. The bank would continue to erode due to stream and tidal flows and wave action from wind and boat traffic. The continued erosion would cause sedimentation and reduced water quality in Goose Creek. Temporary repairs that would replace lost soil and rip-rap would be performed as funding becomes available. There would continue to be potential for undermining of the bridge abutment, which could lead to closure of the bridge. If the Grace Hopper Bridge were to be closed, an 8-mile detour would be required, which would result in increased traffic through other parts of JB CHS, increased fuel consumption and associated vehicle emissions, and increased costs for transport operations.

2.4 ALTERNATIVES ELIMINATED FROM FURTHER ANALYSIS

No other alternatives were considered or eliminated from analysis in this EA, as no other feasible alternatives were identified.

3.0 Affected Environment

3.1 AIR QUALITY

In accordance with the Federal Clean Air Act (CAA) requirements, the air quality in a given region or area is measured by the concentration of criteria pollutants in the atmosphere. The air quality in a region is a result of not only the types and quantities of atmospheric pollutants and pollutant sources in the area, but also surface topography, the size of the topological "air basin," and the prevailing meteorological conditions.

Ambient Air Quality Standards. Under the CAA, United States Environmental Protection Agency (USEPA) developed numerical concentration based standards (National Ambient Air Quality Standards [NAAQS]) for pollutants that have been determined to affect human health and the environment. The NAAQS represent the maximum allowable concentrations of ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), respirable particulate matter (including particulate matter equal to or less than 10 microns in diameter [PM_{10}] and including particulate matter equal to or less than 2.5 microns in diameter [$PM_{2.5}$], and lead (40 *Code of Federal Regulations* [CFR] Part 50). The CAA also gives the authority to states to establish air quality rules and regulations. The State of South Carolina has adopted the NAAQS and promulgated additional State Ambient Air Quality Standard for gaseous fluorides. Table 1 presents the presents the NAAQS and state standards.

TABLE 1
Ambient Air Quality Standards
JB CHS, South Carolina

Criteria Pollutant	Federal Standard (Averaging Period)[a]	Federal Attainment Status	State Standard (Averaging Period)	State Attainment Status
CO	35 ppm (1 hour)	Unclassified/ Attainment	Same	NA
	9 ppm (8 hour)	Attainment	Same	NA

TABLE 1
Ambient Air Quality Standards
JB CHS, South Carolina

Criteria Pollutant	Federal Standard (Averaging Period)[a]	Federal Attainment Status	State Standard (Averaging Period)	State Attainment Status
NO_2	0.100 ppm (1 hour)	Unclassified/ Attainment	Same	NA
	0.053 ppm (annual arithmetic mean)	Unclassified/ Attainment	Same	NA
O_3	0.075 ppm (8 hour)	Unclassified/ Attainment	Same	NA
Fine particulate matter ($PM_{2.5}$)	12 µg/m^3 (annual arithmetic mean)	Unclassified/ Attainment	Same	NA
	35 µg/m^3 (24 hours)[b]	Unclassified/ Attainment	Same	NA
Particulate matter (PM_{10})	150 µg/m^3 (24 hours)	Attainment	Same	NA
SO_2	0. 5 ppm (3 hours, secondary standard)	Unclassified/ Attainment	0.04 ppm (24 hours)	NA
	0.075 ppm (1 hour)[c]	Unclassified	0.25 ppm (1 hour)	NA
Lead	0.15 µg/m^3 (rolling 3-month average)	Unclassified/ Attainment	1.5 µg/m^3 (30 day average)	NA
Gaseous Fluorides (as HF)	No Federal Standard		3.7 µg/m^3 (12 hours)	Attainment
			2.9 µg/m^3 (24 hours)	Attainment
			1.6 µg/m^3 (1 week)	Attainment
			0.8 µg/m^3 (1 month)	Attainment

Sources: http://www.epa.gov/air/criteria.html, http://www.scdhec.gov/environment/baq/Regulation-SIPManagement/reg61-62index.asp, as of March 2013.
µg/m^3 : microgram per cubic meter
ppm: parts per million
NA: not applicable

Notes:

[a] National standards other than O3, particulate matter, and those based on annual averages or annual arithmetic means are not to be exceeded more than once a year. The O3 standard is attained when the fourth highest 8-hour concentration in a year, averaged over 3 years, is equal to or less than the standard. For PM10, the 24-hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m3 is equal to or less than 1. For PM2.5, the 24-hour standard is attained when 98 percent of the daily concentrations, averaged over 3 years, is equal to or less than the standard.

[b] To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 parts per billion.

[C] To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 parts per billion.

Attainment versus Nonattainment and General Conformity. The USEPA classifies the air quality in an area according to whether the concentrations of criteria pollutants in ambient air exceed the NAAQS. Areas are designated either “attainment,” “nonattainment,” “maintenance,” or unclassified for each of the six criteria pollutants. Attainment means that the air quality within an area is better than the NAAQS; nonattainment means that criteria pollutant levels exceed NAAQS; maintenance means that an area was previously designated nonattainment but is now attainment; and unclassified air quality designation by USEPA means there is not enough information to appropriately classify an area, so the area is considered attainment. USEPA has delegated the authority for ensuring compliance with the NAAQS in South Carolina to the South Carolina Department of Health and Environmental Control (SCDHEC), Bureau of Air Quality. In accordance with the CAA, each state must develop a State Implementation Plan (SIP), which is a compilation of regulations, strategies, schedules, and enforcement actions designed to move the state into compliance with all NAAQS.

The General Conformity Rule applies only to significant actions in nonattainment or maintenance areas. This rule requires that any federal action meet the requirements of a SIP or Federal Implementation Plan. More specifically, CAA conformity is ensured when a federal action does not cause a new violation of the NAAQS; contribute to an increase in the frequency or severity of violations of NAAQS; or delay the timely attainment of any NAAQS, interim progress milestones, or other milestones toward achieving compliance with all NAAQS.

JB CHS-WS is located in Berkeley County, which is in attainment for all NAAQS parameters (USEPA, 2013a). JB CHS-WS has over 400 emission sources and has a conditional Major Air Quality Permit from SCDHEC. Emissions at JB CHS-WS are less than the threshold to be classified as a major source of air pollutants regulated by the CAA. Major sources of air pollutants are those that emit 10 tons per year of any listed pollutant or 25 tons per year of a mixture of air toxics. Approximately 75 percent of emission sources at JB CHS are combustion sources for heat, vehicles, and clothes drying. The other 25 percent of emission sources support mission requirements and consist mostly of generators, parts cleaners, and paint booths (Zapata, 2010).

Greenhouse Gas Emissions. Greenhouse gases (GHGs) are gaseous emissions that trap heat in the atmosphere. The emissions occur from natural processes and human activities. The most common GHGs emitted from human activities include carbon dioxide (CO_2), methane, and nitrous oxide. GHGs are primarily produced by burning fossil fuels and through industrial and biological processes. The USEPA Mandatory Reporting Rule became effective on December 29, 2009, and sources required to report were to begin collecting data on January 1, 2010. In general, suppliers of fossil fuels or industrial GHGs, manufacturers of vehicles and engines, and facilities with 25,000 metric tons or more per year of carbon dioxide equivalent (CO_{2e}) emissions are required to submit annual reports to USEPA. USEPA reporting requirements continue to be updated. On November 8, 2010, reporting requirements for petroleum and natural gas systems were finalized. The purpose of the rule is to collect comprehensive and accurate data on CO_2 and other GHG emissions that can be used to inform future policy decisions. GHG emissions threshold of significance for the permitting of stationary sources are 75,000 tons per year (tpy) of CO_{2e} and 100,000 tpy of CO_{2e} for prevention of significant deterioration and Title V, respectively.

EO 13514, Federal Leadership in Environmental, Energy, and Economic Performance, was signed in October 2009 and requires agencies to set goals for reducing GHG emissions. One requirement within EO 13514 is the development and implementation of an agency Strategic Sustainability Performance Plan (SSPP) that prioritizes agency actions based on lifecycle return on investment. Each SSPP is required to identify, among other things, "agency activities, policies, plans, procedures, and practices" and "specific agency goals, a schedule, milestones, and approaches for achieving results, and quantifiable metrics" relevant to the implementation of EO 13514. On August 26, 2010, the Department of Defense released its SSPP to the public. This implementation plan describes specific actions that the Department of Defense will take to achieve its individual GHG reduction targets, reduce long-term costs, and meet the full range of goals of the EO. All SSPPs segregate GHG emissions into three categories: Scope 1, Scope 2, and Scope 3 emissions. Scope 1 GHG emissions are those directly occurring from sources that are owned or controlled by the agency. Scope 2 emissions are indirect emissions generated in the production of electricity, heat, or steam purchased by the agency. Scope 3 emissions are other indirect GHG emissions that result from agency activities but from sources that are not owned or directly controlled by the agency. The GHG goals in the Department of Defense SSPP include reducing Scope 1 and Scope 2 GHG emissions by 34 percent by 2020, relative to FY 2008 emissions, and reducing Scope 3 GHG emissions by 13.5 percent by 2020, relative to FY 2008 emissions.

Baseline Conditions. JB CHS-WS is located in Berkeley County, approximately 10 miles upriver from the City of Charleston. Berkeley County is in attainment for all NAAQS (USEPA, 2014). The Charleston Interstate Air Quality Control Region (AQCR) includes Berkeley, Charleston, and Dorchester Counties. According 40 CFR Part 81, no Class I areas are located with 10 kilometers of JB CHS-WS (USEPA, 2014).

The most recent emissions for Berkeley County and the Charleston AQCR are shown in Table 2. Berkeley County is considered the local area of influence, and Charleston AQCR is considered the regional area of influence for the air quality analysis of the Proposed Action on JB CHS-WS. Ozone is not a directly emitted pollutant; it is generated from reactions of volatile organic compounds (VOCs) and nitrogen oxides (NO_X), which are ozone precursors. Therefore, VOCs and NO_X emissions are used to represent ozone generation in this air quality analysis.

TABLE 2
Local and Regional Air Emissions Inventory for Proposed Action
JB CHS, South Carolina

	NO_X tpy	VOC tpy	CO tpy	SO_2 tpy	PM_{10} tpy	$PM_{2.5}$ tpy
Berkeley County	14,838	52,235	111,462	21,183	12,308	5,817
Charleston AQCR	35,617	121,878	223,677	26,443	25,936	11,314

Source: USEPA Website October 2014. Data is from 2011.

3.2 WATER RESOURCES

3.2.1 Surface Water

JB CHS-WS is situated along the western bank of the Cooper River. Two major creeks cross JB CHS-WS: Foster Creek to the north and Goose Creek to the south. Foster Creek drains to the Back River, which flows into the Cooper River, and Goose Creek drains directly to the Cooper River. The Cooper River has a mean tidal range of 5.2 feet, with a normal low tide of 1.1 feet and a high tide of 6.3 feet. There are approximately 22 miles of marsh and river frontage at JB CHS-WS. Marshes and low-lying areas flood with the tide. Freshwater features and the proximity to the coast form a combination of saltwater, brackish water, and freshwater marshes and wetlands (Navy, 2003). There are approximately 600 acres of marshland within the boundaries of JB CHS-WS (Zapata, 2010).

The 100-year floodplain elevation at JB CHS-WS ranges from 8.5 to 10.5 feet above mean sea level (Navy, 2003). According to survey information, the 100-year floodplain elevation within the Proposed Action area is 10 feet. Almost the entire Proposed Action area is within the 100-year floodplain. The mean high water line elevation within the Proposed Action area is approximately 2 feet above mean sea level, while the elevation of the mean low water line is approximately 3 feet below mean sea level (O'Brien and Gere Engineers, Inc., 2012).

Grace Hopper Bridge spans Goose Creek approximately 0.7 mile north from its confluence with the Cooper River. Goose Creek is a tidally influenced perennial stream and is considered a traditionally navigable water. Goose Creek is not a 303(d)-listed water at the location of Grace Hopper Bridge, but is listed in multiple locations upstream in Goose Creek Reservoir (USEPA, 2013b). The east embankment of Goose Creek is eroding due to stream and tidal flows, as well as wave action from wind and boat traffic.

Based upon a Jurisdictional Determination (JD) by the USACE no marshes or any other type of wetland are located within the Proposed Action area (USACE, 2014). Marshes are present to the north and south of the Proposed Action area along the east embankment. A large marsh also occurs on the western embankment of Goose Creek at the Grace Hopper Bridge location, but is outside of the project area.

3.3 SOILS

The Soil Survey of Berkeley County, South Carolina identified two soil map units within the project area: Aquic Udifluvents and Bohicket association (Figure 3-1). The Aquic Udifluvents soil profile is silt loam to 60 inches below ground surface (bgs). The soils are poorly drained and the water table occurs between 6 to 30 inches bgs. This soil is classified as hydric and also is classified as farmland of statewide importance. The Bohicket association soil profile is a silty clay loam to 16 inches bgs and silty clay from 16 to 60 inches bgs. The soils are very poorly drained and are associated with marshes. This soil is classified as hydric and is not considered prime farmland (NRCS, 2013).

Aquic Udifluvents are classified as farmland of statewide importance under the Farmland Protection Policy Act of 1981 (FPPA). The FPPA ensures that federal programs are administered in a manner, to the extent practicable, that will be compatible with state, local, and private government farmland protection programs and policies. It does not include land already in or committed to urban development or water storage. Compliance with the FPPA is determined through coordination with the Natural Resources Conservation Service (NRCS). Prime farmland is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion (7 United States Code 4201[c][1][A]). Prime farmland is determined by the NRCS based on soil type, land use, frequency of flooding, irrigation, water table, and erodibility and is protected under the FPPA.

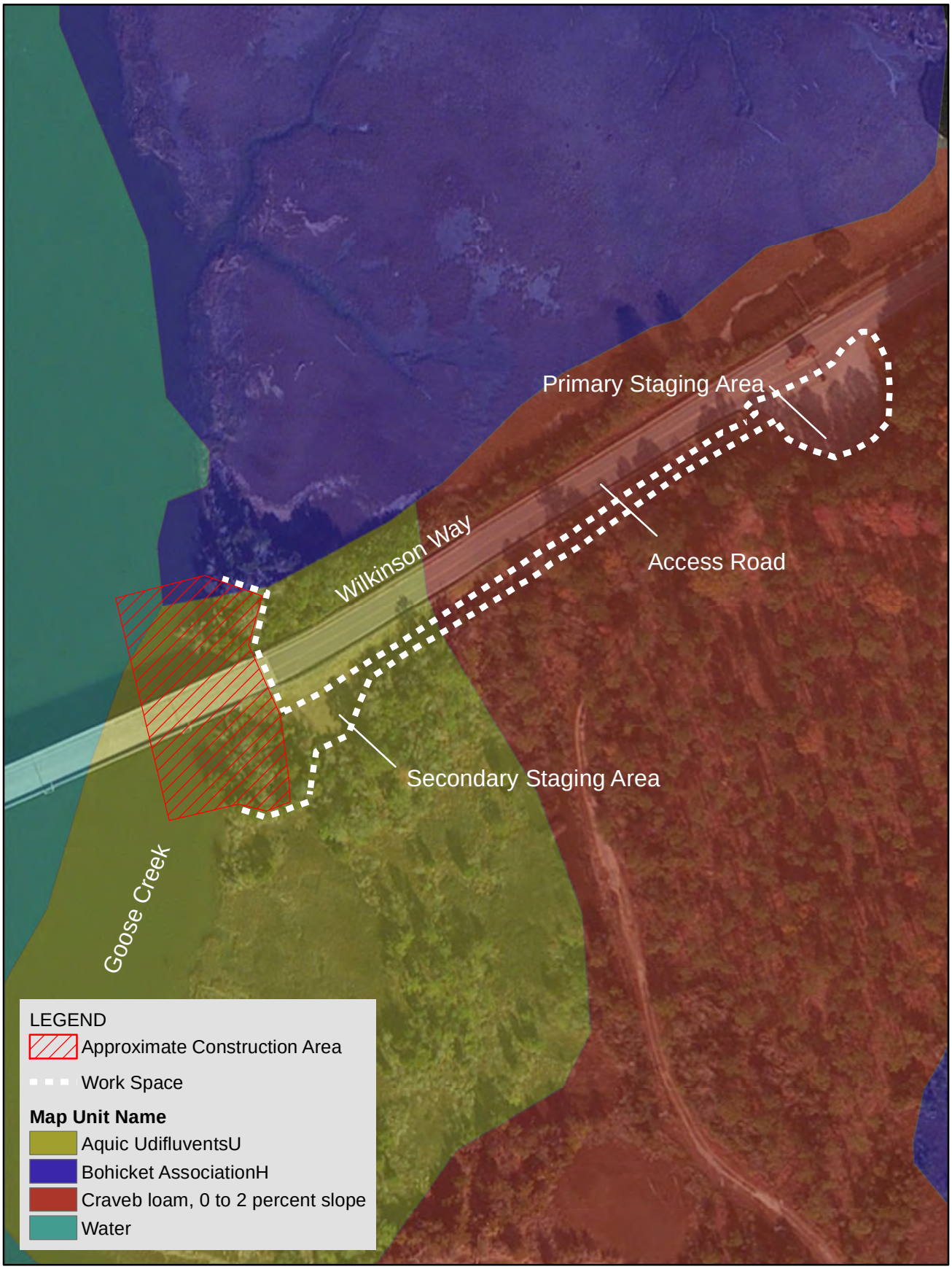

FIGURE 3-1
Soil Map
Grace Hopper Bridge Environmental Assessment
Joint Base Charleston - Weapons Station

Soils that are not prime farmland, but do provide high-value foods or crops are considered unique farmland soils. Local and statewide important farmland soils are those that provide important farming areas for crops such as food, fiber, forage, and/or oilseed.

Soils in the project area have changed since the soil data and mapping were done. The natural movement of the Goose Creek channel has removed some land previously mapped as Aquic Udifluvent from the western portion of the project area and the construction of the Grace Hopper Bridge resulted in placement of fill material over a portion of the native soils (Figure 3-1). Soils present in the project area likely represent a mix of native soil and fill material. The portion of the project in Goose Creek, which is open water, would not be considered prime farmland.

3.4 BIOLOGICAL RESOURCES

3.4.1 Upland Flora and Habitat at JB CHS-WS

Approximately 73 percent of the habitat at JB CHS-WS is upland, consisting mainly of pine flatwoods, pine savannah, and mixed pine and hardwood forest communities. Approximately 80 percent of the upland habitat consists of pinelands and approximately 20 percent consists of mixed pine and hardwood.

Upland habitat in the area surrounding Grace Hopper Bridge consists primarily of mixed pine and hardwood forest communities. Dominant tree canopy species within mixed pine and hardwood forests include loblolly pine (*Pinus taeda*), sweetgum (*Liquidambar styraciflua*), water oak (*Quercus nigra*), and red maple (*Acer rubrum*). Longleaf pine (*Pinus palustris*) is rarely found in these habitats. The understory generally includes species such as American holly (*Ilex opaca*), wax myrtle (*Morella cerifera*), dogwood (*Cornus* sp.), sweetleaf (*Symplocus tinctoria*), and canopy saplings. The herbaceous layer consists mostly of switchcane (*Arundinaria gigantea*), greenbriers, and honeysuckle (*Lonicera japonica*), along with an assortment of ferns and grasses. The canopy of more xeric areas includes live oak (*Quercus virginiana*), southern red oak (*Quercus falcata*), blackjack oak (*Quercus marilandica*), and post oak (*Quercus stellata*) (Navy, 2003).

3.4.2 Wetland Flora and Habitat at JB CHS-WS

Approximately 27 percent of JB CHS-WS consists of wetlands, including a combination of saltmarsh, brackish marsh, and freshwater marsh associated with the coast and rivers and a variety of non-coastal wetlands. Palustrine, lacustrine, and riverine freshwater wetlands make up approximately 16 percent of JB CHS-WS, while tidally influenced estuarine emergent wetlands make up approximately 11 percent. JB CHS-WS also includes approximately 10 miles of perennial stream. Wetland habitat in the vicinity of the Proposed Action consists of tidally influenced estuarine brackish marsh dominated by emergent vegetation.

Estuarine wetlands, including the marsh areas in the vicinity of the Proposed Action area, include deepwater tidal habitats and adjacent tidal wetlands that receive water mostly from the ocean with occasional dilution from freshwater runoff. Primary estuarine habitat at JB CHS-WS includes saltmarsh marsh and brackish marsh. Saltmarsh generally occurs along the lower Cooper River and the lower portion of Goose Creek. Dominant vegetative species in saltmarsh include smooth cordgrass (*Spartina alterniflora*), with a lesser amount of black needle rush (*Juncus roemerianus*), with variations depending upon salinity levels and elevation. Brackish marsh generally occurs on regularly flooded flats next to the upper portions of the Cooper River and Goose Creek and includes the connecting brackish water tributaries. Dominant species in brackish marsh include narrow-leafed cat-tail (*Typha angustifolia*), needle rush, and bulrushes (*Scirpus* spp. and *Schoenoplectus* spp.). Wax myrtle dominates the edges of the marshes (Navy, 2003).

Based upon a JD provided by the USACE, there are no marshlands or other type of wetlands within the Proposed Action area (USACE, 2014).

3.4.3 Fauna at JB CHS-WS

The diverse habitats at JB CHS-WS support a variety of game and non-game fish and wildlife species. Common wildlife species on JB CHS-WS that could occur within the project area include white-tailed deer (*Odocoileus virginianus*), opossum (*Didelphis virginiana*), raccoon (*Procyon lotor*), bobcat (*Lynx rufus*), red fox (*Vulpes vulpes*), northern bobwhite (*Colinus virginianus*), gray squirrel (*Sciurus carolinensis*), eastern cottontail rabbit (*Sylvilagus floridanus*), various waterfowl, and coyote (*Canis latrans*). Other species known to occur on JB CHS-WS include wild turkey (*Meleagris gallopavo*), fox squirrel (*Sciurus niger*), a variety of small mammals, feral hog (*Sus scrofa*), black bear (*Ursus americanus*), and Bachman's sparrow (*Peucaea aestivalis*). Bat species known to occur on JB CHS-WS include red bat (*Lasiurus borealis*), Seminole bat (*Lasiurus seminolus*), big brown bat (*Eptesicus fuscus*), and southeastern myotis (*Myotis austroriparius*). Commonly seen bird species that could occur within the project area

include northern cardinal (*Cardinalis cardinalis*), pine warbler (*Dendroica pinus*), red-bellied woodpecker (*Melanerpes carolinus*), Carolina wren (*Thryothorus ludovicianus*), and eastern towhee (*Pipilo erythrophthalmus*) (Navy, 2003).

Goose Creek supports common fish species such as a variety of sunfish and bass (Family *Centrarchidae*) and catfish (Family *Ictaluridae*). The waters of the Cooper River and Goose Creek in the area of the Proposed Action is in a zone between fresh and saltwater and includes common saltwater species such as winter trout (*Cynoscion nebulosus*), summer flounder (*Paralichthys dentatus*), red drum (*Sciaenops ocellatus*), and Atlantic croaker (*Micropogonias undulatus*).

3.4.4 Essential Fish Habitat

Essential Fish Habitat (EFH) on and around JB CHS-WS includes estuarine waters, such as the Cooper River, adjacent tidal freshwater wetlands, saltmarshes, brackish marshes, tidal flats, and tidal creeks, such as Goose Creek (SAFMC, 1998). These support many aquatic species that rely on these particular habitats for refuge, foraging, and as a nursery for juveniles (SAFMC, 2009).

South Atlantic Fishery Management Council (SAFMC) indicates that saltmarsh and tidal flat habitat are EFH for white shrimp (*Litopenaeus setiferus*) and brown shrimp (*Farfantepenaeus aztecus*) and a variety of other aquatic organisms. Species identified by the Mid-Atlantic Fishery Management Council with EFH in estuarine waters include juvenile and adult summer flounder and juvenile and adult bluefish (*Pomatomus saltatrix*). The Cooper River, tidal creeks such as Goose Creek, and adjacent marshes near the Grace Hopper Bridge also provide nursery and foraging habitat for other species such as black drum (*Pogonias cromis*), Atlantic menhaden (*Brevoortia tyrannus*), tile fish (*Malacanthus* spp.) and blue crab (*Callinectes sapidus*). These species are prey for fish managed by the SAFMC, such as a variety of mackerels, snappers, and groupers, and migratory species such as a variety of billfish and shark managed by the National Marine Fisheries Service. Marsh and nearby channels within JB CHS-WS also provide habitat for juvenile and subadult red drum (SAFMC, 1998; Croom, Miles/National Oceanic and Atmospheric Administration [NOAA]/National Marine Fisheries Service [NMFS], 2011). Saltwater species caught by anglers along the Cooper River in the vicinity of JB CHS-WS include a variety of trout, flounder, drum, and croaker (Navy, 2003). Similar game fish would be expected within Goose Creek.

3.4.5 Field Survey Results

A field survey and wetland delineation of the Proposed Action area were conducted on November 7, 2013 (CH2M HILL, 2014). Dominant upland species within the Proposed Action area included eastern red cedar (*Juniperus virginiana*), hackberry (*Celtis occidentalis*), Japanese honeysuckle, Chinese tallow tree (*Triadica sebifera*), privet (*Ligustrum sinense*), yaupon holly (*Ilex vomitoria*), poison ivy (*Toxicodendron radicans*), and Virginia creeper (*Parthenocissus quinquefolia*). Vegetation observed along Goose Creek included eastern baccharis (*Baccharis halimifolia*), yaupon holly, dwarf palmetto (*Sabal minor*), and switchgrass (*Panicum virgatum*). Based upon a March 26, 2014, JD by the USACE, there are no wetlands within the Proposed Action area. No federally listed species or habitat for these species was observed during the field survey. Potential occurrence of threatened and endangered species is discussed in the following section.

3.4.6 Threatened and Endangered Species

JB CHS-WS has conducted multiple surveys for listed plant and wildlife species. Federally and state-listed threatened and endangered species known to occur or with potential to occur on JB CHS-WS are listed in Table 3. No critical habitat for federally listed species occurs on JB CHS-WS, and no federally listed species or associated habitat was observed in or near the Proposed Action area.

Surveys for rare, threatened, and endangered plant species were conducted at JB CHS-WS in 1987 and 1993. No threatened and endangered plant species were found on JB CHS-WS during these surveys. Also, the habitat within the Proposed Action area is not suitable for the plant species previously indicated. Canby's Dropwort prefers wetland habitat and pondberry prefers forested wetland habitat, while chaff-seed prefers tropical and subtropical grasslands, none of which occur within the Proposed Action area. All of these species are considered unlikely residents on JB CHS-WS (Navy, 2003). No endangered plant species would be expected to occur within the Proposed Action area.

In 1994, a survey for rare, threatened, and endangered amphibians and reptiles was conducted at JB CHS-WS by the South Carolina Department of Natural Resources (SCDNR). The survey did not identify any state or federally listed threatened or endangered species, except American alligator. American alligator, federally listed as Threatened by

TABLE 3
Federally and State-listed Threatened and Endangered Species that Occur or Potentially Occur on JB CHS-WS
JB CHS, South Carolina

Common Name	Species Name	Federal Status	State Status
Reptiles and Amphibians			
Flatwoods Salamander	*Ambystoma cingulatum*	T	E
American Alligator	*Alligator mississippiensis*	T*	T*
Dwarf Siren	*Pseudobranchus striatus*		T
Birds			
Wood Stork	*Mycteria americana*	E	E
Bald Eagle	*Haliaeetus leucocephalus*		E
Swallow-Tailed Kite	*Elanoides forficatus*		E
Red-Cockaded Woodpecker	*Picoides borealis*	E	E
Least Tern	*Sterna antillarum*		T
Wilson's Plover	*Chararius wilsonia*		T
Glossy Ibis	*Plegadis falcinellus*		T
Mammals			
West Indian Manatee	*Trichechus manatus*	E	
Rafinesque's Big-Eared Bat	*Corynorhinus rafinesquii*	SC	E
Southeastern Myotis	*Myotis austroriparius*	SC	T
Fish			
Atlantic Sturgeon	*Acipenser oxyrinchus*	E	
Shortnose Sturgeon	*Acipenser brevirostrum*	E	E
Plants			
Canby's Dropwort	*Oxypolis canbyi*	E	E
Pondberry	*Lindera melissifolia*	E	E
Chaff-Seed	*Schwalbea americana*	E	E

T = Threatened, E = Endangered, SC = Species of Concern
*Threatened by Similarity of Appearance
Source: Navy, 2003

Similarity of Appearance, is common to abundant on JB CHS-WS. American alligators could occur within the project area and within the general vicinity. Reptile species of state concern were documented at JB CHS-WS, including green water snake (*Nerodia cyclopion*), black swamp snake (*Seminatrix pygaea*), eastern diamondback rattlesnake (*Crotalus adamanteus*), and coral snake (*Micrurus fulvius*). These snakes could occur within the project area. Flatwoods salamander and dwarf siren would not likely occur in the area due to lack of potential habitat. Both require freshwater habitat during part or all of their lifecycle. Flatwoods salamanders prefer open long-leaf pine or slash pine flatwoods (Meadows, 2014a). Dwarf sirens are entirely aquatic and require ponds, swamps, or ditches (Meadows, 2014b). Neither species would likely occur within the project area or within the general vicinity.

A 2001 mammal survey conducted by SCDNR at JB CHS-WS did not identify any federally listed species. The survey did locate one southeastern myotis, a state-listed threatened species that also is a federally listed species of special concern. Two additional species of state-listed concern, the eastern woodrat (*Neotoma floridana*) and fox squirrel, are known to occur on JB CHS-WS. These species could occur within the project area or within the general vicinity.

A cluster of the federally listed endangered red-cockaded woodpecker (RCW) occurred on JB CHS-WS prior to Hurricane Hugo. Periodic surveys are conducted for RCW nesting activity in longleaf pine habitat on JB CHS-WS. Habitat with the highest potential for RCW colonization is in the northern part of JB CHS-WS. One lone male was identified and banded during a 1999/2000 survey, but this bird is no longer on JB CHS-WS and now there are no RCWs on JB CHS-WS. JB CHS-WS actively manages forests to promote longleaf pine, which is the preferred habitat of the RCW (Navy, 2003). There is no suitable habitat for RCW in proximity to the Proposed Action and it would be highly unlikely that RCW would occur within the project area.

Estuarine waters of the Cooper River provide feeding habitat for the Atlantic and shortnose sturgeon. Both are considered a likely migrant or an occasional visitor to the estuarine waters of Cooper River and could occur within Goose Creek. Atlantic sturgeon migrate from nearshore Atlantic shelf waters to coastal sounds, bays, and inlets to access tidally connected freshwater channels for spawning. The Atlantic sturgeon spawns in the Cooper River and could occur in this river, approximately 0.7 mile downstream of the project area. Shortnose sturgeon mainly migrate from tidal estuarine or brackish channels to freshwater reaches for spawning. Spawning season is generally winter through early spring (SCDNR, 2012). Both the Atlantic and shortnose sturgeon could occur within Goose Creek at the Grace Hopper Bridge location but would likely occur only as a transient species.

Bald eagles, which are federally protected by the Bald and Golden Eagle Protection Act and are considered state-listed threatened, occur on JB CHS-WS. Two known nests occur on the northern side of the installation, one in a stand of cypress trees and one along the Back River. One nest was active and the other inactive (Navy, 2003). There are no known nests within or near the vicinity of the project area. Bald eagles could, however, occur within the project area for foraging purposes.

Painted bunting (*Passerina ciris*), a federally listed species of concern, has been documented on JB CHS-WS and typically occurs along forest edges. This species could occur within the forested portion of the project area. Although unlikely due to disturbance and noise associated frequent vehicle traffic over Grace Hopper Bridge, wood stork, swallow tailed kite, least tern, Wilson's plover, and glossy ibis could potentially occur in the vicinity of the project area for foraging purposes.

3.5 NOISE

Noise is defined as unwanted or annoying sound that interferes with or disrupts normal human activities. Although exposure to very high noise levels can cause hearing loss, the principal human response to noise is annoyance. The responses of different individuals to similar noise events are diverse and are influenced by the type of noise, the perceived importance of the noise, its appropriateness in the setting, the time of day, the type of activity during which the noise occurs, and the sensitivity of the individual.

Noise is generally measured using A-weighted decibels (dBA), a sound pressure level as measured on a sound level meter using an A-weighting filter network. The A-weighing filter de-emphasizes the very low and very high frequency components of the sound, placing greater emphasis on those frequencies within the sensitive range of the human ear.

Sensitive receptors include those that would likely perceive noise as an annoyance and would include schools, hospitals, and housing. Most of JB CHS-WS is remote and the surrounding lands to the north and east are generally unpopulated. There are no sensitive receptors nearby to the Grace Hopper Bridge location. The bridge is located in a remote area of the installation designated for industrial uses.

The main source of noise at the bridge is associated with vehicular traffic. Existing ambient noise levels at the bridge location are likely comparable to an urban noise environment, which typically average 60 decibels (dB) between day and night (USEPA, 1974).

