FINAL ENVIRONMENTAL ASSESSMENT TO IMPLEMENT THE DEFENSE BASE CLOSURE AND REALIGNMENT COMMISSION RECOMMENDATIONS FOR SHAW AIR FORCE BASE, SOUTH CAROLINA

UNITED STATES AIR FORCE

20th Fighter Wing

July 2007

The Final Environmental Assessment (EA) consists of this Final EA document and the Draft EA; which must be used together to understand the full perspective of the environmental consequences considered in the analysis of this proposal. All substantive descriptions, data, and analyses presented in the Draft EA are incorporated by reference into this Final EA. To ensure that all interested parties who receive a copy of this Final EA have