3.6 TRANSPORTATION

On-installation access to the South Annex of JB CHS-WS is from the Waterfront District located to the northeast, via the Grace Hopper Bridge on Wilkinson Way. The Grace Hopper Bridge was designed for transportation of passenger vehicles, not heavy equipment, which poses weight limitations that restrict the number and size of

vehicles that may traverse the bridge at any given time. Personnel and equipment convoys must be carefully spaced to avoid overloading the bridge.

Road access to the Waterfront District is via Post 4 in the South Annex District to the south. South Annex traffic must transit the Grace Hopper Bridge. The majority of the land in the Waterfront District, including large sections of Red Bank Road and Wilkinson Way, are below the 100-year flood elevation of the Cooper River. If flooding occurs, this corridor becomes a choke-point for vehicles transiting between East Side, Waterfront, and South Annex districts.

Goose Creek is a navigable channel with boat traffic primarily using the center channel. Goose Creek is a JB CHS security-controlled channel that prohibits boat parking and fishing. Goose Creek is used by private boaters as a thoroughfare to and from the Cooper River. The primary boaters using Goose Creek would be homeowners who live in upstream residential areas and recreational fishermen.

3.7 HAZARDOUS MATERIALS AND SOLID WASTE/HUMAN HEALTH AND SAFETY

Solid waste generated at JB CHS-WS includes municipal solid waste and wastes from commercial, industrial, construction, and demolition activities. A certified contractor provides refuse collection for solid waste at JB CHS-WS, which is transported and disposed of at the nearby Berkeley County landfill or at the BFI landfill in Jedburg, South Carolina (Zapata, 2010).

There are no known hazardous waste sites at the location of the Proposed Action. There are three Environmental Restoration Program sites near Grace Hopper Bridge. Two solid waste management units (SWMUs), SWMU-16 and SWMU-17, are located northeast of the eastern bank of the bridge, approximately 970 feet and 1,100 feet away, respectively. SWMU-16, the Old Southside Missile and Waste Oil Disposal Area, and SWMU-17, the Old Southside Landfill are currently classified as requiring further investigation. In addition, the Old South Annex Burning Grounds (SWMU-21) is located approximately 735 feet west from the eastern bank of Goose Creek. The status of SWMU-21 indicates no further action is required.

There are no known spills that have occurred in the area (Epstein, 2013).

4.0 Environmental Consequences

This EA presents a comprehensive evaluation of the existing conditions and environmental consequences of implementing the Proposed Action and No Action Alternative, as required by NEPA. Three categories of potential impacts were evaluated: direct, indirect, and cumulative. A direct impact is the result of direct action and occurs at the same time and place. An indirect impact is caused by an action and occurs “later in time or removed in distance, but […] still reasonably foreseeable” (40 CFR 1508.8). A cumulative impact results from the incremental impact of the action when combined with other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other action.

In the following sections, the duration of each impact is described either as short-term, such as construction-related impacts that end when construction is complete, or long-term, which would continue after construction is complete. The intensity of a potential impact refers to its severity and takes into account beneficial and adverse impacts, the level of controversy associated with impacts on human health, whether the action establishes a precedent for further actions with significant effects, the level of uncertainty about projected impacts, and the extent to which the action threatens to violate federal, state, or local environmental protection laws or constrain future activities. Intensities that are classified as “negligible” to “moderate” were considered less than significant in the analysis. Significant adverse impacts are those categorized as “major.” Potential beneficial impacts are discussed separately from potential adverse impacts. The thresholds of change for the intensity of impacts are defined as follows:

- Negligible: When the impact is localized and not measureable at the lowest level of detection
- Minor: When the impact is localized and slight, but detectable
- Moderate: When the impact is readily apparent and appreciable
- Major: When the impact is severely adverse, major, and highly noticeable
- Beneficial: When the impact would benefit the resource/issue

Mitigation measures, best management practices (BMPs), and environmental protection measures are discussed as possible means to minimize the level of impact of a project on a resource area. Mitigation measures refer only to those actions that could be implemented to reduce impacts below significance. BMPs are actions required by statutes, by regulations, or to fulfill permitting requirements that reduce potential impacts. Environmental protection

measures are those actions that are used to minimize impacts that are not required as a part of statutes, of regulations, or to fulfill permitting requirements, but may be taken during design and construction phases of a project to reduce impacts on the environment. None of the BMPs or environmental protection measures described are needed to reduce an impact below the threshold of significance.

4.1 AIR QUALITY

4.1.1 Alternative 1

Short-term, minor, adverse effects on air quality would be expected from the construction of the Proposed Action. Construction activities would result in temporary effects on local and regional air quality, primarily from site-disturbing activities, the operation of construction-related equipment, haul trucks transporting fill and building materials, and from workers commuting to the job site. Appropriate fugitive dust-control measures would be employed during construction activities to suppress emissions. All emissions from the construction of the Proposed Action would be temporary in nature.

It is not expected that emissions from the Proposed Action would contribute to or affect local or regional attainment status with respect to the NAAQS. Emissions from the construction of the Proposed Action are summarized in Table 4. Emissions were conservatively estimated using the Air Force's Air Conformity Applicability Model (ACAM), version 5. The ACAM Detail Report is provided in Appendix C. Because there would be no change in traffic volume using Grace Hopper Bridge, there would be no long-term air quality impacts associated with the project.

TABLE 4
Estimated Air Emissions Resulting from Proposed Action
JB CHS, South Carolina

Activity	NO_X tpy	VOC tpy	CO tpy	Sulfur Dioxide tpy	PM_{10} tpy	$PM_{2.5}$ tpy	CO_2 tpy
Total Emissions	3.36	0.455	2.20	0.005	3.25	0.16	192
Percent of AQCR Inventory	0.01	<0.001	<0.001	<0.001	0.01	0.001	<0.001[a]

[a] Percent of State of South Carolina 2010 CO_2 emissions (84 million metric tons, DOE/EIA website).

All necessary environmental permits for the project would be obtained in accordance with applicable state and federal regulations prior to commencing work.

4.1.2 Alternative 2

The air quality impacts from implementation of the Proposed Action with Alternative 2 would be the same as the impacts outlined for Alternative 1.

4.1.3 Alternative 3

The air quality impacts from implementation of the Proposed Action with Alternative 3 would be the same as the impacts outlined for Alternative 1.

4.1.4 No Action Alternative

There would be no change in air quality as a result of the No Action Alternative.

4.2 WATER RESOURCES

4.2.1 Alternative 1

Adverse impacts to water resources would be short-term and would only occur during construction. Approximately 0.09 acre or 110 linear feet of bed and bank impacts to Goose Creek would occur as a result of the proposed construction. There would be no impacts to marshland or any other type of wetland because the site design avoided wetland impacts. Minor impacts to water resources would likely occur during construction due to soil disturbances from grading the bank and backfilling to properly place and anchor the grout-filled mattress while working within

and at the edge of Goose Creek. These activities would likely contribute to a temporary increase in resuspension of sediments, which would lead to increased turbidity within Goose Creek. Increased turbidity would lower the water quality and habitat quality at the work area and immediately downstream. A boom/floating turbidity curtain would be placed around the work area, which would limit the downstream effects of temporarily increased turbidity at the work site. To reduce impacts to the banks of Goose Creek, a water borne work platform would be used to place the mattresses. In addition, a crane, located on the bridge or shore, and a trackhoe could be used to place the mattresses. Construction best management practices (BMPs) used to limit the effects of erosion in upland areas would be utilized as needed. Effects from increased turbidity would be temporary and minor with use of BMPs. Impacts to Goose Creek would require a Clean Water Act Section 404 permit, which would be issued by the USACE. All conditions of the permit would be adhered to. No required mitigation to offset impacts to Goose Creek is expected to be required by the USACE or SCDHEC.

The 100-year floodplain would be temporarily impacted by construction activities related to the Proposed Action. However, no long-term impacts would be anticipated. No change in elevation or additional fill within the floodplain would be expected as a result of the Proposed Action. The project design minimizes impacts to the floodplain to the extent practicable. However, a FONPA is required because of the impacts to the floodplain.

Impacts to water resources could occur from potential spills of petroleum, oil, and lubricants into Goose Creek. However, a Spill Prevention, Control, and Countermeasures Plan (SPCCP) or a similar plan would be required during construction. These plans would include BMPs and procedures to prevent spills and contain them if they were to occur.

The mattresses would be filled with grout after being placed in position in and along Goose Creek. According to mattress-filling procedures, concrete grout is pumped into the self-contained mattress fabrics, which limits the need for dewatering and limits potential for impacts to surrounding water bodies. Potential temporary direct effects could result from reduced water quality due to increased pH from inadvertent exposure of the water column to uncured grout. Grout-filled mattresses consist of a double layer of strong synthetic fabric but are not impermeable, and uncured grout could be introduced to Goose Creek through the mattress fabric. Potential exists for an uncured grout spill while filling the mattress with the pumpable slurry. The concrete grout fill material consists of a mixture of Portland cement, fine aggregate, water, admixtures, and fly ash (optional) to provide the pumpable slurry (DOT, 2011). The selected contractor will have had experience with placing and filling the mattresses and would have grout-spill specific BMPs and procedures in place to prevent spills or leaks of grout into Goose Creek. The contractor would also have a grout spill response plan. In addition, the project area is within a brackish estuarine system near the confluence with the Cooper River that is tidally influenced. These brackish estuarine waters have greater buffering capacity than freshwater systems due to the presence of substantial bicarbonate in the water. This buffering capacity would minimize the potential for uncured grout to alter the pH of the water column. With use of construction BMPs and spill management procedures, minor short-term adverse impacts to water resources would be expected as a result of the Proposed Action.

Long-term minor beneficial impacts to water resources would occur as a result of the Proposed Action. The Proposed Action would stabilize the east embankment of Goose Creek at Grace Hopper Bridge and reduce or prevent further erosion of the bank.

All necessary environmental permits for the project would be obtained in accordance with applicable state and federal regulations prior to commencing work.

4.2.2 Alternative 2

Adverse impacts to water resources would be short-term and would only occur during construction. Bed and bank impacts to Goose Creek less than those discussed for Alternative 1 (2,300 square feet and 100 linear feet) would occur as a result of the proposed construction. There would be no impacts to marshland or any other wetlands because the site design avoided wetland impacts. Minor impacts to water resources would likely occur during construction due to soil disturbances from grading the bank and backfilling to properly place the gabion baskets while working within and at the edge of Goose Creek. These activities would likely contribute to a temporary increase in resuspension of sediments, which would lead to increased turbidity within Goose Creek. Increased turbidity would temporarily lower the water quality and habitat quality at the work area and immediately downstream. A boom/floating turbidity curtain would be placed around the work area, which would limit the downstream effects of temporarily increased turbidity at the work site. Because the gabion baskets are a variety of sizes and weights a water borne work platform, crane, and trackhoe would likely be used in concert to install the gabion baskets. Construction BMPs to limit the

effects of erosion in upland areas would be utilized as needed. Effects from increased turbidity would be temporary and minor with use of BMPs. Impacts to Goose Creek would require a Clean Water Act Section 404 permit, which would be issued by the USACE. All conditions of the permit would be adhered to. No required mitigation to offset impacts to Goose Creek is expected to be required by the USACE or SCDHEC.

The 100-year floodplain would be temporarily impacted by construction activities related to the Proposed Action. However, no long-term impacts to the floodplain would be anticipated. No change in elevation or additional fill within the floodplain would be expected as a result of the Proposed Action. The project design minimizes impacts to the floodplain to the extent practicable. However, a FONPA is required because of the impacts to the floodplain.

Impacts to water resources could occur from potential minor spills of petroleum, oil, and lubricants into Goose Creek during work. However, a SPCCP or a similar plan would be required during construction. These plans would include BMPs and procedures to prevent spills and contain them if they were to occur.

With use of construction BMPs and spill procedures, minor short-term adverse impacts to water resources would be expected as a result of the Proposed Action.

Long-term minor beneficial impacts to water resources would occur as a result of the Proposed Action. The Proposed Action would stabilize the east embankment of Goose Creek at Grace Hopper Bridge and reduce further erosion of the bank.

All necessary environmental permits for the project would be obtained in accordance with applicable state and federal regulations prior to commencing work.

4.2.3 Alternative 3

Minor impacts to water resources would likely occur during construction due to soil disturbances from grading the bank to place the articulating concrete block system and working within and at the edge of Goose Creek. The water resources impacts from implementation of Alternative 3 would be the comparable to the impacts outlined for Alternatives 1 and 2.

4.2.4 No Action Alternative

Under the No Action Alternative, existing conditions would continue to change. The bank would continue to erode due to stream and tidal flows and wave action from wind and boat traffic, contributing to increased turbidity in Goose Creek. Impacts from the No Action Alternative on water resources would be long-term and minor.

4.3 SOILS

4.3.1 Alternative 1

Adverse impacts to soils would only occur during construction. Upland soils and soils within Goose Creek would be graded and sloped to place the mattresses properly prior to filling the mattresses with grout. The use of standard construction BMPs would reduce impacts from erosion in upland soils. A boom and/or turbidity curtain would be used to contain increased turbidity in Goose Creek during construction. With the use of construction BMPs adverse impacts to soils would be short-term and minor.

The soils in the immediate vicinity of the bridge are highly disturbed and consist of fill material placed during construction of the Grace Hopper Bridge. Soils today likely represent a mix of source soils and fill that supported previous construction. The portion of the project area in Goose Creek would not be considered prime farmland. Because of the previous level of disturbance to soils where the mats would be placed and the fact that much of the project area is within the waters of Goose Creek, any impacts to soils classified as farmland of statewide importance would be expected to be negligible.

Long-term minor beneficial impacts to soils would occur as a result of the Proposed Action. The Proposed Action would halt the loss of soil due to erosion along the east bank of Goose Creek.

4.3.2 Alternative 2

Upland soils and soils within Goose Creek would be graded and sloped to place the gabion baskets. The soil impacts from implementation of Alternative 2 would be comparable to the impacts outlined for Alternative 1.

4.3.3 Alternative 3

Upland soils and soils within Goose Creek would be graded and sloped to place the articulating concrete block system. The soil impacts from implementation of Alternative 3 would be comparable to the impacts outlined for Alternative 1.

4.3.4 No Action Alternative

Under the No Action Alternative, existing conditions would continue to change. The bank would continue to erode due to stream and tidal flows and wave action from wind and boat traffic, contributing to a loss of soils and increased turbidity in Goose Creek. Minor long-term adverse impacts to soils would occur as a result of the No Action Alternative. Additionally, continued erosion could undermine the bridge abutments and ultimately cause the bridge to fail.

4.4 BIOLOGICAL RESOURCES

4.4.1 Coastal Resources

The Coastal Zone Management Act, as administered through South Carolina's Coastal Management Program, requires that the Air Force ensure that any activity in the coastal zone that affects land or water use or natural resources of the coastal zone be carried out in a manner consistent to the maximum extent practicable with the enforceable policies of federally approved state coastal management programs. A consistency determination for the Proposed Action is located in Appendix D. The Proposed Action has been determined to be consistent to the maximum extent practicable with the enforceable policies of the South Carolina Coastal Management Program and would not have significant impacts on coastal resources. SCDHEC Ocean and Coastal Resources Management Program concurred (Appendix D).

4.4.2 Alternative 1

Adverse impacts to biological resources could result from construction activities. The project area and adjacent work areas are located in Goose Creek and the upland area around the Grace Hopper bridge embankment. Ground disturbance activities resulting from implementation of the proposed action would be limited to rebuilding and reshaping the east bank of Goose Creek. There would be no loss of upland habitat. Approximately 3,600 square feet of streambed would be protected after installation of the grout mats, which would impact 0.09 acre or 110 linear feet of streambed and bank within Goose Creek. There would be no impacts to any marshland or other type of wetland. Impacts to Goose Creek and the floodplain were discussed in Section 4.2, Water Resources.
The proposed action would not result in changes to the general flow pattern of Goose Creek and would not impede movement of aquatic organisms. Implementation of appropriate BMPs during construction would prevent indirect impacts to protected aquatic species that might occur downstream of the project area. Additionally, in the long-term, the proposed action would decrease sedimentation and turbidity in and near the project area improving the habitat for aquatic fauna and flora.

Two federally listed endangered species, the Atlantic and shortnose sturgeon, could occur within the project area. These two sturgeon species also could occur downstream of the project area in the Cooper River. American alligator, federally listed as Threatened by Similarity of Appearance, is common to abundant on JB CHS-WS. American alligators could occur within the project area and within the general vicinity.

Based upon the list of potential listed species that could occur in the project area, the results of previous surveys on JB CHS, and the habitats observed during the site survey, no threatened or endangered species would be expected to occur in the area, except as transients. The habitats in the project vicinity are unsuitable to sustain resident populations of listed species. Because no federally listed species would occur in the immediate project area except as incidental transients, no impacts other than temporary displacement from the proposed work would be expected. Because no impacts would be expected, the proposed activity would not affect federally listed species under the jurisdiction of the USFWS and may affect, but is unlikely to adversely affect federally listed species under the jurisdiction of the National Marine Fisheries Service.

Several reptile species of state concern could occur within the project area. However, it is expected that wildlife would avoid the active construction sites and adjacent areas during construction. Negligible impacts on state protected or sensitive species would result from the Proposed Action.

Potential direct effects would include placement of fill material in designated EFH. Placement of supporting fill and grout-filled mattresses would result in permanent loss of a minor amount of EFH, which would not greatly reduce the available EFH in the area because the habitat in the area of fill is degraded from bank erosion. A long-term benefit to EFH in the area could result from decreased erosion and turbidity after the embankment is stabilized. The Department of the Air Force made a Determination of No Overall Adverse Effects on EFH and has requested NMFS concurrence with the determination. The effects of the construction activities to place the grout-filled mattresses and stabilize the east embankment were assessed to determine their potential to affect EFH on and in the vicinity of JB CHS-WS. The EFH Assessment (Appendix E) included an assessment of EFH in the Cooper River and associated marshes, tidal flats, and tidal creeks. The stabilized streambank would prevent further erosion of the channel, which would be a benefit to EFH at JB CHS-WS.

Consultations have been executed with USFWS and NOAA/NMFS (Habitat Conservation Division & Protected Resources Division). NMFS determined the proposed creek bank stabilization would adversely affect EFH. Therefore, NMFS provided EFH conservation recommendations that the project design should include a living shoreline approach, such as the incorporation of oyster bags and that the project should include BMPs to prevent grout spills including a response plan should a spill occur. JB CHS-WS concurs with the EFH conservation recommendations and will incorporate the recommendations into the project designs (Appendix B).

USFWS noted that the project area appears to contain suitable foraging habitat for the American wood stork, a federally endangered species. There is no suitable foraging habitat for the wood stork within or immediately adjacent to the proposed work area, but it does occur in the project vicinity and extends well beyond the project vicinity along Goose Creek and the Cooper River. Any wood stork would avoid the area of human disturbance and there would be no more than negligible impacts to Wood stork foraging in the area.

USFWS also indicated that the West Indian manatee can occur in these waters during the warmer months (May 15-October 15), and further noted that water-related activities during this time increase the chance of adversely affecting West Indian manatees (Appendix B). Use of the turbidity curtain would prevent West Indian manatee from entering the work area. The level of human activity and associated noise would likely make this species avoid the area if any came into Goose Creek during the period of implementation. Any impacts to this species would be negligible.

USFWS provided a recommendation to eliminate or reduce the potential impacts to the American wood stork and the West Indian manatee. Per the recommendation, to the maximum extent practicable, construction activities should take place between late October and early February when the wood stork and manatee are unlikely to be in the area. JB CHS-WS concurs with the USFWS recommendations and will incorporate the recommendations into the project designs as well as implement the Standard West Indian Manatee Protection Guidelines (Appendix B).

4.4.3 Alternative 2

The biological resources impacts from implementation of Alternative 2 would be equal to or less than impacts outlined for Alternative 1. Approximately 2,300 square feet of streambed would be protected after installation of the grout mats, which would impact 0.05 acre or 100 linear feet of streambed and bank within Goose Creek. In addition, there would be no need to incorporate oyster bags into the project design because the gabion baskets would provide a substrate suitable for colonization by oysters without the use of oyster bags. Potential impacts to wood stork and West Indian manatee would be the same as discussed for Alternative 1.

4.4.4 Alternative 3

The biological resources impacts from implementation of Alternative 3 would be similar to the impacts outlined for Alternative 1. However, there would be no need to incorporate oyster bags into the project design because the articulated concrete mats would provide a substrate suitable for colonization by oysters without the use of oyster bags. Potential impacts to wood stork and West Indian manatee would be the same as discussed for Alternative 1.

4.4.5 No Action Alternative

Under the No Action Alternative, existing conditions would continue to change and contribute to long-term impacts to biological resources. The creek bank would continue to erode and increase turbidity in Goose Creek, resulting in a lower quality habitat for aquatic flora and fauna.

4.5 NOISE

4.5.1 Alternative 1

During construction and demolition, noise would be above background levels except during aircraft flyovers (associated with regular air traffic from incoming and outgoing flights). Heavy equipment such as bulldozers, graders, backhoes, excavators, dump trucks, and cement trucks would generate noise that could affect onsite workers. Construction equipment typically emits noise in the 76- to 89-dBA range at 50 feet (Table 5). Increasing distance from the source decreases noise by 6 dBA when the distance is doubled. At 500 feet, construction noise would generally range from 56.5 to 68.5 dBA.

TABLE 5
Noise Levels of Construction Equipment at 50 and 500 Feet
JB CHS, South Carolina

Equipment	Noise Level at 50 ft (dBA)	Noise Level at 500 ft (dBA)
Earthmoving		
Front Loaders	79	59.5
Backhoes	85	65.5
Dozers	80	60.5
Graders	85	65.5
Trucks	82	62.5
Materials Handling		
Concrete Mixers	85	65.5
Concrete Pump	82	62.5
Crane	83	63.5
Stationary		
Pumps	76	56.5
Generator	78	58.5
Compressors	81	61.5
Impact		
Jack Hammers	88	68.5
Pneumatic Tools	86	66.5
Other		
Saws	78	58.5

Source: USEPA, 1971

The bridge is in a remote area of JB CHS-WS. There are no sensitive receptors near the Proposed Action that would perceive a change in noise. There is a golf course, Yeamans Hall Club, located approximately 4,500 feet to the northwest. At this distance, the loudest construction equipment would be less than 50 dBA, which would likely be near ambient noise levels at the golf course. There would be no impacts to sensitive receptors as a result of construction noise. Construction workers would use hearing protection and would follow Occupational Safety and Health Administration standards and procedures.

No long-term indirect or cumulative noise impacts are expected to occur as a result of the Proposed Action.

4.5.2 Alternative 2

The noise impacts from implementation of Alternative 2 would be comparable to the impacts outlined for Alternative 1.

4.5.3 Alternative 3

The noise impacts from implementation of Alternative 3 would be comparable to the impacts outlined for Alternative 1.

4.5.4 No Action Alternative

There would be no change in noise from current conditions under the No Action Alternative. Therefore, no impacts on noise would result from implementation of the No Action Alternative.

4.6 TRANSPORTATION

4.6.1 Alternative 1

Construction would cause impacts on roads and associated traffic on and near the installation. Traffic would increase during construction hours on roads in the vicinity of construction areas. It may be necessary to temporarily close sections of the bridge or road during construction due to placement/operations of the crane or other construction equipment. There would be limited disruption of traffic on Wilkinson Way and the bridge would generally remain open to traffic. Traffic control procedures, including flaggers, would minimize impacts on traffic flow. Any impacts to vehicle traffic using Grace Hopper Bridge would be temporary and minor.

Construction would temporarily close the eastern portion of the Goose Creek channel to boat traffic due to the placement of the boom and construction water borne work platform. The channel is wide enough at this location to allow private boat traffic to continue while the bank stabilization work is implemented. The water borne work platform would remain in the water for the project duration but would be out of the main navigation channel. While Goose Creek is a navigable channel, it is security-controlled by JB CHS where boat parking and fishing are prohibited. The work would be coordinated with the United States Coast Guard, and boat control procedures, including signs and illumination on the water borne work platform and shore (as necessary), would be employed to minimize impacts on boating traffic. There would be no significant impacts to river navigation. Any impacts to private boaters would be temporary and minor.

4.6.2 Alternative 2

Construction would cause impacts on roads and associated traffic on and near the installation. Traffic would increase during construction hours on roads in the vicinity of construction areas. It may be necessary to temporarily close sections of the bridge or road during construction due to placement/operations of the crane or other construction equipment. There would be limited disruption of traffic on Wilkinson Way and the bridge would generally remain open to traffic. Traffic control procedures, including flaggers, would minimize impacts on traffic flow. Any impacts to vehicle traffic using Grace Hopper Bridge would be temporary and minor.

Construction would temporarily close the eastern portion of the Goose Creek channel to boat traffic due to the placement of the boom and construction water borne work platform. The channel is wide enough at this location to allow private boat traffic to continue while the bank stabilization work is implemented. The water borne work platform would remain in the water for the project duration but would be out of the main navigation channel. While Goose Creek is a navigable channel, it is security-controlled by JB CHS where boat parking and fishing are prohibited. The work would be coordinated with the United States Coast Guard, and boat control procedures, including signs and illumination on the water borne work platform and shore (as necessary), would be employed to minimize impacts on boating traffic. There would be no significant impacts to river navigation. Any impacts to private boaters would be temporary and minor.

4.6.3 Alternative 3

The transportation impacts from implementation of Alternative 3 would be the comparable to impacts outlined for Alternative 2.

4.6.4 No Action Alternative

Implementation of the No Action alternative would maintain current traffic flow patterns and volumes. However, existing conditions would continue to change and could contribute to long-term impacts to transportation. The creek bank would continue to erode and potentially undermining the Grace Hopper Bridge. If the Grace Hopper Bridge were to be closed, an 8-mile detour would be required, which would result in increased traffic through other parts of JB CHS, increased fuel consumption and associated vehicle emissions, and increased costs for transport operations.

4.7 HAZARDOUS MATERIALS AND SOLID WASTE/HUMAN HEALTH AND SAFETY

4.7.1 Alternative 1

Construction of Alternative 1 would require the use of small quantities of potentially hazardous materials, such as gasoline, oils, and grease. Waste would be disposed of in an appropriate manner in compliance with the Hazardous Material Control Center policies. Impacts from hazardous materials during construction would be negligible.

All necessary environmental permits for the project would be obtained in accordance with applicable state and federal regulations prior to commencing work.

4.7.2 Alternative 2

The hazardous materials and solid waste/human health and safety impacts from implementation of Alternative 2 would be the same as the impacts outlined for Alternative 1.

4.7.3 Alternative 3

The hazardous materials and solid waste/human health and safety impacts from implementation of Alternative 3 would be the same as the impacts outlined for Alternative 1.

4.7.4 No Action Alternative

Under the No Action Alternative, there would be no increase in hazardous materials and no change from current conditions.

4.8 CUMULATIVE IMPACTS

The most severe environmental impacts may not result from the direct impacts of any particular action, but from the combination of impacts of multiple, independent actions over time. The President's Council on Environmental Quality (CEQ) regulations implementing NEPA define a cumulative impact for purposes of NEPA as follows:

Cumulative impact is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. (40 CFR Section 1508.7).

The range of alternatives considered must include the No Action Alternative as a benchmark against which to evaluate cumulative impacts.

According to CEQ guidelines, cumulative impacts analyses should be limited to the impacts that can be evaluated meaningfully by the decision-makers. The guidelines further indicate that the area to use in defining the cumulative impacts geographical boundary should extend to the point at which the resource is no longer affected significantly (CEQ, 1997).

Significant cumulative impacts would occur if incremental impacts of the Proposed Action were to add to the environmental impacts of past, present, and reasonably foreseeable actions, resulting in an adverse significant impact on regional resources. For an impact to be considered cumulative, these incremental impacts and potential incremental impacts must be related in space and time, so that they are either capable of combining (when considering potential incremental impacts of future projects) or have, in fact, combined (when considering impacts of current and past projects).

No significant cumulative impact would be likely from implementation of the Proposed Action under any of the considered alternatives. The Proposed Action would have limited potential to interact with other past, present, or reasonably foreseeable future actions to generate cumulative impacts. Erosion protection for the Grace Hopper Bridge would have limited potential to interact with other projects because the effects of the erosion protection would be limited to securing the Grace Hopper Bridge and its future use.

5.0 List of Preparers

Name	Degree(s)	Years of Experience
David Dunagan	MA, English	29

Name	Degree(s)	Years of Experience
Jesse Brown	MS, Biology	3
Josh Jamell	BS, Ecology	12
Betsy Jorgensen	BS, Biology	9
Sara Kent	BS, Biology	7
Richard Reaves	BS, PhD, Wildlife and Wetland Ecology	19
Layne Smith	MA, English	3
Christina Grignon	BA, English	9
Mark Epstein (JB CHS)	BS, Environmental Health/Engineering	34

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Appendixes

Appendix A
Erosion Repair Engineering Reports

2. BACKGROUND

Grace Hopper Bridge (Bridge #2328) is used to connect the main portion of Joint Base Charleston Weapons Station to the South Annex section. This bridge path is a heavily traveled route and crosses Goose Creek. Grace Hopper Bridge was inspected by NAVFAC Engineering Service Center in 2009. The resulting report concluded that the channel was migrating laterally, causing erosion at the east embankment. This erosion allowed for vertical cuts in the embankment, as well as under the existing vegetation on the banks both up and down stream. The general intent of this project is to provide an erosion protection along the abutment on the east bank of the waterway.

Three erosion protection techniques will be presented: gabion mattress, articulating concrete block system, and grout-filled mattress. Design will be based on user requirements. The new erosion protection will cover an area that will span from 50 feet north of the bridge to 30 feet south of the bridge; and from the existing rip rap/100-year water line at the base of the abutment out 30 feet to the mean low water level . A cost estimate will be created for each option (See Exhibit A).

Scour analysis is demonstrated and discussed in Exhibit C.

4. CIVIL BASIS OF DESIGN

The site/civil engineering design will be performed utilizing a topographic survey completed in September 2011. The limits of the survey extended 50 feet from mean low tide shoreline, 100 feet inland from mean high tide, and 200 feet along the shoreline of the abutment in the north and south directions.

A geotechnical report provided two soil boring 15 feet deep. These borings will help to provide information on the soil characteristics so that some design limits can be established for the erosion prevention.

Compiling the information from the survey, geotechnical report, and the Hydraulic Engineering Circular Numbers 18, 20, and 23, three erosion prevention techniques were determined to be the most useful. Prior to installing any of the options, it was decided that rock rip rap will be used to provide a more uniform slope at the location of the vertical cuts in the embankment. This rip rap will be overlaid with a non-woven geotextile fabric.

4.1 OPTION 1: GABION MATTRESS

This is constructed of several wire mesh cages that are filled with rocks. Stones used to fill the containers are preferred to be angular rock, but rounded cobbles are also used. Wire is typically galvanized or coated with polyvinyl chloride (PVC) to resist corrosion, and either welded or twisted into a lattice. The individual cages are then tied together by a variety of options.

To install gabion mattresses a filter layer should be placed on the subgrade. The mattresses can then be placed on top of this filter and oriented with the long dimension parallel to the flow. The individual mattresses should be connected by lacing wire and then filled. Anchors are not typically used, but may be necessary where bedrock is met at shallow depths.

Benefits:

- Wire mesh allows the gabions to deform and adapt to changes in the subgrade while maintaining stability
- When compared to riprap, less excavation of the bed is required, and smaller, more economical stone can be used

Drawbacks:

- The quality of the stream becomes an issue due to corrosion, and may demand an extra coating on the wire mesh system
- Require close observation and increased quality control to ensure a continuous countermeasure system when placed under water
- Cannot be pushed or pulled once on the geotextile

Estimated cost of Option 1 = $157,813

4.2 OPTION 2: ARTICULATING CONCRETE BLOCK SYSTEM

These systems consist of individual blocks which form a continuous blanket by interlocking, binding together by cables, or a combination of both. By being comprised of individual blocks, the system has the ability to conform to changes in the subgrade while remaining interconnected. Block systems are typically available in both open-cell and closed-cell varieties.

Installing the articulating concrete blocks involves providing a smooth subgrade using sand or road base material. The geotextile filter is added over the subgrade. The blocks are strung together by cables which are then pinned down at the corners of the system by 3 or 4 feet deep soil anchors.

Benefits:

- Available in different sizes and varieties
- The blocks are dense, durable, and flexible
- Provides an aesthetically pleasing uniform appearance

Drawbacks:

- Individual protruding blocks require additional design
- When a block looses contact from the subgrade it can lead to the failure of the system

Estimated cost of Option 2 = $169,602

4.3 OPTION 3: GROUT-FILLED MATTRESS

These mattresses are comprised of a double layer of strong synthetic fabric divided into individual compartments that are connected internally. Grout then flows through and fills each compartment and is reinforced by cables. The mattresses are then interconnected by a variety of methods to provide a uniform coverage of the desired area.

To install, these grout-filled mattresses are placed by initially using sand and gravel as backfill to help create the proper slope. Fabric forms are then placed on the filter layer. Cables are installed between the two layers of fabric and run through the ducts connecting them. The grout is injected into the mat starting at the lowest elevation.

Benefits:

- Quick installation
- Can protect where riprap of suitable sizes and quality is not available at a reasonable cost
- Forms can be placed and grout pumped in places where equipment is limited due to flexibility of the fabric prior to filling

Drawbacks:

- Require close observation and increased quality control when placing under water
- Cannot be pulled or pushed after it is filled with grout

Estimated cost of Option 3 = $139,074

4.4 APPLICABLE CODES AND STANDARDS

The following codes, standards, and publications will be used in the site/civil engineering design of the project:

- South Carolina Department of Health and Environmental Control (SCDHEC)
- Low Impact Design (LID)

4.5 MATERIAL SPECIFICATIONS

The following table identifies the materials to be specified for the Grace Hopper Bridge erosion protection sitework:

Table 4-1 *Sitework.*

Item	Materials and Design Criteria
Site Grading	See specification Section 02300 "Earthwork."

Source: O'Brien & Gere Engineers, Inc.
(Table by O'Brien & Gere Engineers, Inc.)

4.6 SITEWORK

4.6.1 Site Demolition

With the erosion protection extending along the embankment 50 feet from the bridge in each direction, some minor clearing and grubbing will be required.

4.6.2 Erosion and Sediment Control

The contractor shall stabilize all disturbed areas by the end of each work day.

4.6.3 Contractor's Lay down Area And Site Security

The contractor lay down area will be located to the south east of the construction area.

SCI
Construction Materials
Non Destructive
Geotechnical
Environmental

SOIL CONSULTANTS, INC.
ENGINEERS & GEOLOGISTS
Since 1951
P.O. Drawer 698 • Charleston, South Carolina 29402 • 843/723-4539 • Fax 843/723-3648

October 20, 2011

Lindbergh & Associates
2170 Ashley Phosphate Road, Suite 504
North Charleston, South Carolina 29406

Attention: Mr. Christopher Whitmore, P.E.

SCI Project 11094

Dear Mr. Whitmore:

The following analysis is given for the subsurface exploration performed at the site of the proposed erosion repair for the existing Grace Hopper Bridge along Wilkinson Way within the Joint Base Charleston Weapons Station in Goose Creek, South Carolina. The exploration was performed in general accordance with Soil Consultants, Inc. (SCI) Proposal No. 14-11-100A, dated August 19, 2011. This report provides a general discussion of the planned construction, the exploration procedures used, subsurface conditions encountered, seismic analysis, and site preparation and foundation recommendations.

SITE DESCRIPTION

The site of the proposed construction is along the east bank of Goose Creek beneath the existing Grace Hopper Bridge along Wilkinson Way within the Joint Base Charleston Weapons Station in Goose Creek, South Carolina. The proposed construction area is between the eastern bridge abutment and the first interior bridge bent from the east creek bank. Based on the information provided and observations at the site, we understand that the creek is experiencing lateral stream migration and as a result, the east embankment is eroding. At the time of our subsurface exploration, some of the existing granite rip rap had been washed away, and the creek had cut an approximately 3-foot vertical wall into the soil embankment.

SCOPE OF PROJECT

Based on project information provided, it is our understanding that the proposed project includes the repair and future prevention of soil erosion near the east abutment of the existing Grace Hopper Bridge. We have been provided photographs which show the existing site conditions and the general area where the erosion repair is necessary. We understand that several repair alternatives, including a gabion mattress, a grout-filled mattress, and an articulating concrete block system, are being considered at this time.

Although we understand that a retaining wall structure is not being considered as part of a repair alternative for this project at this time, we have provided pertinent geotechnical recommendations to aid in design of a retaining wall structure in case this alternative is considered in the future. Based on a telephone conversation with you, we understand that if a retaining wall structure is selected for this project, it would likely be a 40 to 50-foot long cast-in-place concrete cantilever wall. In addition, we understand that the wall would likely be 6 to 8 feet above the foundation depth, and the foundation would bear at a depth of 3 to 4 feet below the ground surface.

FIELD EXPLORATION

On September 22, 2011, we performed two soil borings, designated B-1 and B-2, using mud-rotary drilling procedures at the project site to depths of approximately 16½ feet below the existing creek bank surface. The borings were performed using tripod-mounted drilling equipment with split-spoon sampling and Standard Penetration Testing (SPT) performed at selected intervals. The borings were performed on the north and south sides of the bridge at the east river bank adjacent to the waterline at low tide (below the existing 3-foot eroded soil wall). Boring locations were staked at the site by our firm using a tape to measure distances and estimating right angles with reference to existing site features. In addition to the SPT borings, our representatives collected two "grab samples," designated S-1 and S-2, of the surface soils from the creek bottom at locations which were 5 feet and 10 feet, respectively, from the

RECOMMENDATIONS

As previously discussed, we understand that several repair alternatives are currently being considered for this project. At this time, we understand that the most-likely mitigation alternatives include a gabion mattress, a grout-filled mattress, or an articulating concrete block system, all of which would be placed on a geotextile mat or directly on prepared granular soil bedding. However, we have not been informed that a retaining wall or sea wall structure has been ruled out. Therefore, we have provided recommendations considering each of these alternatives so that the desired recommendations are included for whichever repair alternative is selected.

Grading and Drainage

As previously indicated, the proposed construction area is along the bank of Goose Creek which is a tidal creek branching off of the Cooper River. As such, the tidal fluctuations influence the creek surface elevation. During high tide, much of the proposed construction area is below the creek surface elevation. If soil excavation is required for this project, dewatering should be anticipated. Safety precautions must be taken to maintain the side slopes and bottoms of deeper excavations. With the potential for flooded conditions, significant consideration should be given to site drainage.

Site Preparation

Site preparation should begin with the removal of any existing riprap or other debris from the proposed construction area. Site grading for the proposed repair areas should be performed in accordance with the construction drawings for the project. If one of the three mattress alternatives is selected, the ground surface in the proposed construction area should be prepared such that the slope is no greater than 1 vertical to 2 horizontal and in accordance with the manufacturer's recommendations.

The existing surface soils within the proposed construction area and the bottoms of foundation excavations should be thoroughly and uniformly compacted in place. Any soft or unstable soils encountered during in-place compaction should be removed. Thoroughly compacted backfill and controlled fill should then be placed to the desired subgrade elevations. Recommendations for subgrade and backfill compaction are presented below.

Please note that care should be taken when performing excavation operations and compacting in-situ soils or backfill and fill adjacent to existing structures. If excavation operations are necessary adjacent to an existing structure, sheeting or shoring may be necessary to ensure that the existing foundations are not undermined.

Backfill and Controlled Fill

Backfill or controlled fill material should be non-plastic and granular in nature with a maximum of 12% passing the No. 200 sieve. Backfill and controlled fill soils should be as approved by the project geotechnical engineer and should generally consist of sands classified as SP, SP-SC, or SP-SM, according to the Unified Soil Classification System. In addition, backfill and controlled fill should be free of roots, organics, and debris.

Backfill and controlled fill should be placed in thin successive layers 8 to 10 inches thick loose measurement, and each layer should be compacted to at least 95% of its maximum laboratory dry density, within ±2% of its optimum moisture content, in accordance with ASTM D1557 (Modified Proctor). However, large vibrating compaction equipment should not be used immediately adjacent to existing or recently constructed facilities or structures. Hand operated compaction equipment may be used to compact soils in these areas. If hand-operated compaction equipment is used, the layer thickness should be reduced to approximately 6 inches thick loose measure.

In-place field density tests should be performed as backfill or controlled fill is being placed and compacted to ensure that required density and moisture conditions are being achieved. Since

PLAN NOTES:
1. INSTALL GEOTEXTILE FABRIC & RIPRAP SIM DETAIL.
2. INSTALL GROUT MATTRESS SIM RECOMMENDED BMPs ALONG WITH MANUFACTURER'S RECOMMENDATIONS.

SITE PLAN
SCALE: 1" = 10'

1"=10' 0 10 20

O'BRIEN & GERE ENGINEERS, INC.
2170 ASHLEY PHOSPHATE ROAD, SUITE 304
CHARLESTON, SC 29406 (843) 553-6670

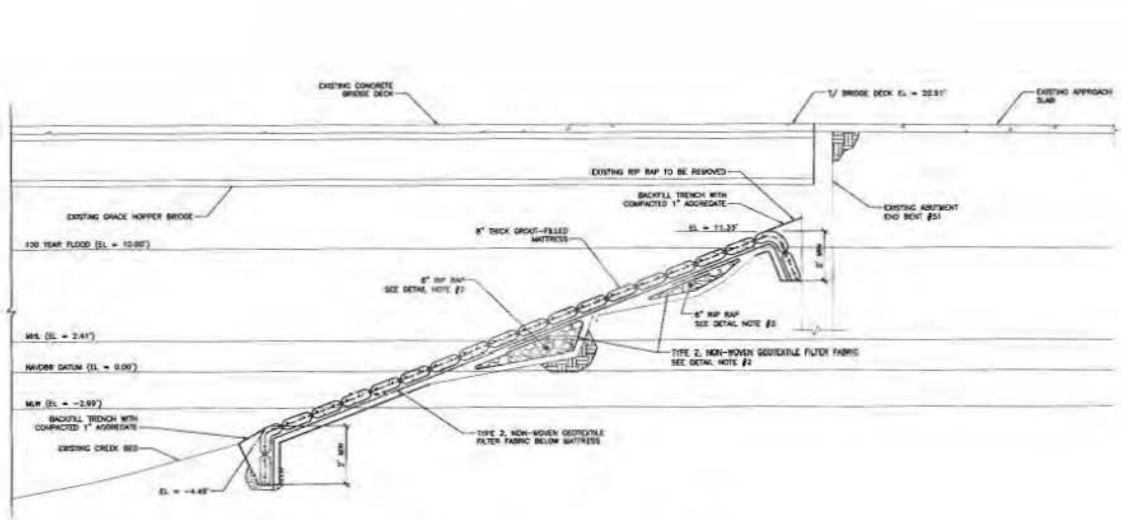
DRAWING REVISIONS

REV.	DESCRIPTION	PREP BY	DATE	APPR'D

JOINT BASE CHARLESTON
CHARLESTON, SC
NAVAL WEAPONS STATION
DEPARTMENT OF THE NAVY

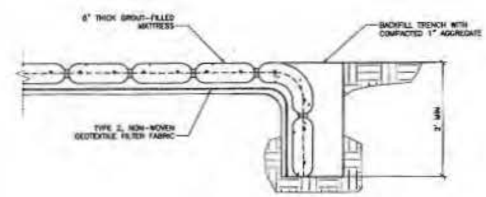
GRACE HOPPER BRIDGE
EROSION REPAIR
SITE PLAN

PROJECT NO: EROS 13-2004
RECORD DRAWING DATE: 5-18-12
SHEET 5 OF 6
C200



A/C600 GROUT-FILLED MATTRESS DETAIL
NOT TO SCALE

DETAIL NOTE:
1. EXISTING RIP RAP AT BASE OF ABUTMENT TO BE REMOVED, SEE PLAN FOR LIMITS.
2. FILL IN EXISTING VOIDS OF EMBANKMENT WITH RIP RAP WRAPPED IN TYPE 2, NON-WOVEN GEOTEXTILE FILTER FABRIC.



B/C600 TURN-DOWN DETAIL AT SIDES
NOT TO SCALE

O'BRIEN & GERE ENGINEERS, INC.
2170 ASHLEY PHOSPHATE ROAD, SUITE 504
CHARLESTON, SC 29406 (843) 553-6670

REV.	DESCRIPTION	PREP BY	DATE	APPR'D
	DRAWING REVISIONS			

DEPARTMENT OF THE AIR FORCE — AIR MOBILITY COMMAND
CHARLESTON AFB
CHARLESTON, SC
GRACE HOPPER BRIDGE
EROSION REPAIR
DETAILS

PROJECT NO. DKGV 11-2024
RECORD DRAWING DATE 5-18-12
SHEET 5 OF 5
C600

Basis of Design & Design Narrative

for the

Erosion Control at the Grace Hopper Bridge East Embankment

NWS Project No. DKGV 11-2024
Charleston Naval Weapons Station
Charleston, SC

Dated:
December 17, 2014

Prepared by:

Jon Guerry Taylor & Associates, Inc.
P.O. BOX 1082; MOUNT PLEASANT, SC 29465 USA
PHONE: 843.884.6415 • FAX: 843.884.4026 • www.jgtinc.com
Civil, Waterfront and Marine Planners & Engineers

Basis of Design:

Jon Guerry Taylor & Associates, Inc. (JGT) was commissioned to develop a solution to the erosion problem of the eastern bank beneath the Grace Hopper Bridge along Wilkinson Way. The Grace Hopper Bridge crosses Goose Creek. The eastern bank of the creek beneath the bridge is experiencing sever erosion due to being located along the outside curve of the creek. Outside curves of moving water bodies experience rapid erosion due to the impact of deflecting the currents. The soils of the bank are mostly consists of a sandy clay material. According to the upland survey and hydrographic/bathymetric survey, the upper bank directly beneath the bridge, appears to have a stable slope between approximately +10.0' (NAVD88) and +5.0' (NAVD88). The lower bank appears to be consistent and stable from approximately +1.0' (NAVD88) to approximately the Mean Low Water (MLW) elevation at approximately -3.0' (NAVD88). Between the elevations of approximately +5.0' (NAVD88) and +1.0' (NAVD88) the bank is near vertical and in some locations within the project area, the bank has been undermined. This area of the bank is unstable and is in risk of failure and further erosion. Goose Creek does experience tide flow and has an approximate tide range of 5.5 feet.

JGT proposes the use of rock-fill gabions and mattresses to stabilize the bank and prevent further erosion that may threaten the bridge structure. These structures come in a variety of sizes and shapes. This allows the mattresses and gabions to be stacked and easily conform or follow the slopes of the bank. For this site, the near vertical bank area between +1.0' and +5.0' (NAVD88) can be conformed to without the need of major grading or placement of large amounts of fill material.

Over time, the rock gabions and mattresses can allow vegetation to establish and further protect the bank.

Design Narrative:

The use of rock gabions and mattresses along the eastern eroded bank of Goose Creek beneath the Grace Hopper Bridge will minimize the amount of fill material, excavation and grading. Mean High Water (MHW) is +2.43' (NAVD88) and Mean Low Water (MLW) is -2.98' (NAVD88).

The vertical bank between approximate elevations +1.0' and +5.0' (NAVD88) will be stabilized using two (2) 3'x3' square rock filled gabions stacked with varying lengths. The top gabions will be staggered (offset) approximately 1.0 foot to the upland side to allow for long term stability and conform to the steep bank. The lower 3'x3' will be toed into the existing soil/bank to allow for structural stability and to allow the top gabion to extend approximately 1.0' above the existing grade.

Above (above approx. +5.0' NAVD88) and below (below approx. +1.0' NAVD88) the rock gabions, rock mattresses will be used to stabilize the banks from erosion. The rock mattresses will be 1.0' thick and will be in varying lengths and widths to properly cover the bank. These mattresses will be fastened to the adjacent gabions and mattresses.

Below the lower bank of mattresses will be a single layer if 3'x3' rock gabions. This layer of gabions will be closest to the creek channel and will be placed just below the MLW elevation. These gabions will be installed into the bank approximately 2.0' to offer toe protection of the mattresses and the bank and prevent undermining of the mattresses.

The areas between the existing riprap beneath the bridge and the top bank of rock mattresses will be filled in with one-man sized riprap placed on non-woven geotextile fabric.

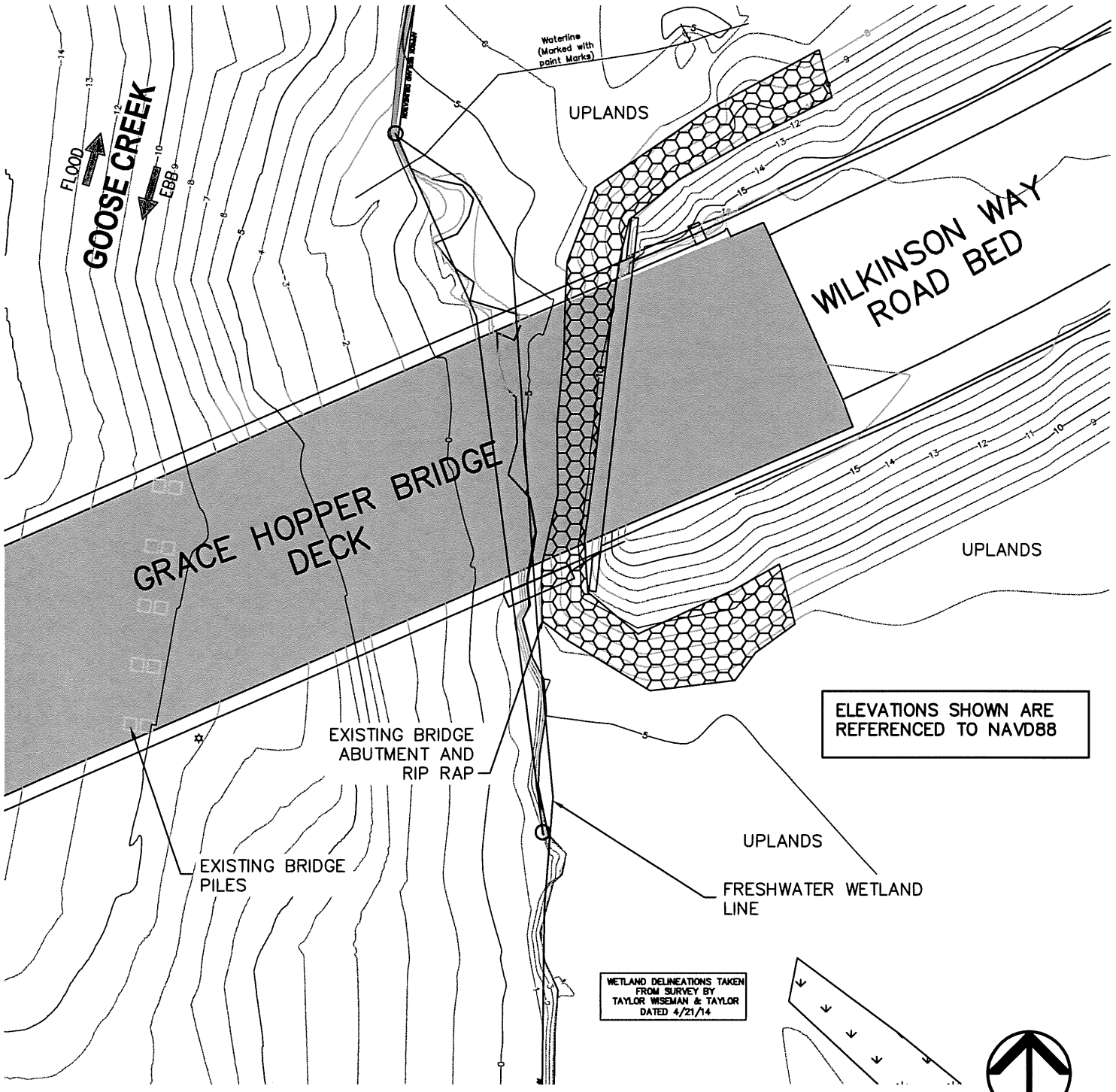
Void areas between the bank, the gabions and the mattresses will be filled with #57 stone and provide a base for the adjacent mattresses and gabions. The rock gabions and mattresses will be staggered horizontally with adjacent gabions and mattresses to avoid joints occurring in the same locations. All of the rock gabions and mattresses will be placed on a layer of non-woven geotextile fabric for separation and stabilization.

The gabions and mattresses will be constructed of 12 gauge welded wire mesh with a mesh opening of 3"x3". The mesh will be galvanized after welding. The gabions and mattresses will be PVC coated after being galvanized. The PVC coating and galvanizing will offer long tern corrosion protection from the salt water environment. 316 Stainless steel welded wire was considered for this project, however; the cost is approximately 3 times as that of PVC coated galvanized. All fasteners, spiral connectors and lacing wire will be 316 stainless steel or PVC coated galvanized steel.

Other Design Considerations:

With unprotected bank on the upstream and downstream side of the project area, JGT is considering adding another row of 3'x3' gabions along these edges to prevent future undermining of the gabions and mattresses. However, there is concern that the erosion upstream and downstream may exceed the +/-2.0' the 3'x3' gabions imbedded into the creek bank. Another consideration is the installation of sheet pile beneath the upstream

and downstream edge of the protected area. These would be short 10 foot long sheets installed at the edge of the mattresses and gabions. This sheet piling would create a barrier to prevent the migration of the erosion and create a “wall” to prevent undermining of the gabions and mattresses. The sheet piling material could be steel, aluminum or composite.



THE WIDTH OF GOOSE CREEK AT THIS LOCATION IS 512' FROM MARSHGRASS TO MARSHGRASS. THIS SITE IS OUTSIDE OF THE OCRM CRITICAL AREA.

LAT.: 32° 55' 07.34" N
LONG.: −79° 57' 23.57" W

EXISTING CONDITIONS
PLAN VIEW

0 20
GRAPHIC SCALE 1" = 20'

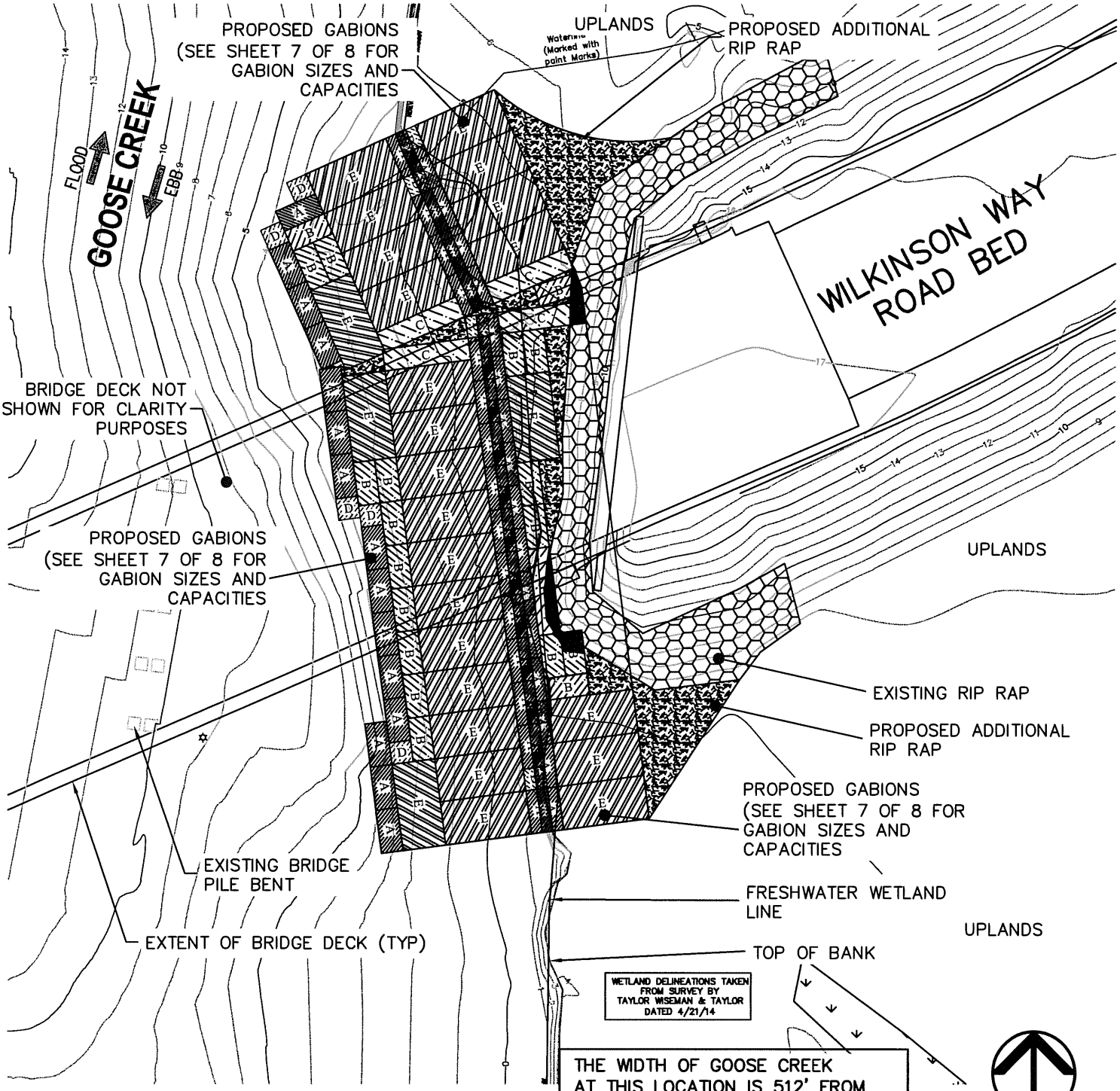
AUTHORIZED AGENT:
JON GUERRY TAYLOR & ASSOCIATES, INC.
P.O. BOX 1082
MT. PLEASANT, SC 29465
c/o CRAIG PAWLYK

GRACE HOPPER BRIDGE EROSION CONTROL
JOINT BASE CHARLESTON

CITY OF GOOSE CREEK
BERKELEY COUNTY, SC

PROPOSED:
INSTALL ROCK GABIONS TO PREVENT FURTHER EROSION AT THE BRIDGE

IN: CITY OF GOOSE CREEK ON: GOOSE CREEK
COUNTY: BERKELEY STATE: SOUTH CAROLINA
DATE: 12/18/2014 REVISED DATE: SHEET: 3 OF 8



PROPOSED IMPROVEMENTS
PLAN VIEW

LAT.: 32° 55' 07.34" N
LONG.: −79° 57' 23.57" W

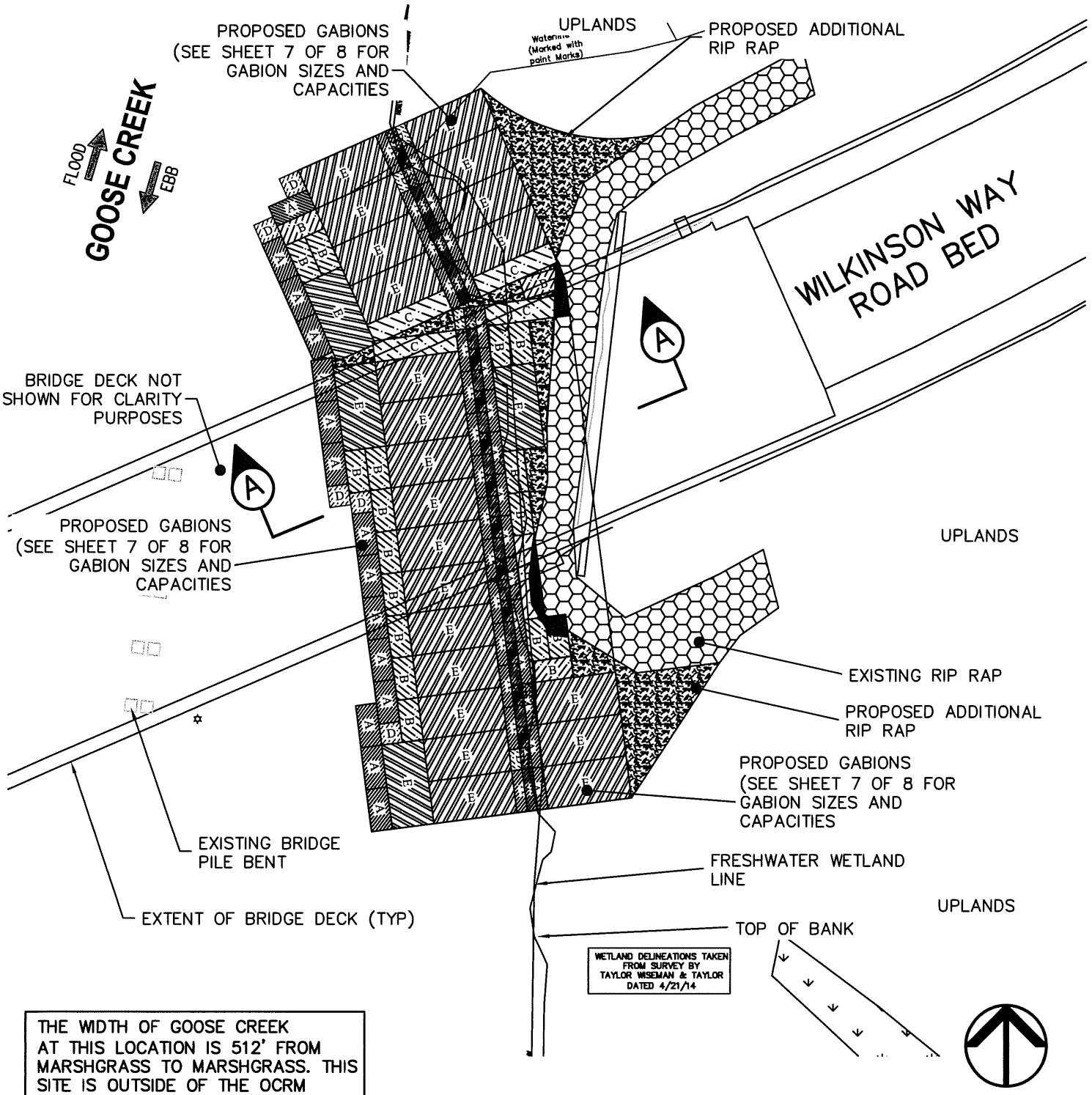
AUTHORIZED AGENT:
JON GUERRY TAYLOR & ASSOCIATES, INC.
P.O. BOX 1082
MT. PLEASANT, SC 29465
c/o CRAIG PAWLYK

GRACE HOPPER BRIDGE
EROSION CONTROL
JOINT BASE CHARLESTON

CITY OF GOOSE CREEK
BERKELEY COUNTY, SC

PROPOSED:
INSTALL ROCK GABIONS TO PREVENT FURTHER EROSION AT THE BRIDGE

IN: CITY OF GOOSE CREEK ON: GOOSE CREEK
COUNTY: BERKELEY STATE: SOUTH CAROLINA
DATE: 12/18/2014 REVISED DATE: SHEET: 4 OF 8



THE WIDTH OF GOOSE CREEK AT THIS LOCATION IS 512' FROM MARSHGRASS TO MARSHGRASS. THIS SITE IS OUTSIDE OF THE OCRM CRITICAL AREA.

PROPOSED IMPROVEMENTS
PLAN VIEW
(WITHOUT CONTOURS FOR CLARITY)

0 20
GRAPHIC SCALE 1" = 20'

LAT.: 32° 55' 07.34" N
LONG.: −79° 57' 23.57" W

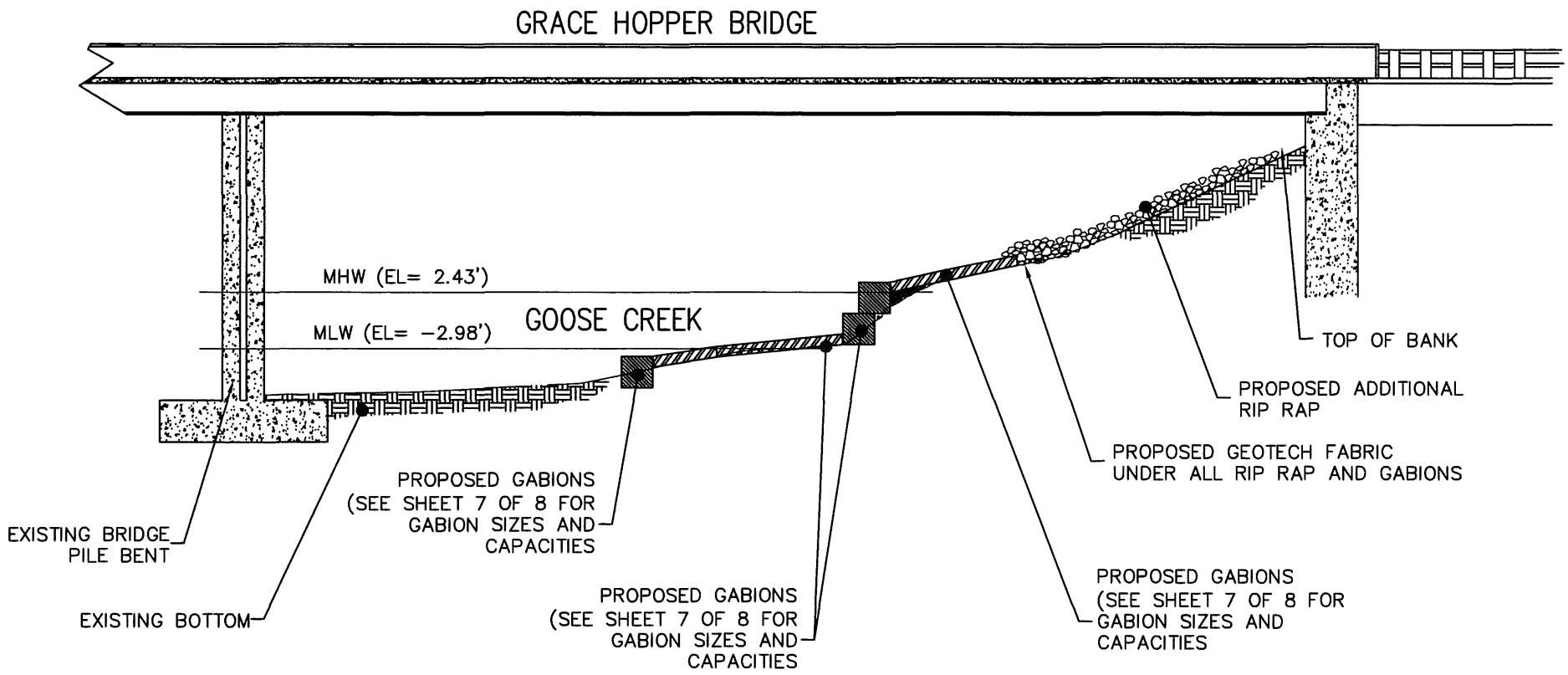
AUTHORIZED AGENT:
JON GUERRY TAYLOR & ASSOCIATES, INC.
P.O. BOX 1082
MT. PLEASANT, SC 29465
c/o CRAIG PAWLYK

GRACE HOPPER BRIDGE EROSION CONTROL
JOINT BASE CHARLESTON

CITY OF GOOSE CREEK
BERKELEY COUNTY, SC

PROPOSED:
INSTALL ROCK GABIONS TO PREVENT FURTHER EROSION AT THE BRIDGE

IN: CITY OF GOOSE CREEK ON: GOOSE CREEK
COUNTY: BERKELEY STATE: SOUTH CAROLINA
DATE: 12/18/2014 REVISED DATE: SHEET: 5 OF 8



LAT.: 32° 55' 07.34" N
LONG.: -79° 57' 23.57" W

SECTION A-A

N.T.S.

AUTHORIZED AGENT:
JON GUERRY TAYLOR & ASSOCIATES, INC.
P.O. BOX 1082
MT. PLEASANT, SC 29465
c/o CRAIG PAWLYK

GRACE HOPPER BRIDGE
EROSION CONTROL
JOINT BASE CHARLESTON

CITY OF GOOSE CREEK
BERKELEY COUNTY, SC

PROPOSED:
INSTALL ROCK GABIONS TO PREVENT FURTHER EROSION AT THE BRIDGE

IN: CITY OF GOOSE CREEK ON: GOOSE CREEK
COUNTY: BERKELEY STATE: SOUTH CAROLINA
DATE: 12/18/2014 REVISED DATE: SHEET: 6 OF 8

GABION SCHEDULE AND QUANTITIES BELOW MEAN HIGH WATER

GABION A (6x3x3): 46 PCS (18 SF AREA / 2 CY CAPACITY EACH)
GABION B (6x3x1): 11 PCS (18 SF AREA / .67 CY CAPACITY EACH)
GABION C (12x3x1): 2 PCS (36 SF AREA / 1.33 CY CAPACITY EACH)
GABION D (3x3x3): 10 PCS (9 SF AREA / 1 CY CAPACITY EACH)
GABION E (12x6x1): 18 PCS (72 SF AREA / 2.7 CY CAPACITY EACH)

TOTAL AMOUNT OF GABIONS INSTALLED BELOW MHW: 87
TOTAL GABION COVERAGE AREA: 2,300 SF (0.052 AC.)
TOTAL GABION CAPACITY (VOLUME) BELOW MHW: 160.62 CY OF ROCK FILL
GEOTEX FABRIC COVERAGE AREA (BENEATH GABIONS): 2,300 SF

GABION DETAIL (DIMENSIONS VARY)
N.T.S.

GABION SCHEDULE, QUANTITIES AND DETAIL

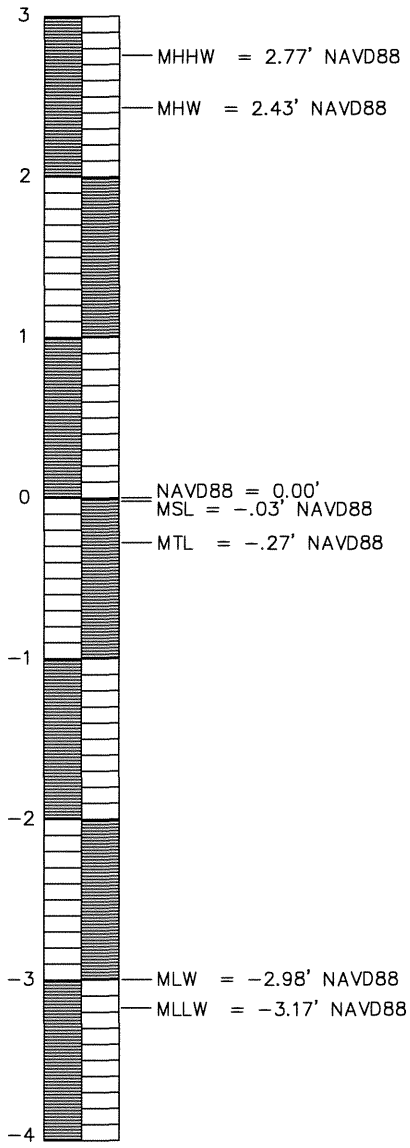
AUTHORIZED AGENT:
JON GUERRY TAYLOR & ASSOCIATES, INC.
P.O. BOX 1082
MT. PLEASANT, SC 29465
c/o CRAIG PAWLYK

GRACE HOPPER BRIDGE
EROSION CONTROL
JOINT BASE CHARLESTON

CITY OF GOOSE CREEK
BERKELEY COUNTY, SC

PROPOSED:
INSTALL ROCK GABIONS TO PREVENT FURTHER EROSION AT THE BRIDGE

IN: CITY OF GOOSE CREEK ON: GOOSE CREEK
COUNTY: BERKELEY STATE: SOUTH CAROLINA
DATE: 12/18/2014 REVISED DATE: SHEET: 7 OF 8



(DATUM RELATIONSHIPS)

TIDE RANGE SCALE

NOT TO SCALE

TIDESCALE

AUTHORIZED AGENT:
JON GUERRY TAYLOR & ASSOCIATES, INC.
P.O. BOX 1082
MT. PLEASANT, SC 29465
c/o CRAIG PAWLYK

GRACE HOPPER BRIDGE
EROSION CONTROL
JOINT BASE CHARLESTON

CITY OF GOOSE CREEK
BERKELEY COUNTY, SC

PROPOSED:
INSTALL ROCK GABIONS TO PREVENT FURTHER EROSION AT THE BRIDGE

IN: CITY OF GOOSE CREEK ON: GOOSE CREEK
COUNTY: BERKELEY STATE: SOUTH CAROLINA
DATE: 12/18/2014 REVISED DATE: SHEET: 8 OF 8

Appendix B
Correspondence, Notice of Availability, Comments, and Responses

NEPA SCOPING LETTERS

AND

RESPONSES

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 628TH AIR BASE WING (AMC)
CHARLESTON AIR FORCE BASE, SC

17 July 2014

MEMORANDUM FOR See Distribution List

FROM: 628 CES/CEN
210 W. Stewart Ave.
Joint Base Charleston, SC 29404-4827

SUBJECT: Preparation of Environmental Assessment for Grace Hopper Bridge Embankment Repair at Joint Base Charleston – Weapons Station

Joint Base Charleston (JB CHS) is preparing an Environmental Assessment (EA) in accordance with the National Environmental Policy Act to analyze the potential impacts and environmental consequences associated with erosion stabilization on the east stream bank of Goose Creek at the Grace Hopper Bridge within the boundaries of JB CHS Weapons Station. Recent inspections indicated that the channel of Goose Creek was migrating laterally, causing erosion at the east embankment, which could potentially undermine the bridge unless corrective action is taken. The action is needed to stabilize the stream bank and prevent further degradation of the embankment.

The Proposed Action is to repair and provide erosion protection along the east bank of Goose Creek at the Grace Hopper Bridge. Three alternatives were determined to be reasonable to meet the project objectives, and these alternatives will be carried forward, along with the No Action Alternative, for detailed analysis in the EA. The considered action alternatives consist of different methods to provide erosion protection. Construction activities would be confined to a barge near the east bank and designated on-shore work areas. A figure depicting the limits of the work area is attached. There would be no disruption to boat traffic on Goose Creek or vehicle traffic on Wilkinson Way, as both the bridge and the stream channel would remain open.

We respectfully request your comments and concerns regarding the proposed action. JB CHS will provide a copy of the draft EA during the government and public comment period. If you have any questions about this action or any concerns, please contact:

Mark Epstein
628 CES/CENPL
210 W. Stewart Ave.
Joint Base Charleston, SC 29404-4827
Phone: 843-963-1458
Email: mark.epstein@us.af.mil

Sincerely,

William C. Dean

William C. Dean, DAFC
Chief, Engineering Flight

Attachments: Distribution List
Map of Project Area and Limits of Disturbance

INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING LIST

Federal Agency Contacts

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Charleston, SC 29407

jay_herrington@fws.gov
843-727-4707 ext. 212

Ms. Robin Coller-Socha
U.S. Army Corps of Engineers
Charleston District
Regulatory Division
69-A Hagood Avenue
Charleston, SC 29403-5107

robin.c.socha@usace.army.mil
843-329-8044

U.S. Department of Commence
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southern Regional Office
Protected Resource Division
263 13th Avenue South
St. Petersburg, FL 33701-5505

Ms. Jaclyn Daly
U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southern Regional Office
Habitat Conservation Division/Atlantic Branch
219 Fort Johnson Road
Charleston, SC 29412

Jaclyn.Daly@noaa.gov
843-762-8604

U.S. Coast Guard
Sector Charleston Command Center
196 Tradd Street
Charleston, SC 29401-1817

State and Local Agency Contacts

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Regional Director
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South Carolina Department of Health and Environmental Control
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Charleston, SC 29405

sanforcc@dhec.sc.gov
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Mr. Bob Perry
Director of Environmental Programs
South Carolina Department of Natural Resources
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Columbia, SC 29202-0167
perryb@dnr.sc.gov
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Mr. Blair Williams
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South Carolina Dept of Health and Environmental Control
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williabn@dhec.sc.gov
843-953-0232

Ms. Elizabeth Johnson
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Eric Greenway, Director
Berkeley County Planning and Zoning Department
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Moncks Corner, SC 29461-6120
843-719-4095

Charleston County Zoning and Planning Department
Lonnie Hamilton, III Public Services Building
4045 Bridge View Drive
North Charleston, SC 29405
843-202-7200

Local Contacts

Mayor R. Keith Summey
2500 City Hall Lane
North Charleston, South Carolina 29406
mayor@northcharleston.org
843-740-2504

Mayor Michael J. Heitzler
P.O. Drawer 1768
Goose Creek, SC 29445-1768
mheitzler@cityofgoosecreek.com
843-797-6220 x 1111

Bryan Derreberry
Executive Director
Charleston Metro Chamber of Commerce
4500 Leeds Avenue, Suite 100,
North Charleston, SC 29405
bderreberry@charlestonchamber.org
843-805-3100

Cyrus Buffum
Charleston Water Keepers
info@charlestonwaterkeeper.org
843-607-3390

P.O. Box 29
Charleston, SC 29402

Ms. Sharon Brennen, Executive Director
Charleston Local Development Corporation
75 Calhoun Street, 3rd Floor
Charleston, SC 29401
sharon@charlestonldc.com
843-724-3796

Mr. Scott Whitaker
Executive Director
Coastal Conservation Association – South Carolina Chapter
3021-10 McNaughton Drive, Columbia, SC 29223
info@ccasouthcarolina.com
803-865-4164

Mr. Dana Beach
Executive Director
Coastal Conservation League –Charleston Office
328 East Bay Street
Post Office Box 1765
Charleston, SC 29402
danabeach@scccl.org
843-723-8035

Mr. David J. Wielicki
Executive Director
South Carolina Waterfowl Association
9833 Old River Road
Pinewood, SC 29125
contact@scwa.org
803-452-6001

Yeamans Hall Club
900 Yeamans Hall Road
Charleston, SC 29410
843-747-8855

D H E C
PROMOTE PROTECT PROSPER
Catherine B. Templeton, Director
Promoting and protecting the health of the public and the environment

August 4, 2014

Mr. Mark Epstein
628 CES/CENPL
210 West Stewart Street
Joint Base Charleston, SC 29404-4827

Re: Preparation of Environmental Assessment for Grace Hopper Bridge Embankment Repair at Joint Base Charleston – Weapons Station

Dear Mr. Epstein:

On July 23, 2014, we received a memorandum dated July 17, 2014, about the Environmental Assessment being prepared for an erosion stabilization project planned for the east stream bank of Goose Creek at the Grace Hopper Bridge, within the boundaries of the Joint Base Charleston Weapons Station, Charleston County, SC. *Based on the information provided, I am responding on behalf of the South Carolina Department of Health and Environmental Control, Bureau of Air Quality (Bureau).*

The Bureau is tasked with implementing the Federal Clean Air Act (1990, as amended) in the State of South Carolina. The Bureau is required to ensure compliance with the National Ambient Air Quality Standards (NAAQS) for criteria pollutants. Currently two criteria pollutants are of particular concern in South Carolina:

- **Ozone** – The 2008 8-hour ozone standards (primary and secondary) are currently set at 0.075 parts per million (ppm). The area represented in this proposal is meeting the 2008 ozone standards. The Environmental Protection Agency (EPA) is currently reviewing the 2008 ozone standard and the proposal of a new standard is anticipated.

- **Particulate Matter 2.5** (Particulates 2.5 microns in size and smaller) – The 2012 standard for maximum daily concentration is set at 35 micrograms per cubic meter. The 2012 standard for the maximum annual concentration is set at 12 micrograms per cubic meter. The area represented in this proposal is meeting the 2012 particulate matter 2.5 standards.

Presently only the eastern portion of York County has been designated nonattainment for the 2008 8-hour ozone NAAQS. For more information on which areas have been designated nonattainment, please visit http://www.epa.gov/oar/oaqps/greenbk. If a project is located in a nonattainment area, it may be subject to prescriptive requirements such as Transportation Conformity or air quality modeling.

An asbestos survey and project license may be required prior to any demolition activities such as deconstruction of a building or removal of structures in the right-of-way of a road project. If you have any questions regarding asbestos regulatory applicability you may contact Robin Mack (with the Bureau's Asbestos Section) at (803) 898-4270 or mackrs@dhec.sc.gov.

All necessary environmental permits for the subject project must be obtained in accordance with applicable state and federal regulations. If you have not already done so, please contact the Bureau of Water at (803) 898-4300 and the Bureau of Land and Waste Management at (803) 898-2000 for input regarding those program areas' assessments of this proposed project.

From the figure depicting the work area attached to the memorandum, it appears that construction of an access road may be required, in addition to the direct construction activities associated with the erosion stabilization. Emissions from construction equipment are regulated by federal standards. The Bureau would like to offer the following suggestions on how this project can help us stay in compliance with the NAAQS. More importantly, these strategies are beneficial to the health of citizens of South Carolina.

- Utilize alternatively fueled equipment.
- Utilize emission controls applicable to your equipment.
- Reduce idling time on equipment.
- Fugitive dust emissions should be minimized through good operating practices.

The Bureau can provide model clean construction contract language. A vendor may need to retrofit, repower or replace older and more polluting diesel construction equipment in order to satisfy clean construction requirements. These types of projects can be financed with Congestion Mitigation and Air Quality (CMAQ) funds, and are in fact a high priority for CMAQ funding. Please contact our office if assistance is needed.

Thank you for the opportunity to comment on this project. Should you have any further questions or comments concerning this matter, please do not hesitate to contact me at (803) 898-4122 or at robertln@dhec.sc.gov.

Sincerely,

L. Nelson Roberts, Jr.

L. Nelson Roberts, Jr., Manager
Air Quality Standards and Assessment Section
SCDHEC Bureau of Air Quality

ec: Wendy Boswell, Low Country EQC McMillan Office, boswelwm@dhec.sc.gov
Shelly Wilson, Federal Facilities Liaison, wilsonmd@dhec.sc.gov

DEPARTMENT OF THE ARMY
CHARLESTON DISTRICT, CORPS OF ENGINEERS
69A Hagood Avenue
CHARLESTON, SOUTH CAROLINA 29403-5107

REPLY TO
ATTENTION OF

August 4, 2014

Regulatory Division

Mr. Mark Epstein
U.S. Air Force, Joint Base Charleston
628 CES/CENPL
210 W. Stewart Avenue
Joint Base Charleston, South Carolina 29404-4827

Dear Mr. Epstein:

This is in response to your letter which was received on July 24, 2014, requesting comments from this office regarding proposed bank stabilization along the east bank of Goose Creek at the Grace Hopper Bridge in Berkeley County, South Carolina. This request was submitted as part of your preparation of an Environmental Assessment for the proposed project.

A letter and associated jurisdictional determination from this office dated June 9, 2014, sent to Ms. Elizabeth Jorgensen of CH2M Hill and copied to you, identified 0.09 acres or 231 linear feet of waters of the United States within the regulatory authority of this office in your project area. Under Section 10 of the Rivers and Harbors Act of 1899, and Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers has regulatory authority over construction, excavation, or deposition of materials in, over, or under navigable waters of the United States. Under Section 404 of the Clean Water Act, the U.S. Army Corps of Engineers regulates the discharge of dredged or fill material into waters of the United States, including freshwater wetlands.

Our observation is that the work described above would require a Department of the Army permit for proposed work in waters of the U.S. For your convenience and future use, I am enclosing a Joint Application For Permit.

Please use your project number, SAC-2014-00137-2JU on all future correspondence. If you have any questions concerning this matter, please contact Steven Currie at 843-329-8044 or toll-free at 1-866-329-8187.

Respectfully,

Mary Hope Green
Watershed Manager

Enclosure:
Joint Application For Permit

US ARMY CORPS OF ENGINEERS

WATERS OF US

JURISDICTIONAL DETERMINATION

DEPARTMENT OF THE ARMY
CHARLESTON DISTRICT, CORPS OF ENGINEERS
69A Hagood Avenue
CHARLESTON, SOUTH CAROLINA 29403-5107

REPLY TO
ATTENTION OF

June 9, 2014

Regulatory Division

Mr. Elizabeth Jorgensen
CH2M Hill
Northpark 400
1000 Abernathy Road, Suite 1600
Atlanta, Georgia 30342

Dear Ms. Jorgensen:

This is in response to your letter which was received on February 3, 2014, requesting a wetland determination, on behalf of the U.S. Air Force/Joint Base Charleston, for a 0.55 acre tract located adjacent to Grace Hopper Bridge, Berkeley County, South Carolina. The project area is depicted on the survey plat you submitted which was prepared by Taylor Wiseman & Taylor, dated November 7, 2013, revised on April 21, 2014, and entitled "Wetland Location Survey, Grace Hopper Bridge, Joint Base Charleston, Berkeley County-Goose Creek, SC".

This plat depicts surveyed boundaries of wetlands or other waters of the United States as established by your office. You have requested that this office verify the accuracy of this mapping as a true representation of wetlands or other waters of the United States within the regulatory authority of this office. The property in question contains 0.09 acres or 231 linear feet of federally defined jurisdictional waters of the United States subject to the jurisdiction of this office. The location and configuration of these areas are reflected on the plat referenced above.

Based on an on-site inspection and a review of aerial photography and soil survey information, it has been determined that the surveyed jurisdictional boundaries shown on the referenced plat are an accurate representation of jurisdictional areas within our regulatory authority. This office should be contacted prior to performing any work in these areas. Enclosed is a form describing the basis of jurisdiction for the areas in question. You should also be aware that these areas may be subject to restrictions or requirements of other state or local governmental entities.

If a permit application is forthcoming as a result of this delineation, a copy of this letter, as well as the verified survey plat, should be submitted as part of the application. Otherwise, a delay could occur in confirming that a delineation was performed for the permit project area.

Please be advised that this determination is valid for five (5) years from the date of this letter unless new information warrants revision of the delineation before the expiration date. All actions concerning this determination must be complete within this time frame, or an additional delineation must be conducted. This **approved** jurisdictional determination is an appealable action under the Corps of Engineers administrative appeal procedures defined at 33 CFR 331. The administrative appeal options, process and appeals request form is attached for your convenience and use.

This delineation/determination has been conducted to identify the limits of U. S. Army Corps of Engineers (COE) Clean Water Act jurisdiction for the particular site identified in this request. This delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

In future correspondence concerning this matter, please refer to SAC-2014-00137-2JU. You may still need state or local assent. Prior to performing any work, you should contact the South Carolina Department of Health and Environmental Control Office of Ocean and Coastal Resource Management. A copy of this letter is being forwarded to them for their information.

If you have any questions concerning this matter, please contact Steven Currie at 843-329-8044 or toll free at 1-866-329-8187.

Respectfully,

Mary Hope Green
Watershed Manager

Enclosures:
Approved Jurisdictional Determination Form
Notification of Appeal Options

Copy Furnished:

South Carolina Department of Health
and Environmental Control
Office of Ocean and Coastal
Resource Management
1362 McMillan Avenue, Suite 400
Charleston, South Carolina 29405

Mr. Mark Epstein
U.S. Air Force, Joint Base Charleston
210 W. Stewart Avenue
628 CES/CEIEP
Joint Base Charleston, South Carolina 29404

CH2M HILL
400 Embassy Row
6600 Peachtree Dunwoody Rd
Suite 600
Atlanta, GA 30328
Tel 770.604.9095
Fax 770.604.9183

CH2MHILL

April 22, 2014

Steven Currie
U.S. Army Corps of Engineers, Charleston District
69A Hagood Avenue
Charleston, SC 29403-0919

Subject: Revised Survey Plat and Wetland Report for Grace Hopper Bridge – Joint Based Charleston – Weapons Station in Berkeley County, South Carolina

Dear Mr. Currie,

Potentially jurisdictional wetlands and waters of the United States (U.S.) were delineated on November 7, 2013, for the Grace Hopper Bridge Project on Joint Base Charleston – Weapons Station (JB CHS-WS). The project area is on JB CHS-WS in Berkeley County, South Carolina, approximately 10 miles northwest of Charleston. The Grace Hopper Bridge (Bridge #2328) crosses Goose Creek, a tidal tributary of the Cooper River, on Wilkinson Way on JB CHS-WS. The project impact area is along the east bank of Goose Creek beneath the Grace Hopper Bridge and extends approximately 50 feet to the north and south of the bridge. In addition, the project area extends approximately 35 feet into Goose Creek.

An Accurate-Approved Jurisdictional Determination Request and Wetland Report were submitted on January 14, 2014. A Jurisdictional Determination site visit was conducted by the Charleston Regulatory District on March 26, 2014. A feature identified as estuarine wetland (W001) within the project area was determined by USACE not to meet the soils criteria and, therefore, has been reclassified as a non-jurisdictional feature that is not subject to regulation under the CWA. The feature has been removed from the Survey Plat. A full-sized signed and sealed revised Survey Plat, a letter-sized copy of the revised Survey Plat, and the revised Wetland Report are included as attachments.

We appreciate your review of the enclosed information. Please contact Mark Epstein, 843-963-1458, if you require additional information from JB CHS-WS. If you require any additional information about the revised Survey Plat or Wetland Report, please call or email Betsy Jorgensen at 678-530-4408 and elizabeth.jorgensen@ch2m.com, or call Dr. Rich Reaves at 678-530-4285.

Sincerely,

Rich Reaves
Environmental Scientist

Attachments:
Revised Survey Plat
Revised Wetland Report

GENERAL NOTES

1) UNIT OF MEASUREMENT IS INTERNATIONAL FEET (IFT) UNLESS SPECIFICALLY NOTED AS METERS (m).

2) ALL DISTANCES AND COORDINATES SHOWN HEREON ARE "GROUND" VALUES.

3) ELEVATIONS BASED UPON NAVD88, ESTABLISHED BY A GPS NETWORK USING GEOID12A(CONUS).

4) PROJECT LIMITS DELINEATED WITH RED FLAGGING PLACED BY MARK EPSTEIN, GS-819-12, BASE ENVIRONMENTAL PLANNER, JOINT BASE CHARLESTON.

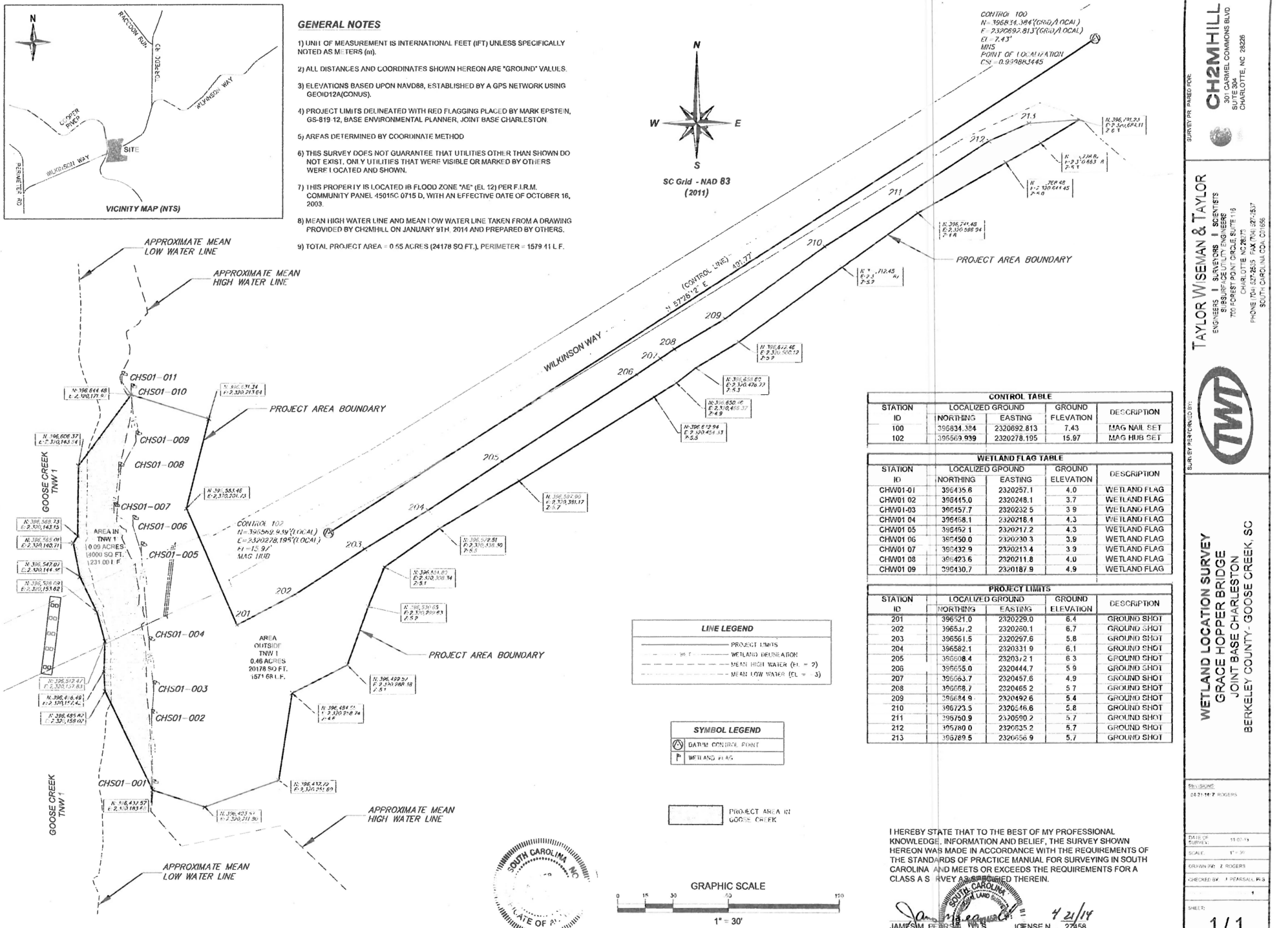
5) AREAS DETERMINED BY COORDINATE METHOD

6) THIS SURVEY DOES NOT GUARANTEE THAT UTILITIES OTHER THAN SHOWN DO NOT EXIST, ONLY UTILITIES THAT WERE VISIBLE OR MARKED BY OTHERS WERE LOCATED AND SHOWN.

7) THIS PROPERTY IS LOCATED IB FLOOD ZONE "AE" (EL 12) PER F.I.R.M. COMMUNITY PANEL 45015C 0715 D, WITH AN EFFECTIVE DATE OF OCTOBER 16, 2003.

8) MEAN HIGH WATER LINE AND MEAN LOW WATER LINE TAKEN FROM A DRAWING PROVIDED BY CH2MHILL ON JANUARY 9TH, 2014 AND PREPARED BY OTHERS.

9) TOTAL PROJECT AREA = 0.55 ACRES (24178 SQ.FT.), PERIMETER = 1579.11 L.F.



CONTROL TABLE				
STATION ID	LOCALIZED GROUND NORTHING	LOCALIZED GROUND EASTING	GROUND ELEVATION	DESCRIPTION
100	396834.384	2320692.813	7.43	MAG NAIL SET
102	396569.939	2320278.195	15.97	MAG HUB SET

WETLAND FLAG TABLE				
STATION ID	LOCALIZED GROUND NORTHING	LOCALIZED GROUND EASTING	GROUND ELEVATION	DESCRIPTION
CHW01-01	396435.6	2320257.1	4.0	WETLAND FLAG
CHW01 02	396445.0	2320248.1	3.7	WETLAND FLAG
CHW01-03	396457.7	2320232.5	3.9	WETLAND FLAG
CHW01 04	396468.1	2320218.4	4.3	WETLAND FLAG
CHW01 05	396462.1	2320217.2	4.3	WETLAND FLAG
CHW01 06	396450.0	2320230.3	3.9	WETLAND FLAG
CHW01 07	396432.9	2320213.4	3.9	WETLAND FLAG
CHW01 08	396423.6	2320211.8	4.0	WETLAND FLAG
CHW01 09	396430.7	2320187.9	4.9	WETLAND FLAG

PROJECT LIMITS				
STATION ID	LOCALIZED GROUND NORTHING	LOCALIZED GROUND EASTING	GROUND ELEVATION	DESCRIPTION
201	396521.0	2320229.0	6.4	GROUND SHOT
202	396531.2	2320260.1	6.7	GROUND SHOT
203	396561.5	2320297.6	5.8	GROUND SHOT
204	396582.1	2320331.9	6.1	GROUND SHOT
205	396608.4	2320372.1	6.3	GROUND SHOT
206	396655.0	2320444.7	5.9	GROUND SHOT
207	396663.7	2320457.6	4.9	GROUND SHOT
208	396668.7	2320465.2	5.7	GROUND SHOT
209	396684.9	2320492.6	5.4	GROUND SHOT
210	396723.5	2320546.6	5.8	GROUND SHOT
211	396750.9	2320590.2	5.7	GROUND SHOT
212	396780.0	2320635.2	5.7	GROUND SHOT
213	396789.5	2320656.9	5.7	GROUND SHOT

LINE LEGEND

- PROJECT LIMITS
- WET — WETLAND DELINEATION
- MEAN HIGH WATER (EL = 7)
- MEAN LOW WATER (EL = 3)

SYMBOL LEGEND

- DATUM CONTROL POINT
- WETLAND FLAG

PROJECT AREA IN GOOSE CREEK

GRAPHIC SCALE

0 15 30 60 120

1" = 30'

I HEREBY STATE THAT TO THE BEST OF MY PROFESSIONAL KNOWLEDGE, INFORMATION AND BELIEF, THE SURVEY SHOWN HEREON WAS MADE IN ACCORDANCE WITH THE REQUIREMENTS OF THE STANDARDS OF PRACTICE MANUAL FOR SURVEYING IN SOUTH CAROLINA AND MEETS OR EXCEEDS THE REQUIREMENTS FOR A CLASS A SURVEY AS SPECIFIED THEREIN.

4/21/14

JAMES M. PEARSALL, PLS LICENSE NO. 27458

SURVEY PREPARED FOR:
CH2MHILL
301 CARMEL COMMONS BLVD
SUITE 304
CHARLOTTE, NC 28226

SURVEY PERFORMED BY:
TAYLOR WISEMAN & TAYLOR
ENGINEERS ▪ SURVEYORS ▪ SCIENTISTS
SUBSURFACE UTILITY ENGINEERS
7101 FOREST POINT CIRCLE, SUITE 116
CHARLOTTE NC 28217
PHONE (704) 527-2615 FAX (704) 527-2537
SOUTH CAROLINA COA C01656

WETLAND LOCATION SURVEY
GRACE HOPPER BRIDGE
JOINT BASE CHARLESTON
BERKELEY COUNTY - GOOSE CREEK, SC

REVISIONS:
04.21.14 J. ROGERS

DATE OF SURVEY: 11.07.13
SCALE: 1" = 30'
DRAWN BY: J. ROGERS
CHECKED BY: J. PEARSALL, PLS

SHEET:
1 / 1

MAGNUSEN STEVENS FISHERIES CONSERVATION AND MANAGEMENT ACT

ESSENTIAL FISH HABITAT

CONSULTATION

CH2M HILL
Embassy Row
6600 Peachtree Dunwoody Rd
Building 400, Suite 600
Atlanta, GA 30328
Tel 770.604.9095
Fax 770.604.9183

11 November 2014

Dr. Pace Wilber
Habitat Conservation Division, South Atlantic Branch
National Oceanic and Atmospheric Administration,
National Marine Fisheries Service
217 Fort Johnson Road
Charleston, SC 29412

SUBJECT: EFH Determination for Grace Hopper Bridge Embankment Repair at Joint Base Charleston – Weapons Station

Dear Dr. Wilber,

We are submitting this letter on behalf of Joint Base Charleston (JB CHS), which proposes erosion stabilization on the east stream bank of Goose Creek at the Grace Hopper Bridge on JB CHS Weapons Station (JB CHS-WS). Recent inspections indicated that the channel of Goose Creek was migrating laterally, causing erosion at the east embankment, which could potentially undermine the bridge unless corrective action is taken. JB CHS is preparing an Environmental Assessment (EA) in accordance with the National Environmental Policy Act to analyze the potential impacts and environmental consequences associated with the proposed erosion stabilization.

The Preferred Alternative would consist of placing clean supporting fill and grout-filled mattresses along the bank from beneath the mean low water elevation to the 100-year-flood elevation. The mattresses would be buried below the mean low water elevation and would extend from 50 feet north of the bridge to 30 feet south of the bridge, for a total length of approximately 120 feet. Laterally, the mattresses would extend approximately 30 feet from the high point on the bank into the water. The work area, including access and staging areas, would encompass approximately 1 acre, with approximately 0.1 acre associated with the proposed erosion protection. Prior to placement of the mattresses, sand and gravel would be placed as backfill in eroded areas, where needed, to create a proper slope. There are no wetlands within the area of disturbance of the Proposed Action, but there would be impacts to the tidal stream as work would occur within Goose Creek.

Potential effects on EFH at JB CHS-WS would be associated with the consequences of construction activities to place the grout-filled mattresses and stabilize the east embankment. The effects of construction activities are assessed to determine their potential to adversely affect EFH, including associated fish and invertebrate species. No adverse effects to EFH are

anticipated once construction activities are completed and the prevention of future erosion of the channel should be beneficial to water quality and EFH.

No compensatory mitigation is proposed for the Grace Hopper Bridge embankment repair.

We are coordinating separately with National Marine Fisheries Service (NMFS) Office of Protected Resources (Dr. Roy Crabtree) and with the U.S. Fish and Wildlife Service regarding potential impacts to species listed under the Endangered Species Act and Marine Mammal Protection Act that are under the jurisdiction of each agency.

All tidal creeks on JB CHS have been designated as essential fish habitat (EFH). Because the proposed activity would include work in Goose Creek, a tidal creek, there is potential to impact EFH.

We have determined that with the proposed mitigation there would be "No Overall Adverse Effect" to Essential Fish Habitat. We submit the attached Essential Fish Habitat Impact Assessment for your review, and respectfully request recommendations per 50 CFR 920(h)(3). If you have any questions about this action or any concerns, please contact:

Dr. Rich Reaves, CH2M HILL
Senior Ecologist
6600 Peachtree Dunwoody Rd.
400 Embassy Row, Suite 600
Atlanta, Georgia 30328
678-530-4285 direct
770-827-5186 mobile
Richard.Reaves@ch2m.com

Sincerely,

Rich Reaves, Ph.D., CEP
Senior Ecologist

Attachments:
Essential Fish Habitat Impact Assessment

Copy to:
JB CHS 628 CES/CENPL(Epstein)

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
http://sero.nmfs.noaa.gov

January 9, 2015 F/SER47:JD/pw

(Sent via Electronic Mail)

Mark Epstein
Base Environmental Planner
628 CES/CEIEP
Bldg 721, JB CHS Air Facility
Joint Base Charleston, SC 29404-4827

Attention: Richard Reaves

Dear Mr. Epstein:

NOAA's National Marine Fisheries Service (NMFS) reviewed the letter, dated November 11, 2014, submitted by Joint Base Charleston (JB CHS) describing stabilization of the embankment at the base of the Grace Hopper Bridge, Berkeley County. The letter included an Essential Fish Habitat (EFH) Assessment. JB CHS intends to apply for a Nationwide Permit from the U.S. Army Corps of Engineers to comply with section 404 of the Clean Water Act for the placement of grout-filled, interconnected mattresses along 120 feet of the eastern bank of Goose Creek. Laterally, the mattresses would extent approximately 30 feet from the high point on the bank into the water. No compensatory mitigation is proposed. The initial determination by JB CHS is the proposed activity would have no overall adverse effect on EFH. As the nation's federal trustee for the conservation and management of marine, estuarine, and anadromous fishery resources, the following comments and recommendations are provided pursuant to authorities of the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

Description of the Proposed Project
The proposed grout-filled, interconnected mattresses would protect the Grace Hopper Bridge from the lateral migration of the stream channel along the eastern bank of Goose Creek. Due to lateral migration of the channel, erosion along the eastern embankment has created vertical cuts into the embankment and the undercut vegetation upstream and downstream of the bridge. JB CHS believes continued erosion could undermine the bridge abutments and ultimately cause the bridge to fail.

The proposed mattresses would extend 50 feet north of the bridge and 30 feet south of the bridge for a total length (including the bridge) of 120 feet. The mattresses would consist of a double layer of synthetic fabric divided into individual compartments connected internally. Grout would be pumped into each compartment. Prior to placement of the mattresses, sand and gravel would be placed as backfill in eroded areas, where needed, to create the desired slope. The mattresses would extend approximately 3 to 7 feet below the mean low water line and terminate above the mean high water line. A turbidity curtain would be placed around the site and anchored to the bank on both ends. Construction activities would take place from a barge and designated upland work area. Construction is anticipated to begin in 2015 and would take approximately six months to complete. The alternatives JB CHS considered for the proposed bank

stabilization focused on the materials used. In lieu of mattresses, Alternative 1 would use gabions, and Alternative 2 would use articulating concrete blocks.

Essential Fish Habitat in the Project Area
The EFH Assessment includes descriptions of the EFH within the project area. While those descriptions are consistent with a site visit NMFS conducted on December 15, 2014, and do not require augmenting to complete the EFH consultation, some improvement could be made.

The EFH Assessment inaccurately describes the bank that would be impacted as upland. While some upland is included, a majority of fill would be placed below the mean high water mark. In addition, the EFH Assessment states no wetlands occur within the project area; however, the small patch of vegetation on the northern side of the bridge is wetland vegetation. The site itself is degraded with a three to four foot vertical embankment; however, the surrounding marsh has a regionally appropriate vegetation density and appears healthy. The proposed fill area is currently all mud and sandy bottom except for a small patch of marsh vegetation on the northern side of the bridge and remnants of previously placed stone riprap directly under the bridge. The U.S. Geological Survey water quality monitoring gauge at Filbin Creek (021720677), the approximately 1.5 miles downstream of the Goose Creek entrance, indicates the site has mesohaline salinities and dissolved oxygen concentrations supportive of aquatic life. In summary, the area provides nursery habitat for estuarine-dependent life stages of federally managed fishery species.

Impacts to Essential Fish Habitat
The proposed bank stabilization would create a hardened shoreline along 120 linear feet of Goose Creek; however, a long-term benefit to EFH in the area could result from decreased erosion and turbidity after the embankment is stabilized. During construction, JB CHS indicates the potential exists for spills of uncured grout while filling the mattresses; this could temporarily reduce water quality due to increased pH. Other potential indirect effects include increased turbidity from soil disturbances during construction; however, the turbidity curtain is designed to limit this impact to a localized area.

JB CHS has proposed impact avoidance and minimization methods. To minimize impacts to the surrounding bank, JB CHS proposes to conduct some construction from barges and to place a turbidity curtain around the work area. Despite loss of EFH, JB CHS has not proposed compensatory mitigation. During the site visit, NMFS recommended a living shoreline approach, i.e., incorporation of oyster bags into the construction design. Given the water quality conditions, oyster should survive at the site once recruitment is successful. JB CHS was receptive to the idea and indicated the concrete could be poured in such a way (e.g., step-like) to support oyster bag stabilization.

Conservation Recommendations
NMFS finds the proposed creek bank stabilization would adversely affect EFH. Section 305(b)(4)(A) of the Magnuson-Stevens Act requires NMFS to provide EFH conservation recommendations when an activity is expected to adversely affect EFH. Based on this requirement, NMFS provides the following:

EFH Conservation Recommendations

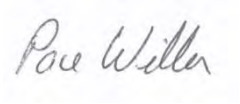
- To minimize impacts of shoreline hardening, the project design shall include a living shoreline approach, such as incorporation of oyster bags. If a living shoreline design is not practicable, compensatory mitigation should be provided for the impacted salt marsh and shallow water habitat.
- The project shall include best management practices to prevent grout spills and have a response plan in place should a spill occur.

Section 305(b)(4)(B) of the Magnuson-Stevens Act and implementing regulation at 50 CFR Section 600.920(k) require JB CHS to provide a written response to this letter within 30 days of its receipt. If it is not possible to provide a substantive response within 30 days, an interim response should be provided. A detailed response must then be provided to NMFS 10 days prior to final approval of the action. The detailed response must include a description of measures proposed by JB CHS to avoid, mitigate, or offset the adverse impacts of the activity. If the response is inconsistent with an EFH conservation recommendation, a substantive discussion justifying the reasons for not following the recommendation must be provided.

In accordance with section 7 of the Endangered Species Act of 1973, as amended, it is the responsibility of JB CHS to review and identify any proposed activity that may affect endangered or threatened species and their designated critical habitat. Determinations involving species under NMFS jurisdiction should be reported to NMFS' Protected Resources Division at the letterhead address.

NMFS appreciates the opportunity to provide these comments. Please direct related correspondence to the attention of Ms. Jaclyn Daly-Fuchs at our Charleston Area Office. She may be reached at (843) 762-8610 or by e-mail at Jaclyn.Daly@noaa.gov.

Sincerely,



/ for

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

cc:

JB CHS, Mark.Epstein@us.af.mil
CH2MHILL, Richard.Reaves@ch2m.com
SAFMC, Roger.Pugliese@safmc.net
F/SER4, David.Dale@noaa.gov
F/SER47, Jaclyn.Daly@noaa.gov

Jorgensen, Elizabeth/ATL

Subject: RE: Joint Base Charleston Grace Hopper Bridge, NMFS comments

-----Original Message-----
From: EPSTEIN, MARK A GS-12 USAF AMC 628 CES/CENP [mailto:mark.epstein@us.af.mil]
Sent: Thursday, February 05, 2015 11:56 AM
To: Robin Wiebler - NOAA Federal; Reaves, Richard/ATL; SAFMC Roger Pugliese; David Dale - NOAA Federal; Sharon Rolfes - NOAA Federal; Jaclyn Daly - NOAA Federal
Subject: RE: Joint Base Charleston Grace Hopper Bridge, NMFS comments

Jaclyn,

1. Reference subject letter of January 9, 2015; F/SER47:JD/pw from Virginia Fay signed by Pace Wilbur.

2. In accordance with paragraph 9 and 50 CFR 600.920(k), Joint Base Charleston concurs with the EFH Conservation Recommendations contained in the referenced NOAA/NMFS letter. Specifically, Joint Base Charleston will assure:

a. That the project final design includes a living shoreline approach and

b. That the project includes best management practices to prevent grout spills and includes a grout spill response plan

2. We assume this e-mail is sufficient to provide the written response required by the regulations. Please let us know if you require a more formal response and accept this e-mail as an interim response.

3. Please contact me if you have any questions.

VR,
Mark Epstein, GS-819-12
Environmental Engineer/Planner
Joint Base Charleston
628 CES/CENP
Bldg 721, JB CHS Air Facility
843-963-1458
DSN-673
Make it a Great Day: It's always our choice!

-----Original Message-----
From: Robin Wiebler - NOAA Federal [mailto:robin.wiebler@noaa.gov]
Sent: Monday, January 12, 2015 9:31 AM
To: EPSTEIN, MARK A GS-12 USAF AMC 628 CES/CENP; CH2M Hill Richard Reaves; SAFMC Roger Pugliese; David Dale - NOAA Federal; Sharon Rolfes - NOAA Federal; Jaclyn Daly - NOAA Federal
Subject: Joint Base Charleston Grace Hopper Bridge, NMFS comments

ENDANGERED SPECIES ACT SECTION SEVEN

CONSULTATIONS

WITH

US FISH AND WILDLIFE SERVICE

AND

NOAA/NMFS

PROTECTED RESOURCE DIVISION

CH2M HILL
Embassy Row
6600 Peachtree Dunwoody Rd
Building 400, Suite 600
Atlanta, GA 30328
Tel 770.604.9095
Fax 770.604.9183

11 November 2014

Mr. Mark Caldwell
Regulatory Team Leader
U.S. Fish and Wildlife Service
176 Croghan Spur Road, Suite 200
Charleston, SC 29407

SUBJECT: Potential Protected Species Issues Related to Grace Hopper Bridge Embankment Repair at Joint Base Charleston – Weapons Station

Dear Mr. Caldwell,

We are submitting this letter on behalf of Joint Base Charleston (JB CHS), which proposes erosion stabilization on the east stream bank of Goose Creek at the Grace Hopper Bridge on JB CHS Weapons Station (JB CHS-WS). Recent inspections indicated that the channel of Goose Creek was migrating laterally, causing erosion at the east embankment, which could potentially undermine the bridge unless corrective action is taken. JB CHS is preparing an Environmental Assessment (EA) in accordance with the National Environmental Policy Act to analyze the potential impacts and environmental consequences associated with the proposed erosion stabilization.

The Preferred Alternative would consist of placing clean supporting fill and grout-filled mattresses along the bank from beneath the mean low water elevation to the 100-year-flood elevation. The mattresses would be buried below the mean low water elevation and would extend from 50 feet north of the bridge to 30 feet south of the bridge, for a total length of approximately 120 feet. Laterally, the mattresses would extend approximately 30 feet from the high point on the bank into the water. The work area, including access and staging areas, would encompass approximately 1 acre, with approximately 0.1 acre associated with the proposed erosion protection. Prior to placement of the mattresses, sand and gravel would be placed as backfill in eroded areas, where needed, to create a proper slope. There are no wetlands within the area of disturbance of the Proposed Action. There would be impacts to the stream as work would occur within Goose Creek.

We are coordinating separately with National Marine Fisheries Service (NMFS) Habitat Conservation Division regarding potential impacts to Essential Fish Habitat and with the NMFS Office of Protected Resources regarding potential impacts to species listed under the

Endangered Species Act and Marine Mammal Protection Act that are under the jurisdiction of that agency.

The project area, including the downstream areas with potential for indirect impacts, is depicted on the attached U.S. Fish and Wildlife Service (USFWS) Information, Planning, and Conservation (IPaC) Report. Review of existing data, including the JB CHS Integrated Natural Resources Management Plan, the protected species list for Berkeley County, and the IPaC Report identified multiple species under the jurisdiction of your agency with potential to occur in the project area, as identified on the IPaC Report.

Surveys of the immediate project area completed in November 2013 determined that the habitat within the project area, which consists of upland scrub and open water is unsuitable for the listed plant species. There is no suitable reproductive/nesting habitat for any of the listed animal species. These animal species would not occur in these habitats or only would occur as transients. Federally listed endangered animal species that could occur in the Cooper River and other waters that feed into the Cooper River include West Indian Manatee (*Trichechus manatus*) and shortnose sturgeon (*Acipenser brevirostrum*), but these species have not been found by the South Carolina Department of Natural Resources during surveys conducted at JB CHS-WS. In addition, the endangered Atlantic Sturgeon (*Acipenser oxyrinchus*) migrates up the Cooper River, which is 0.7 mile downstream of the project site, to spawn.

American alligator, federally listed as Threatened by Similarity of Appearance, is common to abundant on JB CHS-WS. American alligators could occur within the project area and within the general vicinity, but have not been observed in this area in previous surveys.

None of these species would be likely to occur in the area during times of concentrated human activity, such as implementation of the proposed action. Because no listed species would occur in the immediate project area except as incidental transients, no impacts from the proposed work would be expected.

Work would include appropriate best management practices to minimize the potential for sediments or turbidity to enter the water column. No adverse cumulative impacts to protected species would be expected.

If you have any questions about this action or any concerns, please contact:

Dr. Rich Reaves, CH2M HILL
Senior Ecologist
6600 Peachtree Dunwoody Rd.
400 Embassy Row, Suite 600
Atlanta, Georgia 30328
678-530-4285 direct
770-827-5186 mobile
Richard.Reaves@ch2m.com

Because no impacts would expected, the proposed activity would not affect listed species under the jurisdiction of the USFWS. We respectfully request concurrence with this determination.
Sincerely,

Rich Reaves, Ph.D., CEP
Senior Ecologist

Attachments:
IPaC Report
Berkeley County Protected Species List

Copy to:
JB CHS 628 CES/CENPL(Epstein)

United States Department of the Interior

FISH AND WILDLIFE SERVICE
176 Croghan Spur Road, Suite 200
Charleston, South Carolina 29407

December 9, 2014

Dr. Rich Reaves
CH2M HILL
6600 Peachtree Dunwoody Road
400 Embassy Row, Suite 600
Atlanta, GA 30328

Re: Protected Species Review
Grace Hopper Bridge Embankment Repair
Joint Base Charleston-Weapons Station
Berkeley County, South Carolina
FWS Log No. 2015-I-0076

Dear Mr. Reaves:

The U.S. Fish and Wildlife Service (Service) has received your November 11, 2014, letter submitted on behalf of Joint Base Charleston (JB CHS) for the above-referenced project. The proposed project entails erosion stabilization on the east stream bank of Goose Creek at the Grace Hopper Bridge on JB CHS Weapons Station located in Berkeley County, South Carolina. Pursuant to section 7 of the Endangered Species Act, as amended (16 U.S.C. 1531 *et seq.*) (ESA), you requested that the Service provide concurrence or comments regarding potential impacts to federally protected trust resources resulting from the proposed project.

Lateral migration of the Goose Creek channel is causing erosion at the east embankment, which could potentially undermine the bridge unless corrective action is taken. In accordance with the National Environmental Policy Act, JB CHS is preparing an Environmental Assessment to analyze the potential impacts and environmental consequences associated with the proposed erosion stabilization. The preferred alternative would consist of placing clean supporting fill and grout-filled mattresses along the bank from beneath the mean low water elevation to the 100-year-flood elevation. There are no wetlands within the area of disturbance of the proposed action. There would be impacts to the stream as work would occur within Goose Creek.

You have determined that the proposed project will have no effect on federally protected species. The ESA does not require consultation for no effect determinations. Therefore, no further action is necessary. However, please note that the project area appears to contain suitable foraging habitat for the American wood stork (*Mycteria americana*) which may be impacted by the proposed action. Additionally, the West Indian manatee *(Trichechus manatus),* is known to occur during the warmer months (May 15-October 15) of the year. Water-related activities during this time increase the chance of adversely affecting West Indian manatees.

Please note that due to obligations under the ESA, the potential impacts of this project must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered, (2) this action is subsequently modified in a manner, which was not considered in this assessment, or (3) a new species is listed or critical habitat is determined that may be affected by the identified action.

For informational purposes only, the Service has included a list of species that have been petitioned for listing under the ESA as well as Candidate Species. These species are collectively referred to as "At-Risk Species" (ARS). We have included a list of the ARS that may occur in Berkeley County, South Carolina. Although there are no Federal protections afforded to ARS, please consider including them in your survey efforts. Incorporating proactive measures to avoid or minimize harm to ARS may improve their status and assist with precluding the need to list these species. Additional information on ARS can be found at:

http://www.fws.gov/southeast/candidateconservation

The Service recommends that you contact the South Carolina Department of Natural Resources, regarding potential impacts to State protected species. If the proposed project will impact wetlands, you should contact the U.S. Army Corps of Engineers, Charleston District. If you need further assistance, please contact Mr. Mark Leao at (843) 727-4707 ext. 228, and reference FWS Log No. 2015-I-0076.

Sincerely,

Thomas D. McCoy

Thomas D. McCoy
Acting Field Supervisor

TDM/MCL

Enclosure

South Carolina List of At-Risk, Candidate, Endangered, and Threatened Species - Berkeley County

*	Contact National Marine Fisheries Service (NMFS) for more information on this species
**	The U.S. Fish and Wildlife Service (FWS) and NMFS share jurisdiction of this species
ARS	At-Risk Species - Species that the FWS has been petitioned to list and for which a positive 90-day finding has been issued (listing may be warranted); information is provided only for conservation actions as no Federal protections currently exist.
BGEPA	Federally protected under the Bald and Golden Eagle Protection Act
C	FWS or NMFS has on file sufficient information on biological vulnerability and threat(s) to support proposals to list these species
CH	Critical Habitat
E	Federally Endangered
P or P - CH	Proposed for listing or critical habitat in the Federal Register
S/A	Federally protected due to similarity of appearance to a listed species
T	Federally Threatened

COUNTY	CATEGORY	COMMON NAME	SCIENTIFIC NAME	STATUS
Berkeley	Amphibian	Frosted flatwoods salamander	*Ambystoma cingulatum*	T, CH
	Amphibian	Gopher frog	*Lithobates capito*	ARS
	Bird	Bald eagle	*Haliaeetus leucocephalus*	BGEPA
	Bird	MacGillivray's seaside sparrow	*Ammodramus maritimus macgillivraii*	ARS
	Bird	Red-cockaded woodpecker	*Picoides borealis*	E
	Bird	Wood stork	*Mycteria americana*	T
	Crustacean	None Found		
	Fish	American eel	*Anguilla rostrata*	ARS
	Fish	Atlantic Sturgeon*	*Acipenser oxyrinchus**	E
	Fish	Blueback herring	*Alosa aestivalis*	ARS
	Fish	Shortnose sturgeon*	*Acipenser brevirostrum**	E
	Insect	None Found		
	Mammal	West Indian manatee	*Trichechus manatus*	E
	Plant	American chaffseed	*Schwalbea americana*	E
	Plant	Boykin's lobelia	*Lobelia boykinii*	ARS
	Plant	Canby's dropwort	*Oxypolis canbyi*	E
	Plant	Carolina-birds-in-a-nest	*Macbridea caroliniana*	ARS
	Plant	Carolina bishopweed	*Ptilimnium ahlesii*	ARS
	Plant	Ciliate-leaf tickseed	*Coreopsis integrifolia*	ARS
	Plant	Pondberry	*Lindera melissifolia*	E
	Plant	Raven's seedbox	*Ludwigia ravenii*	ARS
	Plant	Sun-facing coneflower	*Rudbeckia heliopsidis*	ARS
	Reptile	Eastern diamondback rattlesnake	*Crotalus adamanteus*	ARS
	Reptile	Southern hognose snake	*Heterdon simus*	ARS
	Reptile	Spotted turtle	*Clemmys guttata*	ARS

These lists should be used only as a guideline, not as the final authority. The lists include known occurrences and areas where the species has a high possibility of occurring. Records are updated as deemed necessary and may differ from earlier lists.

For a list of State endangered, threatened, and species of concern, please visit https://www.dnr.sc.gov/species/index.html.

CH2M HILL
Embassy Row
6600 Peachtree Dunwoody Rd
Building 400, Suite 600
Atlanta, GA 30328
Tel 770.604.9095
Fax 770.604.9183

11 November 2014

Roy E. Crabtree, Ph.D.
Administrator, Southeast Region
Attn: Protected Resource Division
National Marine Fisheries Service
263 13th Avenue South
St. Petersburg, FL 33701

SUBJECT: Potential Protected Species Issues Related to Grace Hopper Bridge Embankment Repair at Joint Base Charleston – Weapons Station

Dear Dr. Crabtree,

We are submitting this letter on behalf of Joint Base Charleston (JB CHS), which proposes erosion stabilization on the east stream bank of Goose Creek at the Grace Hopper Bridge on JB CHS Weapons Station (JB CHS-WS). Recent inspections indicated that the channel of Goose Creek was migrating laterally, causing erosion at the east embankment, which could potentially undermine the bridge unless corrective action is taken. JB CHS is preparing an Environmental Assessment (EA) in accordance with the National Environmental Policy Act to analyze the potential impacts and environmental consequences associated with the proposed erosion stabilization.

The Preferred Alternative would consist of placing supporting fill and grout-filled mattresses along the bank from beneath the mean low water elevation to the 100-year-flood elevation. The mattresses would be buried below the mean low water elevation and would extend from 50 feet north of the bridge to 30 feet south of the bridge, for a total length of approximately 120 feet. Laterally, the mattresses would extend approximately 30 feet from the high point on the bank into the water. The work area, including access and staging areas, would encompass approximately 1 acre, with approximately 0.1 acre associated with the proposed erosion protection. Prior to placement of the mattresses, sand and gravel would be placed as backfill in eroded areas, where needed, to create a proper slope. There are no wetlands within the area of disturbance of the Proposed Action, but there would be impacts to the stream as work would occur within Goose Creek.

We are coordinating separately with National Marine Fisheries Service (NMFS) Habitat Conservation Division (Dr. Pace Wilber) regarding potential impacts to Essential Fish Habitat and with the U.S. Fish and Wildlife Service regarding potential impacts to species listed under the Endangered Species Act that are under the jurisdiction of that agency.

The project area, including the downstream areas with potential for indirect impacts, is depicted on the attached U.S. Fish and Wildlife Service Information, Planning, and Conservation (IPaC) Report. Review of existing data, including the JB CHS Integrated Natural Resources Management Plan, the protected species list for Berkeley County, and the IPaC Report identified five species under the jurisdiction of your agency with potential top occur in the project area: shortnose sturgeon (*Acipenser brevirostrum*), West Indian Manatee (*Trichechus manatus*), Green sea turtle (*Chelonia mydas*), Kemp's Ridley sea turtle (*Lepidochelys kempii*), and Leatherback sea turtle (*Dermochelys coriacea*). In addition, the endangered Atlantic Sturgeon (*Acipenser oxyrinchus*) migrates up the Cooper River, which is 0.7 mile downstream of the project site, to spawn.

There is no suitable nesting or foraging habitat for the sea turtle species in or adjacent to the project area, as the project area is adjacent to the deepwater channel used by private boats. Federally listed endangered animal species that could occur in the Cooper River and other waters that feed into the Cooper River include West Indian Manatee and shortnose sturgeon but these species have not been found by the South Carolina Department of Natural Resources during surveys conducted at JB CHS-WS. The Atlantic sturgeon may occur in the Cooper River . Any use of the general project area by these species likely would be as transients in either the Cooper River or Goose Creek.

None of these species would be likely to occur in the area during times of concentrated human activity, such as implementation of the proposed action. Because no listed species would occur in the immediate project area except as transients, any direct impacts from the proposed work would be limited to temporary displacement. There would be potential for temporary indirect impacts to protected species as a result of water quality issues associated with placing the erosion protection if protected species were passing through the area at the time of the work.

Work would include appropriate best management practices to minimize the potential for sediments or turbidity to enter the water column. No adverse cumulative impacts to protected species would be expected.

If you have any questions about this action or any concerns, please contact:

Dr. Rich Reaves, CH2M HILL
Senior Ecologist
6600 Peachtree Dunwoody Rd.
400 Embassy Row, Suite 600
Atlanta, Georgia 30328
678-530-4285 direct
770-827-5186 mobile
Richard.Reaves@ch2m.com

Because there would be no potential for direct adverse impacts, there would be no more than minor temporary adverse impacts associated with increased turbidity during placement of the erosion protection, and the long-term impacts would be beneficial, the proposed activity may

affect but is unlikely to adversely affect listed species under the jurisdiction of the NMFS. We respectfully request concurrence with this determination.
Sincerely,

Rich Reaves, Ph.D., CEP
Senior Ecologist

Attachments:
IPaC Report
Berkeley County Protected Species List

Copy to:
JB CHS 628 CES/CENPL(Epstein)

From: Eric Hawk - NOAA Federal [mailto:eric.hawk@noaa.gov]
Sent: Friday, November 28, 2014 8:04 AM
To: Reaves, Richard/ATL
Cc: Teletha Mincey - NOAA Federal
Subject: Grace Hopper Bridge Embankment Repair - Your 11 November 2014 letter to NMFS (Crabtree)

Dear Dr. Reaves,
I have reviewed your November 11, 2104, letter/submittal to Dr. Roy Crabtree describing the subject project and your request for NMFS concurrence with your not likely to adversely affect determinations for NMFS trust resources (i.e., sturgeon, sea turtles) that may be in the area of Joint Base Charleston - Weapons Station.

I do not believe the action warrants ESA consultation with NMFS, nor NMFS's issuance of a concurrence letter as your requested, given the implausibility of project effects to sturgeon and sea turtles from the minor activity proposed. Please advise the federal action agency (USN or USAF?) of our determination.

Please save this email for your files as record of your compliance with Section 7 of the ESA.

Thank you.

Eric Hawk

--

Eric G. Hawk
NMFS Southeast Region
ESA Regional Section 7 Coordinator/PCTS Regional Manager

Ofc (727) 551-5773
Fax (727) 824-5309

"How inappropriate to call this planet 'Earth' when it is quite clearly 'Ocean'."

Arthur C. Clarke

NATIONAL HISTORIC PRESERVATION ACT

SECTION 106

CONSULTATIONS

WITH

SC STATE HISTORIC PRESERVATION OFFICE

AND

FEDERALLY RECOGNIZED

NATIVE AMERICAN TRIBES

SC SHPO

CONSULTATION

BERK-M101-NV SOI-NV

268 ✓

South Carolina Archives & History Center

History & Heritage For All Generations

May 24, 2002

Mr. L.M. Pitts
Environmental Planning Branch
Southern Division
Naval Facilities Engineering Command
PO Box 190010
North Charleston, SC 29419-9010

Re: Final Report, *Intensive Archaeology Survey of Selected Portions of the Charleston Naval Weapons Station, Berkeley County, South Carolina*

Dear Mr. Pitts:

We have received four copies of the above referenced final report. The report meets the standards and guidelines established by the Secretary of the Interior and those prepared by the South Carolina SHPO. As such, this report fulfills your obligations under Section 106 of the National Historic Preservation Act, as amended, for identification of historic resources, and is in partial fulfillment of Section 110.

If you have any further questions, please contact me at (803) 896-6173.

Sincerely,

Valerie Marcil
Staff Archaeologist
State Historic Preservation Office

NATIVE AMERICAN TRIBAL

CONSULTATIONS

GOVERNMENT-TO-GOVERNMENT

BASEWIDE

TRIBAL CONSULTATION

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 628TH AIR BASE WING (AMC)
JOINT BASE CHARLESTON SC

Colonel Jeffrey W. DeVore
Commander, Joint Base Charleston
102 East Hill Blvd, Suite 100
Joint Base Charleston SC 29404-5004

Eastern Band of Cherokee Nation
Principal Chief Michell Hicks
P. O. Box 455
Cherokee NC 28719

RE: Installation Development at Joint Base Charleston Facilities in Charleston, Berkeley, and Orangeburg Counties of South Carolina

Dear Principal Chief Hicks,

I am writing to initiate formal Government-to-Government consultations to meet the requirements of Section 106 of the National Historic Preservation Act of 1966 (16 USC 407f), the National Environmental Policy Act (NEPA), the Native American Grave Protection and Repatriation Act of 1990 (25 USC 3001-3013), and Executive Order 13175 regarding future Installation Development undertakings with the potential to impact sites of religious or cultural significance within and/or adjacent to the boundaries of Joint Base Charleston (JB CHS) facilities.

As noted in correspondence sent to your office on March 14, 2013, JB CHS is preparing an Environmental Assessment in accordance with the National Environmental Policy Act to analyze the potential environmental impacts from continuing installation development at the JB CHS Air Base (JB CHS-AB, Charleston County), JB CHS Weapons Station (JB CHS-WS, Charleston County and Berkeley County), and North Auxiliary Air Field (NAAF, Orangeburg County).

In accordance with 36 Code of Federal Regulation 800.4, the Department of Defense has conducted numerous basewide and project specific surveys to identify historic properties and sites on JB CHS. In 1984, the National Park Service (NPS) conducted a basewide preliminary cultural resource survey of JB CHS-AB and NAAF. A subsequent survey of approximately 1,150 undeveloped acres at NAAF resulted in the discovery of 6 prehistoric campsites and 11 historical archeological sites. None of the 17 sites are considered eligible for inclusion in the National Register of Historic Places (NRHP). Fifteen separate archaeological surveys of JB CHS-WS lands were conducted from 1994 to the present. Ninety-five percent of the lands of JB CHS-WS that possess the potential for intact archaeological resources have been surveyed. Eight archaeological sites were found that are individually eligible for listing in the NRHP.

There are also 2 NRHP-eligible archaeological historic districts (Foster Creek Discontiguous Historic District and Parnassus Plantation Discontiguous Historic District) containing 11 contributing sites, including 3 that are also individually eligible. Nine archaeological sites are present at JB CHS-WS that require further work to determine their eligibility status. No Traditional Cultural Properties (TCP) or Native Indian sacred sites were identified during any of the surveys on JB CHS facilities.

No Installation Development projects are proposed in any areas where known archaeological resources are present. If any unanticipated discoveries of TCP occur, work will be temporarily halted and the procedures outlined in the JB CHS Integrated Cultural Resources Management Plan, Standard Operating Procedure #5 will be followed. Specifically, for discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony, the JB CHS Cultural Resources Manager will be contacted and all appropriate measures will be implemented to protect the remains and any other protected cultural items. JB CHS will immediately inform you of the discovery and invite you to assist in the evaluation of those resources and implementation of procedures to minimize adverse impacts.

Based on the above information, it is our conclusion that implementation of future installation development undertakings will not have an adverse affect on any TCPs or Native Indian sacred sites on or adjacent to JB CHS. I request your input regarding knowledge of any properties on JB CHS of religious or cultural significance that could be affected by future implementation of installation development proposed actions. I would also like to determine if the Eastern Band of Cherokee Nation has a cultural or historical affiliation with the lands of JB CHS or if tribal treaty rights or other rights to natural resources potentially could be affected. In that respect, please identify any potential sites on or adjacent to the three distinctly separate JB CHS facilities shown on the attached maps. I understand that there may be concerns regarding the confidentiality of information on resources of religious, traditional, and cultural importance. In that event, please contact my designees below to develop procedures to maintain the confidentiality of such information. If applicable to the Eastern Band of Cherokee Nation, I respectfully request your written concurrence with our conclusion that implementation of future installation development undertakings will not have an adverse affect on any TCPs or Native Indian sacred sites on or adjacent to JB CHS.

I have appointed two JB CHS staff members to act as agents for JB CHS to execute routine tribal consultations. I respectfully request that you authorize your Tribal Historic Preservation Officer (THPO) or another representative to work directly with them to meet the legal objectives defined by law. My appointed individuals are Mr. Mark Epstein and Mr. Terrence Larimer.

In furtherance of establishing a respectful and open relationship, I welcome you and your staff to visit Joint Base Charleston facilities to become familiar with our location and operations. We are happy to help you determine if any TCP, sacred sites, or resources of interest to the Eastern Band of Cherokee Nation are present on JB CHS.

We look forward to hearing from you and your staff. If you have any questions, you may contact me at (843) 963-3419.

Sincerely

Digitally signed by DEVORE.JEFFREY.W.1080966640
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USAF, cn=DEVORE.JEFFREY.W.1080966640
Date: 2014.11.04 15:59:44 -05'00'

JEFFREY W. DEVORE, Colonel, USAF
Commander

Attachment:
JB CHS Property Maps

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 628TH AIR BASE WING (AMC)
JOINT BASE CHARLESTON SC

Colonel Jeffrey W. DeVore
Commander, Joint Base Charleston
102 East Hill Blvd, Suite 100
Joint Base Charleston SC 29404-5004

Muscogee (Creek) Nation
Principal Chief George Tiger
P. O. Box 580
Okmulgee OK 74447

RE: Installation Development at Joint Base Charleston Facilities in Charleston, Berkeley, and Orangeburg Counties of South Carolina

Dear Principal Chief Tiger

I am writing to initiate formal Government-to-Government consultations to meet the requirements of Section 106 of the National Historic Preservation Act of 1966 (16 USC 407f), the National Environmental Policy Act (NEPA), the Native American Grave Protection and Repatriation Act of 1990 (25 USC 3001-3013), and Executive Order 13175 regarding future Installation Development undertakings with the potential to impact sites of religious or cultural significance within and/or adjacent to the boundaries of Joint Base Charleston (JB CHS) facilities.

As noted in correspondence sent to your office on March 14, 2013, JB CHS is preparing an Environmental Assessment in accordance with the National Environmental Policy Act to analyze the potential environmental impacts from continuing installation development at the JB CHS Air Base (JB CHS-AB, Charleston County), JB CHS Weapons Station (JB CHS-WS, Charleston County and Berkeley County), and North Auxiliary Air Field (NAAF, Orangeburg County).

In accordance with 36 Code of Federal Regulation 800.4, the Department of Defense has conducted numerous basewide and project specific surveys to identify historic properties and sites on JB CHS. In 1984, the National Park Service (NPS) conducted a basewide preliminary cultural resource survey of JB CHS-AB and NAAF. A subsequent survey of approximately 1,150 undeveloped acres at NAAF resulted in the discovery of 6 prehistoric campsites and 11 historical archeological sites. None of the 17 sites are considered eligible for inclusion in the National Register of Historic Places (NRHP). Fifteen separate archaeological surveys of JB CHS-WS lands were conducted from 1994 to the present. Ninety-five percent of the lands of JB CHS-WS that possess the potential for intact archaeological resources have been surveyed. Eight archaeological sites were found that are individually eligible for listing in the NRHP.

There are also 2 NRHP-eligible archaeological historic districts (Foster Creek Discontiguous Historic District and Parnassus Plantation Discontiguous Historic District) containing 11 contributing sites, including 3 that are also individually eligible. Nine archaeological sites are present at JB CHS-WS that require further work to determine their eligibility status. No Traditional Cultural Properties (TCP) or Native Indian sacred sites were identified during any of the surveys on JB CHS facilities.

No Installation Development projects are proposed in any areas where known archaeological resources are present. If any unanticipated discoveries of TCP occur, work will be temporarily halted and the procedures outlined in the JB CHS Integrated Cultural Resources Management Plan, Standard Operating Procedure #5 will be followed. Specifically, for discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony, the JB CHS Cultural Resources Manager will be contacted and all appropriate measures will be implemented to protect the remains and any other protected cultural items. JB CHS will immediately inform you of the discovery and invite you to assist in the evaluation of those resources and implementation of procedures to minimize adverse impacts.

Based on the above information, it is our conclusion that implementation of future installation development undertakings will not have an adverse affect on any TCPs or Native Indian sacred sites on or adjacent to JB CHS. I request your input regarding knowledge of any properties on JB CHS of religious or cultural significance that could be affected by future implementation of installation development proposed actions. I would also like to determine if the Muscogee (Creek) Nation has a cultural or historical affiliation with the lands of JB CHS or if tribal treaty rights or other rights to natural resources potentially could be affected. In that respect, please identify any potential sites on or adjacent to the three distinctly separate JB CHS facilities shown on the attached maps. I understand that there may be concerns regarding the confidentiality of information on resources of religious, traditional, and cultural importance. In that event, please contact my designees below to develop procedures to maintain the confidentiality of such information. If applicable to the Muscogee (Creek) Nation, I respectfully request your written concurrence with our conclusion that implementation of future installation development undertakings will not have an adverse affect on any TCPs or Native Indian sacred sites on or adjacent to JB CHS.

I have appointed two JB CHS staff members to act as agents for JB CHS to execute routine tribal consultations. I respectfully request that you authorize your Tribal Historic Preservation Officer (THPO) or another representative to work directly with them to meet the legal objectives defined by law. My appointed individuals are Mr. Mark Epstein and Mr. Terrence Larimer.

In furtherance of establishing a respectful and open relationship, I welcome you and your staff to visit Joint Base Charleston facilities to become familiar with our location and operations. We are happy to help you determine if any TCP, sacred sites, or resources of interest to the Muscogee (Creek) Nation are present on JB CHS.

We look forward to hearing from you and your staff. If you have any questions, you may contact me at (843) 963-3419.

Sincerely,

Digitally signed by DEVORE.JEFFREY.W.1080966640
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USAF, cn=DEVORE.JEFFREY.W.1080966640
Date: 2014.11.04 16:00:09 -05'00'

JEFFREY W. DEVORE, Colonel, USAF
Commander

Attachment:
JB CHS Property Maps

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 628TH AIR BASE WING (AMC)
JOINT BASE CHARLESTON SC

Colonel Jeffrey W. DeVore
Commander, Joint Base Charleston
102 East Hill Blvd, Suite 100
Joint Base Charleston SC 29404-5004

Eastern Shawnee Tribe of Oklahoma
Chief Glenna J Wallace
P. O. Box 350
Seneca MO 64865

RE: Installation Development at Joint Base Charleston Facilities in Charleston, Berkeley, and Orangeburg Counties of South Carolina

Dear Chief Wallace

I am writing to initiate formal Government-to-Government consultations to meet the requirements of Section 106 of the National Historic Preservation Act of 1966 (16 USC 407f), the National Environmental Policy Act (NEPA), the Native American Grave Protection and Repatriation Act of 1990 (25 USC 3001-3013), and Executive Order 13175 regarding future Installation Development undertakings with the potential to impact sites of religious or cultural significance within and/or adjacent to the boundaries of Joint Base Charleston (JB CHS) facilities.

As noted in correspondence sent to your office on March 14, 2013, JB CHS is preparing an Environmental Assessment in accordance with the National Environmental Policy Act to analyze the potential environmental impacts from continuing installation development at the JB CHS Air Base (JB CHS-AB, Charleston County), JB CHS Weapons Station (JB CHS-WS, Charleston County and Berkeley County), and North Auxiliary Air Field (NAAF, Orangeburg County).

In accordance with 36 Code of Federal Regulation 800.4, the Department of Defense has conducted numerous basewide and project specific surveys to identify historic properties and sites on JB CHS. In 1984, the National Park Service (NPS) conducted a basewide preliminary cultural resource survey of JB CHS-AB and NAAF. A subsequent survey of approximately 1,150 undeveloped acres at NAAF resulted in the discovery of 6 prehistoric campsites and 11 historical archeological sites. None of the 17 sites are considered eligible for inclusion in the National Register of Historic Places (NRHP). Fifteen separate archaeological surveys of JB CHS-WS lands were conducted from 1994 to the present. Ninety-five percent of the lands of JB CHS-WS that possess the potential for intact archaeological resources have been surveyed. Eight archaeological sites were found that are individually eligible for listing in the NRHP.

There are also 2 NRHP-eligible archaeological historic districts (Foster Creek Discontiguous Historic District and Parnassus Plantation Discontiguous Historic District) containing 11 contributing sites, including 3 that are also individually eligible. Nine archaeological sites are present at JB CHS-WS that require further work to determine their eligibility status. No Traditional Cultural Properties (TCP) or Native Indian sacred sites were identified during any of the surveys on JB CHS facilities.

No Installation Development projects are proposed in any areas where known archaeological resources are present. If any unanticipated discoveries of TCP occur, work will be temporarily halted and the procedures outlined in the JB CHS Integrated Cultural Resources Management Plan, Standard Operating Procedure #5 will be followed. Specifically, for discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony, the JB CHS Cultural Resources Manager will be contacted and all appropriate measures will be implemented to protect the remains and any other protected cultural items. JB CHS will immediately inform you of the discovery and invite you to assist in the evaluation of those resources and implementation of procedures to minimize adverse impacts.

Based on the above information, it is our conclusion that implementation of future installation development undertakings will not have an adverse affect on any TCPs or Native Indian sacred sites on or adjacent to JB CHS. I request your input regarding knowledge of any properties on JB CHS of religious or cultural significance that could be affected by future implementation of installation development proposed actions. I would also like to determine if the Eastern Shawnee Tribe of Oklahoma has a cultural or historical affiliation with the lands of JB CHS or if tribal treaty rights or other rights to natural resources potentially could be affected. In that respect, please identify any potential sites on or adjacent to the three distinctly separate JB CHS facilities shown on the attached maps. I understand that there may be concerns regarding the confidentiality of information on resources of religious, traditional, and cultural importance. In that event, please contact my designees below to develop procedures to maintain the confidentiality of such information. If applicable to the Eastern Shawnee Tribe of Oklahoma, I respectfully request your written concurrence with our conclusion that implementation of future installation development undertakings will not have an adverse affect on any TCPs or Native Indian sacred sites on or adjacent to JB CHS.

I have appointed two JB CHS staff members to act as agents for JB CHS to execute routine tribal consultations. I respectfully request that you authorize your Tribal Historic Preservation Officer (THPO) or another representative to work directly with them to meet the legal objectives of the law. My appointed individuals are Mr. Mark Epstein and Mr. Terrence Larimer.

In furtherance of establishing a respectful and open relationship, I welcome you and your staff to visit Joint Base Charleston facilities to become familiar with our location and operations. We are happy to help you determine if any TCP, sacred sites, or resources of interest to the Eastern Shawnee Tribe of Oklahoma are present on JB CHS.

We look forward to hearing from you and your staff. If you have any questions, you may contact me at (843) 963-3419.

Sincerely

Digitally signed by
DEVORE.JEFFREY.W.1080966640
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USAF, cn=DEVORE.JEFFREY.W.1080966640
Date: 2014.11.04 16:00:28 -05'00'

JEFFREY W. DEVORE, Colonel, USAF
Commander

Attachment:
JB CHS Property Maps

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 628TH AIR BASE WING (AMC)
JOINT BASE CHARLESTON SC

Colonel Jeffrey W. DeVore
Commander, Joint Base Charleston
102 East Hill Blvd, Suite 100
Joint Base Charleston SC 29404-5004

Catawba Indian Nation
Chief William (Bill) Harris
966 Avenue of the Nations
Rock Hill SC 29730

RE: Installation Development at Joint Base Charleston Facilities in Charleston, Berkeley, and Orangeburg Counties of South Carolina

Dear Chief Harris

I am writing to initiate formal Government-to-Government consultations to meet the requirements of Section 106 of the National Historic Preservation Act of 1966 (16 USC 407f), the National Environmental Policy Act (NEPA), the Native American Grave Protection and Repatriation Act of 1990 (25 USC 3001-3013), and Executive Order 13175 regarding future Installation Development undertakings with the potential to impact sites of religious or cultural significance within and/or adjacent to the boundaries of Joint Base Charleston (JB CHS) facilities.

As noted in correspondence sent to your office on March 14, 2013, JB CHS is preparing an Environmental Assessment in accordance with the National Environmental Policy Act to analyze the potential environmental impacts from continuing installation development at the JB CHS Air Base (JB CHS-AB, Charleston County), JB CHS Weapons Station (JB CHS-WS, Charleston County and Berkeley County), and North Auxiliary Air Field (NAAF, Orangeburg County).

In accordance with 36 Code of Federal Regulation 800.4, the Department of Defense has conducted numerous basewide and project specific surveys to identify historic properties and sites on JB CHS. In 1984, the National Park Service (NPS) conducted a basewide preliminary cultural resource survey of JB CHS-AB and NAAF. A subsequent survey of approximately 1,150 undeveloped acres at NAAF resulted in the discovery of 6 prehistoric campsites and 11 historical archeological sites. None of the 17 sites are considered eligible for inclusion in the National Register of Historic Places (NRHP). Fifteen separate archaeological surveys of JB CHS-WS lands were conducted from 1994 to the present. Ninety-five percent of the lands of JB CHS-WS that possess the potential for intact archaeological resources have been surveyed. Eight archaeological sites were found that are individually eligible for listing in the NRHP.

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No Installation Development projects are proposed in any areas where known archaeological resources are present. If any unanticipated discoveries of TCP occur, work will be temporarily halted and the procedures outlined in the JB CHS Integrated Cultural Resources Management Plan, Standard Operating Procedure #5 will be followed. Specifically, for discovery of human remains, funerary objects, sacred objects, or objects of cultural patrimony, the JB CHS Cultural Resources Manager will be contacted and all appropriate measures will be implemented to protect the remains and any other protected cultural items. JB CHS will immediately inform you of the discovery and invite you to assist in the evaluation of those resources and implementation of procedures to minimize adverse impacts.

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I have appointed two JB CHS staff members to act as agents for JB CHS to execute routine tribal consultations. I respectfully request that you authorize your Tribal Historic Preservation Officer (THPO) or another representative to work directly with them to meet the legal objectives defined by law. My appointed individuals are Mr. Mark Epstein and Mr. Terrence Larimer.

In furtherance of establishing a respectful and open relationship, I welcome you and your staff to visit Joint Base Charleston facilities to become familiar with our location and operations. We are happy to help you determine if any TCP, sacred sites, or resources of interest to the Catawba Indian Nation are present on JB CHS.

We look forward to hearing from you and your staff. If you have any questions, you may contact me at (843) 963-3419.

Sincerely

Digitally signed by DEVORE.JEFFREY.W.1080966640
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USAF, cn=DEVORE.JEFFREY.W.1080966640
Date: 2014.11.04 15:59:23 -05'00'

JEFFREY W. DEVORE, Colonel, USAF
Commander

Attachment:
JB CHS Property Maps

From:	Tyler B. Howe
To:	EPSTEIN, MARK A GS-12 USAF AMC 628 CES/CENP
Cc:	Russell Townsend
Subject:	EBCI THPO comments regarding proposed runway and taxiway work, North Auxiliary Air Field, Organgeburg County, SC
Date:	Wednesday, March 04, 2015 11:41:19 AM
Attachments:	aboriginal territory map.pdf

Mr. Epstein:

It was a pleasure speaking with you this morning. I look forward to continuing and strengthening the nation-to-nation consultation between the United States Air Force, and the Joint Base Charleston Facilities. As per our conversation, I herewith submit the comments of the Eastern Band of Cherokee Indians Tribal Historic Preservation Office (EBCI THPO) regarding the proposed federal undertakings at the North Auxiliary Air Field located in Orangeburg County, South Carolina. In specific reference to the invitation to consult by Col. Devore, dated 4 – November – 2014, and your email dated 9 – February – 2015, the EBCI THPO has reviewed the materials provided for the proposed C-17 Landing Zone, and Taxiways Alpha and Bravo Additions. The EBCI THPO concurs with the archaeologist's recommendations that no cultural resoruces important to the Cherokee people should be adversely impacted by the proposed federal undertaking. As such, it is the opinion of the EBCI THPO the proposed federal undertakings may proceed as planned. In the event, however, that cultural resources or human remains are encountered during the construction phase, the EBCI THPO requests all work to cease and our office to be notified so we may continue the nation-to-nation consultation process.

Additionally, as per our conversation, I have attached a map of our traditional aboriginal territory. Those counties which are shaded grey are those in which we request our involvement as per section 106 of the National Historic Preservation Act. As it pertains to the letter from Col. Devore regarding several projects at Joint Base Charleston facilities in Charleston and Berkeley counties, those counties are outside the traditional aboriginal territory of the Cherokee people, and we respectfully defer those projects to the Catawba Nation.

Sincerely,

Tyler B. Howe

Tribal Historic Preservation Specialist

Eastern Band of Cherokee Indians

(828) 554-6852

PROJECT SPECIFIC

TRIBAL CONSULTATION

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 628TH AIR BASE WING (AMC)
JOINT BASE CHARLESTON SC

11 March 2015

MEMORANDUM FOR See Distribution List

FROM: 628 CES/CENPL
210 W. Stewart Ave.
Joint Base Charleston, SC 29404-4827

SUBJECT: National Historic Preservation Act (NHPA) Section 106 Consultation for Grace Hopper Bridge Erosion Repair at Joint Base Charleston (JB CHS) – Weapons Station

1. Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, 36 CFR Part 800, *Protection of Historic Properties*, the National Environmental Policy Act (NEPA), the Native American Grave Protection and Repatriation Act of 1990 (25 USC 3001-3013), and Executive Order 13175, require that Federal agencies consult with tribes when an agency action might affect historic properties of religious and cultural significance to the tribes.

2. JB CHS Commander Colonel Jeffrey W. DeVore's letter of November 4, 2014 initiated Government-to-Government consultation for future undertakings on all JB CHS managed property with an initial focus on 66 specific proposed construction, demolition, and repair Installation Development undertakings. Thank you for responding and supporting the baseline analysis. You indicated that historic properties of religious and cultural significance may be present at JB CHS and that consultation for additional future sites of specific proposed undertakings is required.

3. JB CHS is preparing plans and an Environmental Assessment for repairing erosion along the bank under the Grace Hopper Bridge over Goose Creek in Berkeley County, South Carolina. Site location maps showing the area of potential effect are attached.

4. Cultural resource surveys conducted in 1989 prior to the construction of the Grace Hopper Bridge did not identify any cultural materials or properties of cultural significance. In 2002, a separate cultural resource survey was conducted that included the proposed project area. This 2002 survey found the area to be highly disturbed by prior construction and classified the area of potential effect as not containing any properties eligible for inclusion in the National Register. The State Historic Preservation Office provided concurrence on this report in 2002.

5. JB CHS does not know of any Native American Traditional Cultural Properties (TCPs) on the area of potential effect and has made a preliminary determination that the proposed action will not impact any cultural resources. Nevertheless, we ask for

your assistance identifying any TCPs of which we may be unaware that may be impacted by the proposed undertaking. Please respond by completing and returning the below response form. A response within 30 days would be appreciated.

6. Your response applies only to providing information and consultations under the NHPA. It will not affect the handling or disposition of human remains, funerary objects, sacred objects, or objects of cultural patrimony under the Native American Graves Protection and Repatriation Act. In the event such items are discovered, we will contact you regarding their handling and disposition.

7. If you have any questions or desire additional information, please contact me at 843-963-1458 or via Email at mark.epstein@us.af.mil

Sincerely,

3/11/2015

X _____

Signed by: EPSTEIN.MARK.A.1229858110

Mark A. Epstein, DAFC
NEPA Manager

Attachments:
Proposed Undertaking Site Maps

Response

The _____has determined that:
(Tribal Name)

☐ Native American Traditional Cultural Properties are not present on the APE for the above proposed undertaking, and therefore the tribe concurs with the JB CHS determination that the undertaking will not impact known TCPs. NHPA Section 106 consultation is considered complete.

☐ Native American Traditional Cultural Properties are present on the APE for the above proposed undertaking and further consultation is required to mitigate potential adverse effects.

☐ Other: _____
_____
_____

_____
Signature

_____
Printed Name

_____
Position/Title

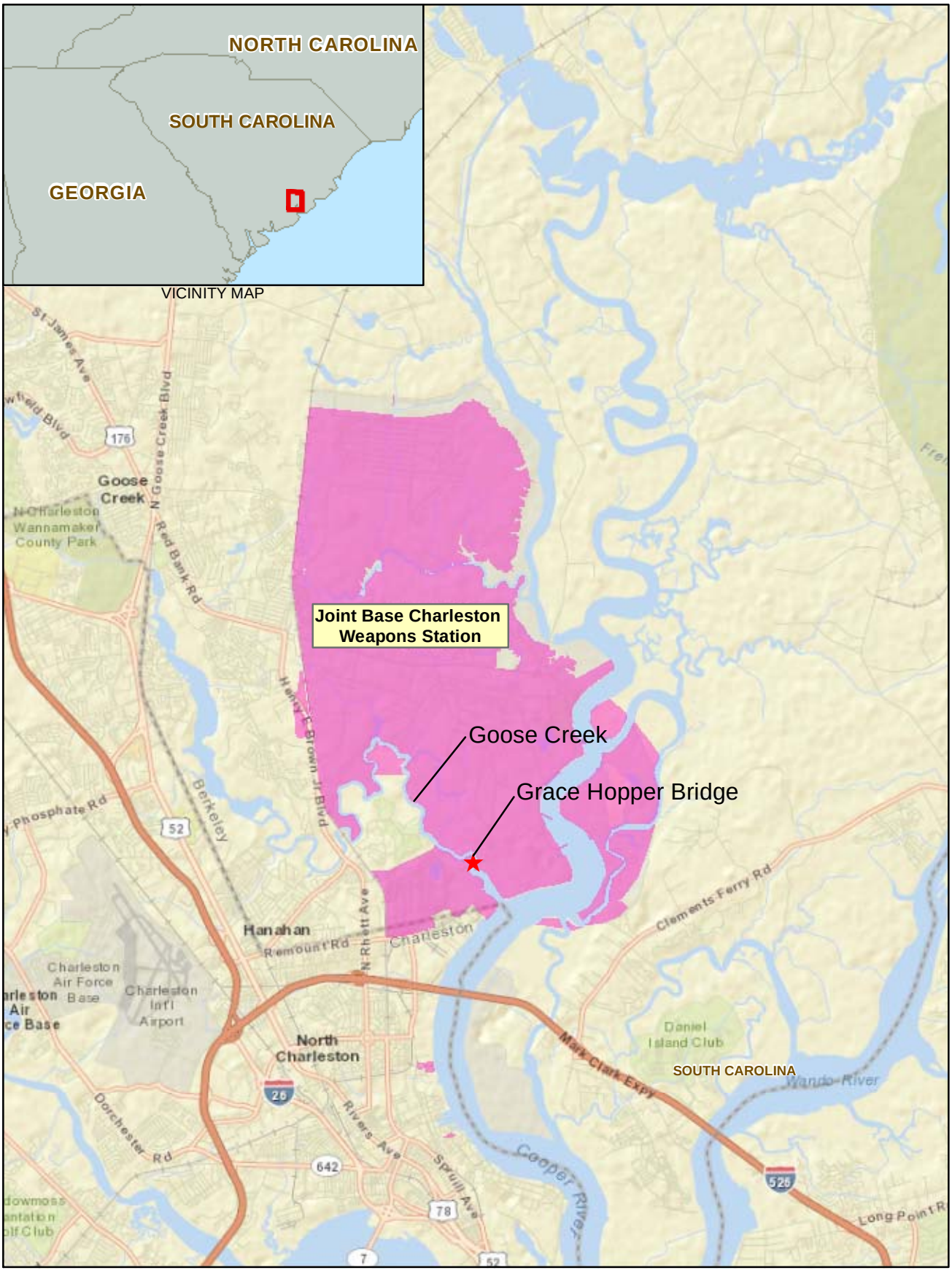
_____
Date

Distribution List:

Catawba Indian Nation
Dr Wenonah Haire, THPO
1536 Tom Stevens Rd
Rock Hill, SC 29730

Eastern Shawnee Tribe of Oklahoma
Ms Robin Dushane, THPO
P.O. Box 350
Seneca, MO 64865

Muscogee (Creek) Nation
Mr David Proctor, Cultural Advisor
P.O. Box 580
Okmulgee, OK 74447



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Miles

FIGURE 1-1
Vicinity Map
Grace Hopper Bridge Environmental Assessment
Joint Base Charleston - Weapons Station

FIGURE 1-2
Project Location Map
Grace Hopper Bridge Environmental Assessment
Joint Base Charleston - Weapons Station

LEGEND
Construction Area
Work Space

N
0 80 160
Feet

FIGURE 2-1
Work Space and Construction Area
Grace Hopper Bridge Environmental Assessment
Joint Base Charleston - Weapons Station

MUSCOGEE (CREEK) NATION

Cultural Preservation — Johnnie Jacobs – Manager

March 16, 2015

Colonel Jeffrey W. DeVore
Commander, Joint Base Charleston
Department of the Air Force
Headquarters 628th Air Base Wing (AMC)
102 E. Hill Blvd. Suite 100
Joint Base Charleston, SC 290404-5004

RE: Proposed Grace Hopper Bridge Erosion Repair
Charleston, Berkley and Orangeburg Co, SC

Dear Colonel DeVore:

Thank you for contacting the Muscogee (Creek) Nation Cultural Preservation Office in reference to your request for comments regarding the above proposed installation development projects.

After review of the material provided, it has been determined that the Muscogee (Creek) Nation has no objections to this project.

Please consider this letter as our concurrence to your request and findings of **no adverse effects on TCP's or Sacred Sites.** However, should cultural material or human remains be encountered during any ground disturbance, construction or demolition, we request to be notified.

Should further information or comment be required please do not hesitate to contact me at (918) 732-7732 or by email at davidp@mcn-nsn.gov. Thank you.

Sincerely,

David J. Proctor
Muscogee (Creek) Nation
Cultural Preservation Dept.

Catawba Indian Nation
Tribal Historic Preservation Office
1536 Tom Steven Road
Rock Hill, South Carolina 29730

Office 803-328-2427
Fax 803-328-5791

April 6, 2015

Attention: Mark A. Epstein
Department of the Air Force
Headquarters 628th Air Base Wing (AMC)
210 W. Stewart Ave.
Joint Base Charleston, SC 29404-4827

Re. THPO #	TCNS #	Project Description
2015-831-3		Grace Hopper Bridge Erosion Repair at JB CHS – Weapons Station

Mr. Epstein,

The Catawba have no immediate concerns with regard to traditional cultural properties, sacred sites or Native American archaeological sites within the boundaries of the proposed project areas. **However, the Catawba are to be notified if Native American artifacts and / or human remains are located during the ground disturbance phase of this project.**

If you have questions please contact Caitlin Totherow at 803-328-2427 ext. 226, or e-mail caitlinh@ccppcrafts.com.

Sincerely,

Caitlin Totherow for

Wenonah G. Haire
Tribal Historic Preservation Officer

your assistance identifying any TCPs of which we may be unaware that may be impacted by the proposed undertaking. Please respond by completing and returning the below response form. A response within 30 days would be appreciated.

6. Your response applies only to providing information and consultations under the NHPA. It will not affect the handling or disposition of human remains, funerary objects, sacred objects, or objects of cultural patrimony under the Native American Graves Protection and Repatriation Act. In the event such items are discovered, we will contact you regarding their handling and disposition.

7. If you have any questions or desire additional information, please contact me at 843-963-1458 or via Email at mark.epstein@us.af.mil

Sincerely,

3/11/2015

X

Signed by: EPSTEIN.MARK.A.1229858110

Mark A. Epstein, DAFC
NEPA Manager

Attachments:
Proposed Undertaking Site Maps

Response

The Eastern Shawnee Tribe has determined that:
(Tribal Name)

☒ Native American Traditional Cultural Properties are not present on the APE for the above proposed undertaking, and therefore the tribe concurs with the JB CHS determination that the undertaking will not impact known TCPs. NHPA Section 106 consultation is considered complete.

☐ Native American Traditional Cultural Properties are present on the APE for the above proposed undertaking and further consultation is required to mitigate potential adverse effects.

☐ Other: _____

_____

_____

Robi Dushane
Signature

Robin Dushane
Printed Name

THPO
Position/Title

4-14-15
Date

Distribution List:

Catawba Indian Nation
Dr Wenonah Haire, THPO
1536 Tom Stevens Rd
Rock Hill, SC 29730

Eastern Shawnee Tribe of Oklahoma
Ms Robin Dushane, THPO
P.O. Box 350
Seneca, MO 64865

Muscogee (Creek) Nation
Mr David Proctor, Cultural Advisor
P.O. Box 580
Okmulgee, OK 74447

DRAFT EA AND FONSI/FONPA

PUBLIC NOTICE

AND

FEDERAL/STATE AGENCY

AND

LOCAL ORGANIZATION

COORDINATION

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS 628TH AIR BASE WING (AMC)
JOINT BASE CHARLESTON SC

11 March 2015

MEMORANDUM FOR See Distribution List

FROM: 628 CES/CENPL
210 W. Stewart Ave.
Joint Base Charleston, SC 29404-4827

SUBJECT: Draft Environmental Assessment for Grace Hopper Bridge Erosion Repair at Joint Base Charleston – Weapons Station

1. As stated in the Description of Proposed Action and Alternatives letter sent on July 17, 2014, Joint Base Charleston (JB CHS) has prepared a draft environmental assessment to analyze the potential impacts and environmental consequences associated with subject Proposed Action. In accordance with Executive Order 12372 (Intergovernmental Review of Federal Programs), we respectfully request your input during the 30-day public review and comment period.

2. If you have any questions about this action or any concerns, please contact:

Mark Epstein
628 CES/CENPL
100 W. Stewart Ave.
Joint Base Charleston, SC 29404-4827
Phone: 843-963-1458
Email: mark.epstein@us.af.mil

Sincerely,

3/11/2015

X

Signed by: EPSTEIN.MARK.A.1229858110

Mark A. Epstein, DAFC
NEPA Manager

Attachments:
Distribution List
CD with Draft IDEA
Public Notice

INTERAGENCY AND INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING LIST

Federal Agency Contacts

Mr. Jay Herrington
Field Supervisor
U.S. Fish and Wildlife Service
176 Croghan Spur Road, Suite 200
Charleston, SC 29407

jay_herrington@fws.gov
843-727-4707 ext. 212
FWS Log No. 2015-I-0076

Ms. Robin Coller-Socha
U.S. Army Corps of Engineers
Charleston District
Regulatory Division
69-A Hagood Avenue
Charleston, SC 29403-5107

robin.c.socha@usace.army.mil
843-329-8044
SAC-2014-00137-2JU

Mr. Eric G. Hawk
U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Regional Office
Protected Resource Division
263 13th Avenue South
St. Petersburg, Florida 33701-5505

eric.hawk@noaa.gov
727-551-5773

Ms. Jaclyn Daly
U.S. Department of Commerce
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Southeast Regional Office
Habitat Conservation Division/Atlantic Branch
219 Fort Johnson Road
Charleston, South Carolina 29412

Jaclyn.Daly@noaa.gov
843-762-8604

State and Local Agency Contacts

Ms. Christine Sanford-Coker
Regional Director
Region 7 Environmental Quality Control Office
South Carolina Department of Health and Environmental Control
1362 McMillan Avenue, Suite 300
Charleston, SC 29405
sanforcc@dhec.sc.gov
843-953-0150

Mr. Bob Perry
Director of Environmental Programs
South Carolina Department of Natural Resources
PO Box 167 (1000 Assembly Street, Columbia, SC 29201-3117)
Columbia, SC 29202-0167
perryb@dnr.sc.gov
803-734-3766

Mr. Blair Williams
Office of Ocean and Coastal Resource Mgmt
South Carolina Dept of Health and Environmental Control
1362 McMillan Avenue, Suite 400
Charleston, SC 29405
williabn@dhec.sc.gov
843-953-0232

Ms. Emily Dale
Staff Archaeologist
South Carolina Dept of Archives and History
8301 Parklane Road
Columbia, SC 29223
edale@scdah.state.sc.us
803-869-6181

Local Public Contacts

Yeamans Hall Club
900 Yeamans Hall Road
Charleston, SC 29410
843-747-8855

DEPARTMENT OF DEFENSE
DEPARTMENT OF THE AIR FORCE

NOTICE OF AVAILABILITY OF A DRAFT ENVIRONMENTAL ASSESSMENT FOR THE GRACE HOPPER BRIDGE EMBANKMENT REPAIRS AT JOINT BASE CHARLESTON - WEAPONS STATION, BERKELY COUNTY, SOUTH CAROLINA

Pursuant to the Council on Environmental Quality regulations (40 Code of Federal Regulations §1500-1508) and Air Force requirements (32 CFR §989) implementing the procedural provisions of the National Environmental Policy Act, the Department of the Air Force gives notice that a draft Environmental Assessment (EA) has been prepared addressing the Grace Hopper Bridge embankment repairs at Joint Base Charleston Weapons Station (JB CHS-WS). Based on the assessment of the facts and analysis presented in the EA and after careful review of the potential impacts the proposed action would not have a significant impact on the environment. Therefore, a Finding of No Significant Impacts (FONSI) and Finding of No Practicable Alternative (FONPA) has been determined to be appropriate for the proposed action and an environmental impact statement is not required for implementation of the proposed action.

Proposed Action Purpose and Need: The purpose of the Proposed Action is to provide erosion protection for the Grace Hopper Bridge from the eastward lateral migration of the stream channel along the east bank of Goose Creek. Repair is needed to prevent further erosion, as continued erosion could undermine the bridge abutments and ultimately cause the bridge to fail. The Proposed Action, purpose and need, alternatives, impacts and mitigations are discussed and analyzed as required by NEPA in the EA.

Review Period: The Navy invites the public to review and comment on the Draft EA and unsigned Draft FONSI/FONPA for 30-days. Copies of the Draft EA and unsigned Draft FONSI/FONPA may be reviewed at the Naval Support Activity Branch Library in Goose Creek. These documents are also located on the JB CHS website: http://www.charleston.af.mil/.

Comments should be submitted in writing to Mr. Mark Epstein within 30 days of the public notice at the address indicated below:

Mark Epstein, GS-819-12
Base Environmental Planner
628 CES/CENPL
Bldg 721, JB CHS Air Facility
Joint Base Charleston, SC 29404-4827
Phone: 843-963-1458

United States Department of the Interior

FISH AND WILDLIFE SERVICE
176 Croghan Spur Road, Suite 200
Charleston, South Carolina 29407
March 30, 2015

Mr. Mark A. Epstein
NEPA Manager
628 CES/CENPL
100 W. Stewart Avenue
Joint Base Charleston, SC 29404-4827

Re: Draft Environmental Assessment for Grace Hopper Bridge, Joint Base Charleston – Weapons Station, Berkeley and Charleston Counties, SC
FWS Log No. 2015-CPA-0060

Dear Mr. Epstein:

The U.S. Fish and Wildlife Service (Service) has received the draft Environmental Assessment (EA) for erosion control at the Joint Base Charleston (JBCHS) in Berkeley County, South Carolina. The proposed project entails erosion stabilization on the east stream bank of Goose Creek at the Grace Hopper Bridge on JBCHS Weapons Station. The Department of the Air Force is the lead agency for this project and, in cooperation with the Department of the Navy, is requesting our review of the draft EA to satisfy, in part, provisions of the National Environmental Policy Act of 1969.

The Service previously reviewed the proposed action under section 7 of the Endangered Species Act of 1973. In our correspondence, we stated that the project area contains suitable habitat for the American wood stork (*Mycteria americana*) and the West Indian manatee (*Trichechus manatus*) and they may be impacted by the proposed work. In order to eliminate or reduce the potential for impacts we recommend all construction activities take place between late October and early February when the wood stork and manatee are unlikely to be in the area.

The Service appreciates the opportunity to provide comments on the draft EA. If you have any questions on our comments, please contact Mr. Mark Caldwell at (843) 727-4707 ext. 215, and reference FWS Log No. 2015-CPA-0060.

Sincerely,

Thomas D. McCoy

Thomas D. McCoy
Acting Field Supervisor

TDM/MAC

Manatee Guidelines

To reduce potential construction-related impacts to the manatee to discountable and insignificant levels, the Service recommends implementing the *Standard Manatee Construction Conditions*, which are as follows:

The permittee will comply with the following manatee protection construction conditions:

a. The permittee shall instruct all personnel associated with the project of the potential presence of manatees and the need to avoid collisions with manatees. All construction personnel must monitor water-related activities for the presence of manatee(s) during May 15 - October 15.

b. The permittee shall advise all construction personnel that there are civil and criminal penalties for harming, harassing, or killing manatees which are protected under the Marine Mammal Protection Act of 1972 and the Endangered Species Act ofl973.

c. Any siltation barriers used during the project shall be ma e of material in which manatees cannot become entangled and must be properly secured, and regularly monitored to avoid manatee entrapment.

d. All vessels associated with the project shall operate at "no wake/idle" speeds at all times while in the construction area and while in water where the draft of the vessel provides less than a four-foot clearance from the bottom. All vessels will follow routes of deep water whenever possible.

e. If manatee(s) are seen within 100 yards of the active construction area all appropriate precautions shall be implemented to ensure protection of the manatee. These precautions shall include the operation of all moving equipment no closer than 50 feet to a manatee. Operation of any equipment closer than 50 feet to a manatee shall necessitate immediate shutdown of that equipment. Activities will not resume until the manatee(s) has departed the project area of its own volition.

f. Any collision with and/or injury to a manatee shall be reported immediately to the SCDNR Hotline@1-800-922-5431 and the U.S. Fish and Wildlife Service at (843) 727-470.

UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Southeast Regional Office
263 13th Avenue South
St. Petersburg, Florida 33701-5505
http://sero.nmfs.noaa.gov

April 1, 2015 F/SER47:JD/pw

(Sent via Electronic Mail)

Mark Epstein
Base Environmental Planner
628 CES/CENPL
Bldg 721, JB CHS Air Facility
Joint Base Charleston, SC 29404-4827

Dear Mr. Epstein:

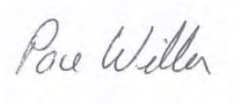
NOAA's National Marine Fisheries Service (NMFS) reviewed the *Draft Environmental Assessment for Grace Hopper Bridge Erosion Repair at Joint Base Charleston-Weapons Station* (JB CHS-WS), dated March 2015. The Department of the Air Force proposes to stabilize the eastern embankment of the Grace Hopper Bridge in Berkeley County by installing grout-filled mattresses, rock-filled gabions, rock mattress gabions, or an articulating concrete block system along the bank from beneath the mean low water elevation to the 100-year flood elevation. As the nation's federal trustee for the conservation and management of marine, estuarine, and anadromous fishery resources, the following comments and recommendations are provided pursuant to authorities of the Fish and Wildlife Coordination Act and the Magnuson-Stevens Fishery Conservation and Management Act (Magnuson-Stevens Act).

On November 11, 2014, JB CHS-WS submitted an Essential Fish Habitat (EFH) Assessment describing the proposed alternatives and a determination that, with the proposed mitigation, there would be no overall adverse effect on EFH from the bank stabilization. On January 9, 2015, NMFS provided EFH conservation recommendations that would minimize impacts by incorporating living-shoreline design principles into the project and best management practices to address potentially toxic spills during grout installation. Page 21 of the Environmental Assessment states JB CHS-WS concurs with the EFH conservation recommendations and will incorporate them into the project. For example, as described in the Environmental Assessment, concrete could be poured in such a way (e.g., step-like) to accommodate installation of oyster bags.

NMFS appreciates JB CHS-WS incorporating the conservation recommendations into its design plan and recommends JB CHS-WS work with the South Carolina Department of Natural Resources (contact Ms. Nancy Hadley) and NMFS to finalize a design that promotes establishment of oyster habitat. Should later analysis show a living shoreline design is impracticable, NMFS will be happy to work with JB CHS-WS to identify appropriate compensatory mitigation.

Thank you for the opportunity to provide these comments. Please direct related correspondence to the attention of Ms. Jaclyn Daly-Fuchs at our Charleston Area Office. She may be reached at (843) 762-8610 or by e-mail at Jaclyn.Daly@noaa.gov.

Sincerely,



/ for

Virginia M. Fay
Assistant Regional Administrator
Habitat Conservation Division

cc:

JB CHS, Mark.Epstein@us.af.mil
SAFMC, Roger.Pugliese@safmc.net
F/SER4, David.Dale@noaa.gov
F/SER47, Jaclyn.Daly@noaa.gov

South Carolina Department of
Natural Resources

PO Box 12559
Charleston, SC 29422
843.953.9003 Office
843.953.9399 Fax
Daviss@dnr.sc.gov

Alvin A. Taylor
Director
Robert D. Perry
Director, Office of
Environmental Programs

April 2, 2015

Mr. Mark Epstein
628 CES/CENPL
100 W. Stewart Avenue
Joint Base Charleston, SC 29404-4827

Re: Draft Environmental Assessment (DEA) for Grace Hopper Bridge Erosion Repair at Joint Base Charleston – Weapons Station

Dear Mr. Epstein:

Personnel with the South Carolina Department of Natural Resources have reviewed the Draft Environmental Assessment for the above referenced project and offer the following comments.

After a thorough review, our department finds the submitted DEA sufficient in addressing the full range of potential environmental impacts associated with the proposed project. We concur that the proposed project will not result in significant impacts to natural resources.

Sincerely,

Susan F. Davis
Coastal Environmental Coordinator

4-8-14
The "March 11 scoping letter" referenced below was actually a letter submitting a copy of the Draft EA & FONSI/FONPA that was placed on public notice. It was sent as a courtesy for the SHPO to validate or refute the JB CHS conclusion of no impact on cultural resources. This conclusion was based on prior surveys and consultation with the SHPO. There was no intent or request to engage in new consultation.

March 31, 2015

Mark Epstein
628 CES/CENPL
100 W. Stewart Ave.
Joint Base Charleston, SC 29404

Re: Grace Hopper Bridge Erosion Repair, Joint Base Charleston, Draft EA
Charleston County, South Carolina
SHPO Project No. 14-ED0095

Dear Mark Epstein:

Our office has received the scoping letter dated March 11 that you submitted as part of your agency's National Environmental Policy Act (NEPA) process for the project referenced above. This letter is for preliminary, informational purposes only and does not constitute consultation or agency coordination with our office as defined in 36 CFR 800: "Protection of Historic Properties" or by any state regulatory process. If the Department of the Air Force chooses to substitute the NEPA process for the process outlined in Section 106 of the National Historic Preservation Act, your agency must notify our office of the proposed substitution.

Our office maintains several resources for identifying historic properties. ArchSite is an online Geographic Information System (GIS) mapping program that includes all known historic and archaeological sites in South Carolina. Information on ArchSite can be found here: http://archsite.cas.sc.edu/ArchSite/. A list of properties listed in the National Register of Historic Places can be found here: http://www.nationalregister.sc.gov/nrlinks.htm. Additional historic contexts, survey reports, and related historic property documents can be found here: http://shpo.sc.gov/research/Pages/conreps.aspx. These sources should assist your agency in identifying historic properties for NEPA scoping.

The State Historic Preservation Office will provide comments regarding historic and archaeological resources and effects to them once the federal or state agency initiates consultation. Project Review Forms and additional guidance regarding our office's role in the compliance process and historic preservation can be found on our website at: http://shpo.sc.gov/programs/revcomp.

If you have any questions, please contact me at (803) 896-6181 or at edale@scdah.state.sc.us.

Sincerely,

Emily Dale
Staff Archaeologist/GIS Coordinator
State Historic Preservation Office

Appendix C
Detail Air Conformity Applicability Model Report

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

1. General Information

- Action Location
Base: CHARLESTON AFB
County(s): Charleston
Regulatory Area(s): NOT IN A REGULATORY AREA

- Action Title: Shoreline Stabilization Project

- Project Number/s (if applicable):

- Projected Action Start Date: 2 / 2015

- Action Purpose and Need:

- Action Description:
Stabilization of eroding shoreline

- Point of Contact
Name: Sara Kent
Title: Scientist
Organization: CH2M Hill
Phone Number: (678) 530-4513

- Activity List:

Activity Type		Activity Title
2.	Construction / Demolition	JB CHS Shoreline Stabilization

2. Construction / Demolition

2.1 General Information & Timeline Assumptions

- Activity Location
County: Charleston
Regulatory Area(s): NOT IN A REGULATORY AREA

- Activity Title: JB CHS Shoreline Stabilization

- Activity Description:

- Activity Start Date
Start Month: 2
Start Month: 2015

- Activity End Date
Indefinite: False
End Month: 8
End Month: 2015

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

- Activity Emissions:

Pollutant	Total Emissions (TONs)
VOC	0.455066
SO_x	0.005165
NO_x	3.358465
CO	2.204031
PM 10	3.246596

Pollutant	Total Emissions (TONs)
PM 2.5	0.160460
Pb	0.000000
NH_3	0.002922

2.1 Site Grading Phase

2.1.1 Site Grading Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2015

- Phase Duration
Number of Month: 6
Number of Days: 0

2.1.2 Site Grading Phase Assumptions

- General Site Grading Information
Area of Site to be Graded (ft^2): 43560
Amount of Material to be Hauled On-Site (yd^3): 0
Amount of Material to be Hauled Off-Site (yd^3): 0

- Site Grading Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

Equipment Name	Number Of Equipment	Hours Per Day
Graders Composite	1	6
Other Construction Equipment Composite	1	8
Rubber Tired Dozers Composite	1	6
Tractors/Loaders/Backhoes Composite	1	7

- Vehicle Exhaust
Average Hauling Truck Capacity (yd^3): 20 (default)
Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips
Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.1.3 Site Grading Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2**
Emission Factors	0.1277	0.0014	0.9794	0.5930	0.0488	0.0488	0.0115	132.74
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2**
Emission Factors	0.0768	0.0012	0.6391	0.3645	0.0263	0.0263	0.0069	122.59
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2**
Emission Factors	0.2721	0.0024	2.2344	1.0419	0.0924	0.0924	0.0245	239.09
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2**
Emission Factors	0.0666	0.0007	0.4500	0.3715	0.0297	0.0297	0.0060	66.799

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**Pb**	**NH_3**	**CO_2**
LDGV	00.5130	00.0068	00.3660	07.6700	00.0248	00.0113		00.1017	00368.0
LDGT	00.7340	00.0095	00.5760	09.1200	00.0249	00.0113		00.1017	00516.2
HDGV	00.7630	00.0165	01.0570	08.2000	00.0432	00.0275		00.0451	00904.8
LDDV	00.1110	00.0029	00.1370	00.7480	00.0447	00.0295		00.0068	00314.1
LDDT	00.3450	00.0056	00.3830	00.6140	00.0533	00.0375		00.0068	00598.6
HDDV	00.3090	00.0116	02.4520	00.7240	00.0970	00.0707		00.0270	01243.4
MC	02.4100	00.0033	01.1600	14.2900	00.0372	00.0207		00.0113	00177.4

2.1.4 Site Grading Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)
20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)
ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)

(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase
$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

2.2 Trenching/Excavating Phase

2.2.1 Trenching / Excavating Phase Timeline Assumptions

- Phase Start Date
Start Month: 2
Start Quarter: 1
Start Year: 2015

- Phase Duration
Number of Month: 6
Number of Days: 0

2.2.2 Trenching / Excavating Phase Assumptions

- General Trenching/Excavating Information
Area of Site to be Trenched/Excavated (ft^2): 8712
Amount of Material to be Hauled On-Site (yd^3): 1290.67
Amount of Material to be Hauled Off-Site (yd^3): 0

- Trenching Default Settings
Default Settings Used: Yes
Average Day(s) worked per week: 5 (default)

- Construction Exhaust (default)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

Equipment Name	Number Of Equipment	Hours Per Day
Excavators Composite	2	8
Other General Industrial Equipmen Composite	1	8
Tractors/Loaders/Backhoes Composite	1	8

- Vehicle Exhaust

Average Hauling Truck Capacity (yd^3): 20 (default)

Average Hauling Truck Round Trip Commute (mile): 20 (default)

- Vehicle Exhaust Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	0	0	0	0	0	100.00	0

- Worker Trips

Average Worker Round Trip Commute (mile): 20 (default)

- Worker Trips Vehicle Mixture (%)

	LDGV	LDGT	HDGV	LDDV	LDDT	HDDV	MC
POVs	50.00	50.00	0	0	0	0	0

2.2.3 Trenching / Excavating Phase Emission Factor(s)

- Construction Exhaust Emission Factors (lb/hour) (default)

Graders Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2**
Emission Factors	0.1277	0.0014	0.9794	0.5930	0.0488	0.0488	0.0115	132.74
Other Construction Equipment Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2**
Emission Factors	0.0768	0.0012	0.6391	0.3645	0.0263	0.0263	0.0069	122.59
Rubber Tired Dozers Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2**
Emission Factors	0.2721	0.0024	2.2344	1.0419	0.0924	0.0924	0.0245	239.09
Tractors/Loaders/Backhoes Composite								
	VOC	**SO_x**	**NO_x**	**CO**	**PM 10**	**PM 2.5**	**CH_4**	**CO_2**
Emission Factors	0.0666	0.0007	0.4500	0.3715	0.0297	0.0297	0.0060	66.799

- Vehicle Exhaust & Worker Trips Emission Factors (grams/mile)

	VOC	SO_x	NO_x	CO	PM 10	PM 2.5	Pb	NH_3	CO_2
LDGV	00.5130	00.0068	00.3660	07.6700	00.0248	00.0113		00.1017	00368.0
LDGT	00.7340	00.0095	00.5760	09.1200	00.0249	00.0113		00.1017	00516.2
HDGV	00.7630	00.0165	01.0570	08.2000	00.0432	00.0275		00.0451	00904.8
LDDV	00.1110	00.0029	00.1370	00.7480	00.0447	00.0295		00.0068	00314.1
LDDT	00.3450	00.0056	00.3830	00.6140	00.0533	00.0375		00.0068	00598.6
HDDV	00.3090	00.0116	02.4520	00.7240	00.0970	00.0707		00.0270	01243.4
MC	02.4100	00.0033	01.1600	14.2900	00.0372	00.0207		00.0113	00177.4

2.2.4 Trenching / Excavating Phase Formula(s)

- Fugitive Dust Emissions per Phase

$PM10_{FD} = (20 * ACRE * WD) / 2000$

$PM10_{FD}$: Fugitive Dust PM 10 Emissions (TONs)

20: Conversion Factor Acre Day to pounds (20 lb / 1 Acre Day)

DETAIL AIR CONFORMITY APPLICABILITY MODEL REPORT

ACRE: Total acres (acres)
WD: Number of Total Work Days (days)
2000: Conversion Factor pounds to tons

- Construction Exhaust Emissions per Phase

$CEE_{POL} = (NE * WD * H * EF_{POL}) / 2000$

CEE_{POL}: Construction Exhaust Emissions (TONs)
NE: Number of Equipment
WD: Number of Total Work Days (days)
H: Hours Worked per Day (hours)
EF_{POL}: Emission Factor for Pollutant (lb/hour)
2000: Conversion Factor pounds to tons

- Vehicle Exhaust Emissions per Phase

$VMT_{VE} = (HA_{OnSite} + HA_{OffSite}) * (1 / HC) * HT$

VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
HA_{OnSite}: Amount of Material to be Hauled On-Site (yd^3)
$HA_{OffSite}$: Amount of Material to be Hauled Off-Site (yd^3)
HC: Average Hauling Truck Capacity (yd^3)
(1 / HC): Conversion Factor cubic yards to trips (1 trip / HC yd^3)
HT: Average Hauling Truck Round Trip Commute (mile/trip)

$V_{POL} = (VMT_{VE} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Vehicle Exhaust Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Vehicle Exhaust On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

- Worker Trips Emissions per Phase

$VMT_{WT} = WD * WT * 1.25 * NE$

VMT_{WT}: Worker Trips Vehicle Miles Travel (miles)
WD: Number of Total Work Days (days)
WT: Average Worker Round Trip Commute (mile)
1.25: Conversion Factor Number of Construction Equipment to Number of Works
NE: Number of Construction Equipment

$V_{POL} = (VMT_{WT} * 0.002205 * EF_{POL} * VM) / 2000$

V_{POL}: Vehicle Emissions (TONs)
VMT_{VE}: Worker Trips Vehicle Miles Travel (miles)
0.002205: Conversion Factor grams to pounds
EF_{POL}: Emission Factor for Pollutant (grams/mile)
VM: Worker Trips On Road Vehicle Mixture (%)
2000: Conversion Factor pounds to tons

Appendix D
Coastal Zone Management Act Consistency Determination

CH2M HILL
Embassy Row
6600 Peachtree Dunwoody Rd
Building 400, Suite 600
Atlanta, GA 30328
Tel 770.604.9095
Fax 770.604.9183

20 August 2014

John Cox
Coastal Zone Consistency, Regulatory Division
DHEC OCRM
1362 McMillan Avenue, Ste 400
Charleston, S. C. 29405
843-953-0205
coxjh@dhec.sc.gov

SUBJECT: Coastal Zone Consistency for proposed streambank stabilization at Grace Hopper Bridge on Joint Base Charleston

Dear Mr. Cox,

We are submitting this letter and the attached Coastal Zone Consistency Determination on behalf of Joint Base Charleston (JB CHS), which proposes to install hard engineering streambank stabilization on the east bank of Goose Creek on JB CHS in Berkeley County.

The Proposed Action is to stabilize the eroding bank and to provide erosion protection along the east bank of Goose Creek at the Grace Hopper Bridge. The work would not affect the ability of boat traffic to pass beneath the bridge or affect vehicle traffic on the bridge. Three reasonable alternatives were identified and these are described in the attached project description. The proposed work will include appropriate best management practices, including use of a turbidity curtain, to minimize the potential for elevated turbidity in Goose Creek during the work. Impacts will be limited to the eroding streambank and stream channel. No work would occur in tidal wetlands.

If you have any questions about this action or any concerns, please contact:

Dr. Rich Reaves, CH2M HILL
Senior Ecologist
6600 Peachtree Dunwoody Rd.
400 Embassy Row, Suite 600
Atlanta, Georgia 30328
678-530-4285 direct
770-827-5186 mobile
Richard.Reaves@ch2m.com

The Proposed Action is consistent to the maximum extent practicable with the applicable Enforceable Policies of the South Carolina Coastal Management Program. We respectfully request concurrence with this determination.

Sincerely,

Rich Reaves, Ph.D., CEP
Senior Ecologist

Attachments:
SCDHEC Form D-0478
SCDHEC Form D-0488
Consistency Determination
Project Description
Vicinity Map
Project Component Location Maps

Copy to:
JB CHS 628 CES/CENPL(Epstein)

D H E C
PROMOTE PROTECT PROSPER

DHEC OCRM State Coastal Zone Consistency (CZC) Certification Request Form

Project Name: Grace Hopper Bridge Embankment Repairs

Applicant Information:

Contact Name Mark Epstein/628 CES/CEIEP

Address 210 West Stewart Ave, JBCHS, SC 29404-4827

Phone # 843-963-1458

E-mail mark.epstein@us.af.mil

Agent/Engineer Information:

Contact Name Rich Reaves, Ph.D., CEP
CH2M HILL

Address 6600 Peachtree Dunwoody Rd.
400 Embassy Row, Suite 600
Atlanta, Georgia 30328

Phone # 678-530-4285

E-mail Richard.Reaves@ch2m.com

Site details:

Location/Address:

The work would occur at the east embankment of Goose Creek at the Grace Hopper Bridge on Wilkinson Way in Berkeley County, South Carolina, within the boundaries of Joint Base Charleston.

County: Berkeley

TMS:

Type of Permit Requested:
(ex. Landfills, Mining, Wastewater, etc.)

Erosion Control

Name of Permitting Authority(s):
(ex. DHEC Bureau of Water)

DHEC OCRM

Description of Proposed Activity(s):

● *including total disturbed area, name of and distance to nearest waterbody, and onsite non-jurisdictional wetland impacts and acreage.*

All work is within the bank and channel of Goose Creek. There are no non-jurisdictinoal wetlands imapcts associated with this project.

The activity would consist of of placing grout-filled mattresses along the bank from beneath the mean low water elevation to the 100-year flood elevation. The mattresses would be buried below the mean low water elevation and would extend from 50 feet north of the bridge to 30 feet south of the bridge, for a total length of approximately 120 feet. Laterally, the mattresses would extend approximately 30 feet from the high point on the bank into the water. The work area, including access and staging areas, would encompass approximately 1 acre, with approximately 0.1 acre associated with the proposed erosion protection. Access and staging areas are in uplands. Prior to placement of the mattresses, clean sand and gravel would be placed as backfill in eroded areas, where needed, to create a proper slope. To minimize disturbance to the bank, a barge would be staged in Goose Creek to serve as a work platform. Other construction equipment would likely include a trackhoe, flatbed truck, and a crane. A turbidity curtain would be placed around the work area. Construction activities would be confined to the barge and designated work areas. There would be no disruption of traffic on Wilkinson Way and the bridge would remain open to traffic. Private boat traffic along Goose Creek would be able to continue during the work.

All applicable Project Policy Checklist(s) that apply to the proposed project must be submitted with this request form. (See www.scdhec.gov/environment/ocrm/czc for available Policy Checklists)

Submitted By: Richard Reaves Date: 8-20-14

D H E C
PROMOTE PROTECT PROSPER

Policy Group X - Erosion Control

Project Name: Grace Hopper Bridge Embankment Repairs
TMS: _____

* Policies excerpted from the GAPC Section of the CZMP as well as Chapter X.

The Agency's Coastal Zone Consistency (CZC) certification review of all activities within the Coastal Zone that require a State permit will be based on the policies contained within the project based checklists. For the CZC request to be complete, you must answer the questions contained within the policies segment relative to your project by checking off all that apply. More than one checklist may apply to your project based on the plan proposal. For example, a road or highway project might also require dredging and filling of coastal wetlands.

A) **Funding Policies:**

Required: Will the expenditure of public funds for beach and shore erosion control measures project or plans…

a.	☐ be limited to beach or shore erosion control only in areas, communities, or on barrier islands to which the public has full and complete access (as defined in the shoreline access segment of the program)? ☑ or is this N/A?
b.	☐ be limited to beach erosion control practices deemed by CZC Staff to be consistent with the Beach Erosion Control Policies, in this section and the overall Policies of the CZMP, and any applicable rules and regulations promulgated pursuant to the Act? ☑ or is this N/A?
c.	☑ provide adequate consideration and demonstration is being given to the erosion control problems and needs of each coastal county based on the relative benefits of the particular project? ☐ or is this N/A?
d.	☑ give consideration to the extent to which the proposal will maximize the protection of public health, safety, and welfare? ☐ or is this N/A?
e.	☑ give consideration to the full range of alternative erosion control measures which are possible, including no action? Before decisions are made, consideration must be given to the long and short-range costs and benefits of the various alternatives. ☐ or is this N/A?
f.	☑ give consideration to the long and short-range costs and benefits of various alternatives? ☐ or is this N/A?
g.	☐ propose the removal or modification of existing publicly-funded control structures based on the applicable policies in this section and determination that the structure has an adverse impact on the public interest, as mandated by *Section 48-39-120(C)* of the CTWA? ☑ or is this N/A?
h.	☐ be consistent with the Priority of Uses of each listed Geographic Areas of Particular Concern (GAPCs) as discussed in the Geographic Areas of Particular Concern (GAPCs) Polices and Priority of Uses document located on the Resources section of the CZC webpage? ☑ or is this N/A?

Required:

As applicant or agent, having completed all appropriate checklists and having read the applicable polices, I certify that this project is consistent with the South Carolina Coastal Zone Management Program based on the information outlined above and supplemental information attached.

Richard Reaves 8-20-14

Signature and date

B. General Considerations:

Required: Will your proposed erosion control project or plans …

a.	☑ consider the type of materials, their useful life expectancy along with anticipated maintenance and replacement costs? ☐ or is this N/A?
b.	☑ consider the economic justification of the proposed project in comparison with available erosion control alternatives including consideration of the anticipated damage and economic loss due to failure? ☐ or is this N/A?
c.	☐ consider the rate of rise or fall of sea level at the location? ☑ or is this N/A?
d.	☐ consider sediment transport and sand budget in the project area? ☑ or is this N/A?
e.	☐ consider the extent of up or downdrift damage due to installation or lack of installation of the erosion control structure? ☑ or is this N/A?
f.	☐ consider the extent to which the project fits into a comprehensive shore protection program for that particular stretch of beach, aimed at preserving the beach profile in its present slope and configuration? ☑ or is this N/A?
g.	☐ be consistent with the Priority of Uses of each listed Geographic Areas of Particular Concern (GAPCs) as discussed in the Geographic Areas of Particular Concern (GAPCs) Polices and Priority of Uses document located on the Resources section of the CZC webpage? ☑ or is this N/A?

Required:

As applicant or agent, having completed all appropriate checklists and having read the applicable polices, I certify that this project is consistent with the South Carolina Coastal Zone Management Program based on the information outlined above and supplemental information attached.

Richard Reaves 8-20-14

Signature and date

C. Erosion Control Policies:

1. **Seawalls, Bulkheads and Revetments (outside of Critical Areas):**

Required: Will your proposed bulkhead and revetment project or plans…

a.	☐ consider a comprehensive program to insure the proposed structure does not cause adverse effects to adjoining property owners or appreciably accelerate erosion in the general area? ☑ or is this N/A?
b.	☐ avoids interfering with existing or planned public access unless other access is provided? ☑ or is this N/A?
c.	☑ avoid scouring where appropriate? ☐ or is this N/A?
d.	☐ consider utilizing natural features rather than artificial protection? ☑ or is this N/A?
e.	☑ demonstrate that the revetment materials are appropriate for use? ☐ or is this N/A?
f.	☐ ensure that the proposed groins will not interfere with public access? ☑ or is this N/A?
g.	☐ be consistent with the Priority of Uses of each listed Geographic Areas of Particular Concern (GAPCs) as discussed in the Geographic Areas of Particular Concern (GAPCs) Polices and Priority of Uses document located on the Resources section of the CZC webpage? ☑ or is this N/A?

Required:

As applicant or agent, having completed all appropriate checklists and having read the applicable polices, I certify that this project is consistent with the South Carolina Coastal Zone Management Program based on the information outlined above and supplemental information attached.

Richard Reed 8-20-14

Signature and date

2. **Sand Dune Management (outside of Critical Areas):**

Required: Will your proposed dune management project or plans…

a.	☐ utilize non-structural means for private and public projects in restoring and stabilizing dunes? ☑ or is this N/A?
b.	☐ to the extent possible keep the secondary dunes intact to insure protection of adjoining areas against flooding during storms? ☑ or is this N/A?
c.	☐ establish buffer areas, where feasible, to allow for frontal dune growth and movement? ☑ or is this N/A?

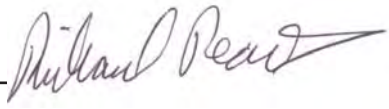
d.	☐ contain plans for dune restoration, reconstruction or stabilization? ☑ or is this N/A?
e.	☐ limit dune reconstruction in areas above the existing berm line or in line with existing primary oceanfront dunes? Dunes should be constructed using only native material (sand) of the appropriate grain size and stabilized with native vegetation. Consultation is encouraged with NRCS in determination of plant materials most suitable for dune stabilization. ☑ or is this N/A?
f.	☐ demonstrate that walkover structures will not interfere with existing public access? ☑ or is this N/A?
g.	☐ be consistent with the Priority of Uses of each listed Geographic Areas of Particular Concern (GAPCs) as discussed in the Geographic Areas of Particular Concern (GAPCs) Polices and Priority of Uses document located on the Resources section of the CZC webpage? ☑ or is this N/A?

Recommended policies to consider with dune management projects:

a. *DHEC-OCRM recommends that local governments in shoreline areas institute shorefront construction back lines as part of their land planning activities and or local building codes, subdivision regulations, or zoning ordinances.*
b. *Private property owners and developers are encouraged to consult with OCRM or with technical consultants to learn the erosion trends and shoreline dynamics in their particular area before initiating construction.*

Required:

As applicant or agent, having completed all appropriate checklists and having read the applicable polices, I certify that this project is consistent with the South Carolina Coastal Zone Management Program based on the information outlined above and supplemental information attached.



8-20-14

Signature and date

Project Description

The Air Force is submitting this Consistency Determination under Coastal Zone Management Act 16 U.S.C. § 1451 et seq. and associated regulations at 15 C.F.R. Part 930.39, for the embankment repairs at Grace Hopper Bridge at Joint Base Charleston Weapons Station, South Carolina

Proposed Action: The Proposed Action is to repair and provide erosion protection along the east bank of Goose Creek at the Grace Hopper Bridge that would not alter the ability of boat traffic to pass beneath the bridge. Three alternatives were determined to be reasonable to meet the project objectives, and these alternatives are carried forward, along with the No Action Alternative, for detailed analysis in the Environmental Assessment. The considered Proposed Action and alternatives consist of different methods to provide erosion protection.

Purpose and Need: The purpose of the Proposed Action is to provide erosion protection for the Grace Hopper Bridge from the eastward lateral migration of the stream channel along the east bank of Goose Creek. Due to lateral migration of the channel, erosion along the east embankment has created vertical cuts in the embankment and the undercutting of vegetation upstream and downstream of the bridge. Continued erosion could undermine the bridge abutments and ultimately cause the bridge to fail. The need is to repair and prevent future erosion. The Proposed Action would stabilize the stream bank and provide protection to the embankment, which would prevent further degradation of the embankment. If the Grace Hopper Bridge were to be closed, an 8-mile detour would be required, which would result in increased traffic through other parts of JB CHS, increased fuel consumption and associated vehicle emissions, and increased costs for transport operations.

Preferred Alternative (Proposed Action): The preferred alternative is the Proposed Action. Under this alternative, grout-filled mattresses would be placed along the bank from beneath the mean low water elevation to the 100-year flood elevation. The mattresses would be buried below the mean low water elevation and would extend from 50 feet north of the bridge to 30 feet south of the bridge, for a total length of approximately 120 feet (see attached Figure). Laterally, the mattresses would extend approximately 30 feet from the high point on the bank into the water. The work area, including access and staging areas, would encompass approximately 1 acre, with approximately 0.1 acre associated with the proposed erosion protection. The site access and staging areas are in uplands.

Prior to placement of the mattresses, sand and gravel would be placed as backfill in eroded areas, where needed, to create a proper slope. To minimize disturbance to the bank, a barge would be staged in Goose Creek to serve as a work platform. Other construction equipment would likely include a trackhoe, flatbed truck, and a crane. Construction activities would be confined to the barge and designated work areas in uplands. There would be no disruption of traffic on Wilkinson Way and the bridge would remain open to traffic. Private boat traffic along Goose Creek would be able to continue during work.

The grout-filled mattresses consist of a double layer of synthetic fabric divided into individual compartments that are connected internally. Grout is pumped into each compartment and is reinforced by cables. The cables are installed between the two layers of fabric and run through the ducts that connect them. Multiple mattresses would be interconnected to provide uniform coverage.

The primary construction staging area would be at an asphalt turn-around by the guard shack on Wilkinson Way. There is an unimproved field road paralleling the south side of Wilkinson Way that connects the primary staging area with the proposed worksite. Crushed rock would be placed in this road to fill low spots and facilitate site access. A cleared grassy area near the proposed work area along the field road would be used as a secondary staging area

Alternative 1: Alternative 1 would be the same as the Preferred Alternative, except that gabions would be used to stabilize the stream bank instead of grout filled mattresses. Alternative 1 would employ the same work area, access, extent of erosion protection, and work approach that would be implemented

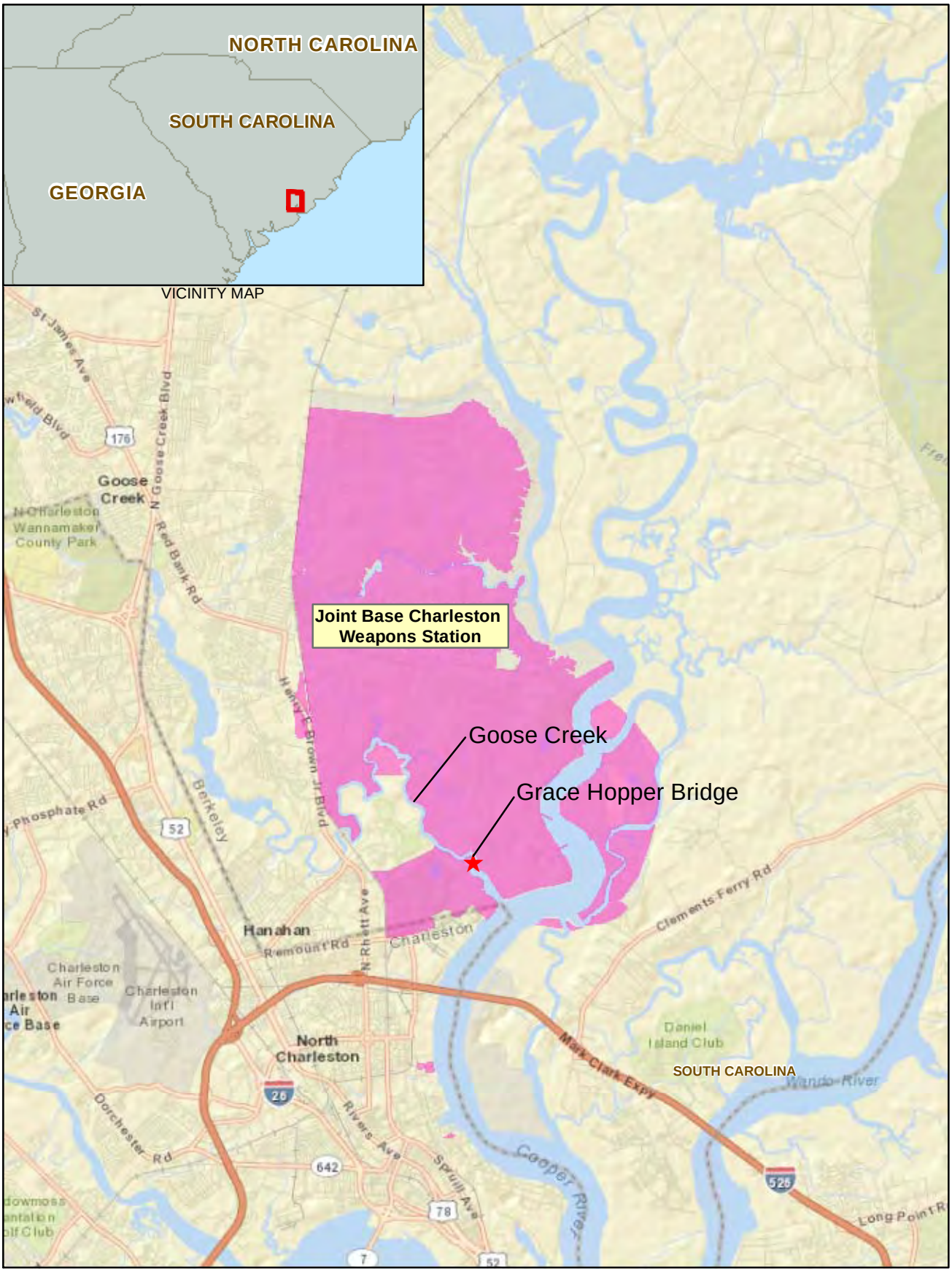
under the Preferred Alternative. Gabions consist of connected wire mesh cages filled with rock that are stacked to create a wall. As with the Preferred Alternative, construction activities would not disrupt road traffic as the bridge would stay operational. Construction would begin in October 2014 and would take approximately 6 months to complete.

Alternative 2: Alternative 2 would be similar to the Preferred Alternative, but would use an articulating concrete block system for erosion protection instead of grout filled mattresses. Alternative 2 would employ the same work area, access, extent of erosion protection, and work approach that would be implemented under the Preferred Alternative; additional grading and backfill would likely be required, however. Prior to placement of the articulating concrete blocks, the grade would be sloped properly, which could require backfill of sand or road-base material. Construction equipment, including the barge to be used as a work platform, would be the same as described for the Preferred Alternative.

Articulating concrete block systems consist of individual blocks that form a continuous blanket by interlocking, binding together by cables, or a combination of both. The blocks are connected by cables that are secured at the corners of the system by soil anchors placed approximately 3 to 4 feet into the soil.

As with the Preferred Alternative, construction activities would not disrupt road traffic as the bridge would stay operational. Construction would begin in October 2014 and would take approximately 6 months to complete.

No Action Alternative: Under the No Action Alternative, there would be no change from current conditions. This alternative is carried forward for analysis as a baseline against which the impacts of the Proposed Action and potential action alternatives can be evaluated. Under the No Action Alternative, the bank would continue to erode due to stream and tidal flows and wave action from wind and boat traffic. The continued erosion would cause sedimentation and reduced water quality in Goose Creek. Temporary repairs that would replace lost soil and rip-rap would be performed as funding becomes available. There would continue to be potential for undermining of the bridge abutment, which could lead to closure of the bridge. If the Grace Hopper Bridge were to be closed, an 8-mile detour would be required, which would result in increased traffic through other parts of JB CHS, increased fuel consumption and associated vehicle emissions, and increased costs for transport operations.



N

0 1.25 2.5

Miles

Vicinity Map
Grace Hopper Bridge Bank Stabilization
Joint Base Charleston - Weapons Station

CH2MHILL.

N

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Feet

Project Location Map
Grace Hopper Bridge Bank Stabilization
Joint Base Charleston - Weapons Station

CH2MHILL

FEDERAL AGENCY COASTAL ZONE MANAGEMENT ACT (CZMA) CONSISTENCY DETERMINATION FOR THE STATE OF SOUTH CAROLINA

As defined by the South Carolina's Coastal Management Program (CMP), the coastal zone of South Carolina includes all the lands and waters out to a 3-mile limit in Beaufort, Berkeley, Charleston, Colleton, Dorchester, Horry, Jasper, and Georgetown counties. Critical areas, as defined by South Carolina's CMP, include coastal waters, tidelands, beaches, and primary oceanfront sand dunes. South Carolina's CMP includes 14 resource policies for activities in the coastal zone subject to management by the Office of Ocean and Coastal Resource Management through the South Carolina CMP and Coastal Management Act of 1977 (Table 1).

The Air Force is required to ensure that any activity in the coastal zone that affects land or water use, or natural resources of the coastal zone to be carried out in a manner consistent to the maximum extent practicable with the enforceable policies of federally approved state coastal management programs. The Air Force has determined that the Proposed Action, Grace Hopper Bridge embankment repairs as presented in Enclosure I, is consistent to the maximum extent practicable with enforceable policies of the South Carolina CMP based on the following information, data, and analysis, as presented in Table 1 below and within the Environmental Assessment.

TABLE 1

Consistency Review of Enforceable Policies

Grace Hopper Bridge Embankment Repairs at JB CHS – Weapons Station

SC CMP Enforceable Policy	Consistency Assessment
Residential Development	The Proposed Action does not include residential development. The Residential Development Enforceable Policies do not apply to the Proposed Action.
Transportation Facilities	The Proposed Action does not include any development of ports, highways, or railways, airfields, or parking areas. The Transportation Enforceable Policies do not apply to the Proposed Action.
Coastal Industries	The Proposed Action does not include any development of agriculture, forestry (silviculture), mineral extraction, manufacturing, fish and seafood processing, or aquaculture. The Coastal Industries Enforceable Policies do not apply to the Proposed Action.
Commercial Development	The Proposed Action does not include any commercial development. The Commercial Development Enforceable Policies do not apply to the Proposed Action.
Recreation and Tourism	The Proposed Action would not involve the development of parks or commercial recreation facilities. The Recreation and Tourism Enforceable Policies do not apply to the Proposed Action.
Marine Related Facilities	The Proposed Action would not involve the development of any marine related facilities. The Marine Related Facilities Enforceable Policies do not apply to the Proposed Action.
Wildlife and Fisheries Management	The Proposed Action would not include artificial reefs and would not cause a substantial negative impact to wildlife and fisheries stocks or habitats. Implementation of the bank stabilization would be a long-term benefit to aquatic habitats in Goose Creek. The Proposed action is consistent to the extent practicable with the Wildlife and Fisheries Management Enforceable Policies.
Dredging	No dredging would occur under the Proposed Action. The Dredging Enforceable Policies do not apply to the Proposed Action.
Public Service and Facilities	The Proposed Action does not include new sewage treatment facilities, new solid waste disposal facilities, new dams and reservoirs, new public/quasi-public buildings, or new

TABLE 1

Consistency Review of Enforceable Policies

Grace Hopper Bridge Embankment Repairs at JB CHS – Weapons Station

SC CMP Enforceable Policy	Consistency Assessment
	water supply facilities. The Public Service and Facilities Enforceable Policies do not apply to the Proposed Action.
Erosion Control	The Proposed Action does not include any activities that would affect beaches or sand dunes, or that would result in use of offshore breakers or jettys, or artificial beef nourishment. The Erosion Control Enforceable Policies for Beaches, Sand Dunes, Use of Offshore Breakers or Jettys, and Artificial Beach Nourishment do not apply to the Proposed Action. The Proposed Action would include a revetment to stabilize the bank of Goose Creek. Best Management Practices, including required erosion and sediment control measures, would be included with the design and construction plans for proposed projects to minimize impacts.
Energy and Energy-Related Facilities	The Proposed Action does not include any energy or energy related facilities. The Energy and Energy Related Facilities Enforceable Policies do not apply to the Proposed Action.
Activities in Areas of Special Resource Significance	There would be no impacts to barrier islands, dune areas, navigational channels, public open spaces, or wetlands as a result of the Proposed Action. The Activities in Areas of Special Resource Significance Enforceable Policies do not apply to the Proposed Action.
Stormwater Management Guidelines	The Proposed Action includes no bridges, golf courses, or mines and landfills. The Stormwater Management Guidelines Enforceable Policies for Stormwater Management Requirements for Bridge Runoff, Golf Courses Adjacent to Receiving Waters, and Mines and landfills do not apply to the Proposed Action. The revetment would be impervious and on the bank of Goose Creek. It is not possible to install a stormwater management system for this bank stabilization effort. The Proposed Action is consistent to the extent practicable with the Stormwater Management Guidelines Enforceable Policies.
Beach and Shoreline Access	The Proposed Action would not impact any beach or shoreline access. The Beach and Shoreline Access Enforceable Policies do not apply to the Proposed Action.
Mitigation Guidelines	The Proposed Action would not include any activities in wetlands. The Mitigation Guidelines Enforceable Policies do not apply to the Proposed Action.
Geographic Areas of Particular Concern	The Proposed Action would not impact any Geographical Areas of particular Concern. The Geographical Areas of particular Concern Enforceable Policies do not apply to the Proposed Action.

D H E C
PROMOTE PROTECT PROSPER
Catherine B. Templeton, Director
Promoting and protecting the health of the public and the environment

October 16, 2014

Mark Epstein
Joint Base Charleston
210 W. Stewart Av
Joint Base Charelston, SC 29404-4827

Re:
Berkeley County/Grace Hopper Bridge Embankment Repair at Joint Base Charleston EA
Federal Consistency - F/C

Dear Mr. Epstein:

The staff of the Office of Ocean and Coastal Resource Management (OCRM) certifies that the above referenced project is consistent with the S.C. Coastal Zone Management Program provided that (1) no freshwater wetlands are disturbed or altered without authorization, and that (2) all necessary erosion and sediment control practices are maintained until the entire site is stabilized. This certification is only applicable for the embankment repair EA for this project. This certification shall serve as the final approval for the referenced permit only and does not alleviate your responsibility to obtain other required local, state or federal approvals.

Sincerely,

D. J. Thompson

David J. Thompson
Wetland Section Manager

Regulatory Programs Division

cc: Mr. Blair Williams, Section Manager

SOUTH CAROLINA DEPARTMENT OF HEALTH AND ENVIRONMENTAL CONTROL
Ocean and Coastal Resource Management
Charleston Office · 1362 McMillan Ave, Suite 400 · Charleston, SC 29405-2047
Phone: 843-953-0200 · Fax: 843-953-0201 · www.scdhec.gov

Appendix E
Essential Fish Habitat Determination of No Overall Adverse Effects

ESSENTIAL FISH HABITAT IMPACT ASSESSMENT

FOR

EMBANKMENT REPAIRS AT THE GRACE HOPPER BRIDGE
JOINT BASE CHARLESTON WEAPONS STATION
CHARLESTON, SOUTH CAROLINA

November 2014

Essential Fish Habitat Impact Assessment for Embankment Repairs at the Grace Hopper Bridge at Joint Base Charleston – Weapons Station

I. INTRODUCTION

In accordance with Section 305(b)(2) of the Magnuson-Stevens Fishery Conservation and Management Act, as amended through October 11, 1996, the United States Air Force (USAF) is issuing this Effects Determination on Essential Fish Habitat (EFH) for proposed embankment repairs at the Grace Hopper Bridge within the boundaries of Joint Base Charleston-Weapons Station (JB CHS-WS), South Carolina (Figures 1 and 2).

II. DESCRIPTION OF PROPOSED ACTION

The purpose of the action is to provide erosion protection for the Grace Hopper Bridge from the eastward lateral migration of the stream channel along the east bank of Goose Creek. Due to lateral migration of the channel, erosion along the east embankment has created vertical cuts in the embankment and the undercutting of vegetation upstream and downstream of the bridge. Continued erosion could undermine the bridge abutments and ultimately cause the bridge to fail. The Proposed Action would stabilize the stream bank and provide protection to the embankment, which would prevent further degradation of the embankment.

The Preferred Alternative would consist of placing grout-filled mattresses along the bank from beneath the mean low water elevation to the 100-year-flood elevation. The mattresses would be buried below the mean low water elevation and would extend from 50 feet north of the bridge to 30 feet south of the bridge, for a total length of approximately 120 feet. Laterally, the mattresses would extend approximately 30 feet from the high point on the bank into the water. The work area, including access and staging areas, would encompass approximately 1 acre, with approximately 0.1 acre associated with the proposed erosion protection. Prior to placement of the mattresses, sand and gravel would be placed as backfill in eroded areas, where needed, to create a proper slope. To minimize disturbance to the bank, a barge would be staged in Goose Creek to serve as a work platform. Other construction equipment would likely include a trackhoe, flatbed truck, and a crane. Construction activities would be confined to the barge and designated work areas. There would be no disruption of traffic on Wilkinson Way and the bridge would remain open to traffic. Boat traffic along Goose Creek would not be substantially impeded by the proposed work, as private boat traffic would be able to pass the work area while work is ongoing. The extents of construction within Goose Creek would be demarcated by an erosion control boom.

The grout-filled mattresses consist of a double layer of synthetic fabric divided into individual compartments that are connected internally. Grout is pumped into each compartment and is reinforced by cables. The concrete grout fill material consists of a mixture of Portland cement, fine aggregate, water, admixtures, and fly ash (optional) to provide the pumpable slurry. The cables are installed between the two layers of fabric and run through the ducts that connect them (DOT, 2011). Multiple mattresses would be interconnected to provide uniform coverage.

The primary construction staging area would be at an asphalt turn-around by the guard shack on Wilkinson Way. There is an unimproved access road paralleling the south side of Wilkinson Way that connects the primary staging area with the proposed worksite. Crushed rock would be placed in this road to fill low spots and facilitate site access. A cleared grassed area near the proposed work area along the access road would be used as a secondary staging area.

Construction is anticipated to begin in 2015 and would take approximately 6 months to complete. The Preferred Alternative was determined to be the most cost-efficient method, and would be equally or more effective than Alternative 1 or Alternative 2, described as follows.

Alternative 1 would be the same as the Preferred Alternative, except that gabions would be used to stabilize the stream bank instead of grout-filled mattresses. Alternative 1 would employ the same work area, access, extent of erosion protection, and work approach that would be implemented under the Preferred Alternative. Prior to placement of the gabions, the grade would be properly sloped, which could require backfill of sand or road-base material. Construction equipment, including the barge to be used as a work platform, would be the same as described for the Preferred Alternative. Gabions consist of connected wire mesh cages filled with rock that are stacked to create a wall. As with the Preferred Alternative, construction activities would not disrupt road traffic, as the bridge would remain operational and boat traffic along Goose Creek would be able to continue with minimal disruption. Construction would begin in 2015 and would take approximately 6 months to complete.

Alternative 2 would also be similar to the Preferred Alternative, but would use an articulating concrete block system for erosion protection. Alternative 2 would employ the same work area, access, extent of erosion protection, and work approach that would be implemented under the Preferred Alternative; however, additional grading and backfill would likely be required. Prior to placement of the articulating concrete blocks, existing rip-rap would be removed and the grade would be sloped properly, efforts that could require backfill of sand or road-base material. Construction equipment, including the barge to be used as a work platform, would be the same as described for the Preferred Alternative. Articulating concrete block systems consist of individual blocks that form a continuous blanket by interlocking, binding together by cables, or a combination of both. The blocks are connected by cables that are secured at the corners of the system by soil anchors placed approximately 3 to 4 feet into the soil. As with the Preferred Alternative, construction activities would not disrupt road traffic, as the bridge would remain operational and interference with boat traffic would be minimal. Construction would begin in 2015 and would take approximately 6 months to complete.

III. Description of the Study Area

JB CHS-WS was known as the Naval Weapons Station Charleston (United States Navy), but was realigned to Charleston Air Force Base (USAF) as part of recommendations of the 2005 Defense Base Closure and Realignment Commission. JB CHS-WS totals 16,750 acres in Berkeley County northeast of North Charleston along the western bank of the Back River and partly straddling the Cooper River (Figure 1). The northern portion of JB CHS-WS is bisected by Foster Creek, while Goose Creek bisects the southern portion of JB CHS-WS. There are approximately 22 miles of marsh and river frontage at JB CHS-WS. Freshwater features and the proximity to the coast result in a combination of salt, brackish, and freshwater marshes and wetlands (Navy, 2003). Approximately 600 acres of marshland occurs within the boundaries of JB CHS-WS (Zapata, 2010). Access on JB CHS-WS is restricted, although public recreational activities are allowed in designated areas.

The workspace area is on the east embankment of Goose Creek at the Grace Hopper Bridge (Figure 2). The stream bank that would be impacted by the Proposed Action is upland, consisting mainly of placed fill for the bridge, and not marsh. Some rip-rap remains along the bank and down to the low water elevation, though most has washed away, which has contributed to the erosion of the stream bank. Much of the bank is cut vertically due to wave action from boat traffic. Erosion from the failing embankment likely contributes to increased turbidity in Goose Creek, thereby reducing the overall water quality of Goose Creek.

There are no wetlands within the area of disturbance of the Proposed Action. There would be impacts to the tidal stream as work would occur within Goose Creek.

IV. EFH Designation in the Proposed Action Area

EFH habitat at JB CHS-WS includes estuarine waters, such as the Cooper River, adjacent tidal freshwater wetlands, salt marshes, brackish marshes, tidal flats, and tidal creeks, such as Goose Creek and Foster Creek (SAFMC, 1998). EFH at JB CHS-WS is shown on Figure 1. These waters support many species that rely on these particular habitats for refuge, foraging, and as a nursery for juveniles (SAFMC, 2009).

The South Atlantic Fishery Management Council (SAFMC) indicates that salt marsh and tidal flats habitat are EFH for white shrimp (*Litopenaeus setiferus*) and brown shrimp (*Farfantepenaeus aztecus*) and a variety of other aquatic organisms. Species identified by the Mid-Atlantic Fishery Management Council with EFH in estuarine waters include juvenile and adult summer flounder (*Paralichthys dentatus*) and juvenile and adult bluefish (*Pomatomus saltatrix*). The Cooper River, tidal creeks, and adjacent marshes within the project area for JB CHS-WS also provide nursery and foraging habitat for other species such as black drum (*Pogonias cromis*), Atlantic menhaden (*Brevoortia tyrannus*), tile fish (*Malacanthus* sp.), and blue crab (*Callinectes sapidus*). These species are prey for fish managed by the SAFMC, such as a variety of mackerels, snappers, and groupers and migratory species such as a variety of billfish and shark managed by the NMFS. Marsh and nearby channels within JB CHS-WS also provide habitat for juvenile and subadult red drum (*Sciaenops ocellatus*) (Croom, Miles/NOAA/NMFS, 2011). Saltwater species caught by anglers along the Cooper River in the vicinity of JB CHS-WS include winter trout, flounder, drum, and croaker (Navy, 2003).

V. Assessment of Potential Effects

As noted in 50 CFR 600.910(a), an “adverse effect” on EFH includes any impact that reduces the quantity and/or quality of EFH. Temporary impacts include those limited in duration and that allow the environment to recover

without measurable impact. Minimal impacts include those that may result in relatively small changes in the affected environment and insignificant changes in ecological functions.

Potential effects on EFH at JB CHS-WS would be associated with the consequences of construction activities to place supporting clean fill material and grout-filled mattresses to stabilize the east embankment beneath Grace Hopper Bridge. The effects of construction activities are assessed to determine their potential to adversely affect EFH, including associated fish and invertebrate species. No adverse effects to EFH are anticipated once construction activities are completed.

A. Potential Direct Effects

Potential direct effects would include placement of fill material in designated EFH. Placement of supporting fill and grout-filled mattresses would result in permanent loss of a minor amount of EFH, which would not greatly reduce the available EFH in the area because the habitat in the area of fill is degraded from bank erosion. A long-term benefit to EFH in the area could result from decreased erosion and turbidity after the embankment is stabilized.

Additional potential temporary direct effects could result from reduced water quality due to increased pH from inadvertent exposure of the water column to uncured grout. Grout-filled mattresses consist of a double layer of strong synthetic fabric but are not impermeable and uncured grout could be introduced to Goose Creek through the mattress fabric. Potential exists for an uncured grout spill while filling the mattress with the pumpable slurry. However, the project area is within a brackish estuarine system near the confluence with the Cooper River that is tidally influenced. These brackish estuarine waters have greater buffering capacity than freshwater systems due to the presence of substantial bicarbonate in the water. This buffering capacity would minimize the potential for uncured grout to alter the pH of the water column. Any impacts would be expected to be minor and temporary.

B. Potential Indirect Effects

The main potential indirect effect would be from reduced water quality due to increased turbidity from soil disturbances during construction. The project would consist of removing existing rip-rap and would require the bank to be graded and backfilled to properly place and anchor the grout-filled mattresses. These activities would likely contribute to a temporary increase in resuspension of sediments, which would lead to increased turbidity within Goose Creek. Increased turbidity would lower the water quality and habitat quality at the work area and immediately downstream. A boom/floating turbidity curtain would be placed around the work area, which would limit the downstream effects of temporarily increased turbidity at the work site. A barge would be utilized to place the mattresses, which would reduce impacts to the banks of Goose Creek. Construction best management practices (BMPs) used to limit the effects of erosion in upland areas would be utilized as needed. Effects from increased turbidity would be temporary and minor with use of BMPs.

Other potential indirect effects include accidental spills of fuels or concrete into Goose Creek during construction. The selected contractor would be required to obtain a National Pollutant Discharge Elimination System construction stormwater permit. As required by the permit, the contractor would formulate and implement a Spill Prevention, Control, and Countermeasures Plan (SPCCP) for the proposed work designed to prevent accidental spills from impacting Goose Creek or other waters.

VI. Federal Agency Conclusion

The determinations within this EFH Assessment conclude that, with the proposed mitigation measures, there will be "No Overall Adverse Effect" from the proposed stream bank stabilization measures on the east embankment of Goose Creek at the Grace Hopper Bridge. The stabilized streambank would prevent future erosion of the channel, which would be a benefit to EFH at JB CHS-WS.

VII. References

Croom, Miles/National Oceanic and Atmospheric/National Marine Fisheries Service (NOAA/NMFS). 2011. Personal communication with Dale Clark, P.E./AFCEE/TDX. March 10.

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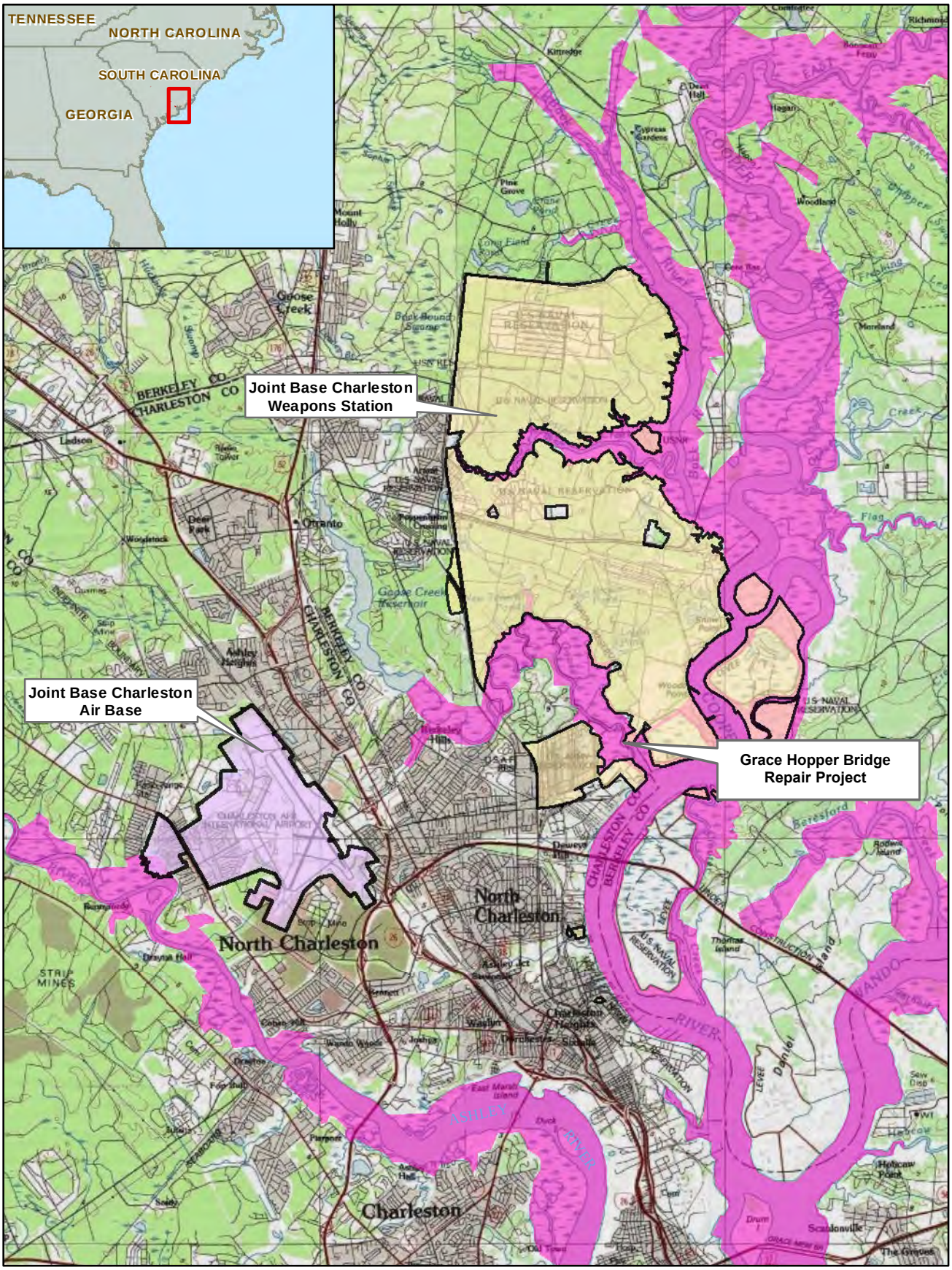

FIGURE 1
Essential Fish Habitat (EFH)
Environmental Assessment for the Grace Hopper Bridge Repairs
Joint Base Charleston - Weapons Station

CH2MHILL

N

0 75 150

Feet

FIGURE 2
Work Space and Construction Area
Grace Hopper Bridge Environmental Assessment
Joint Base Charleston - Weapons Station

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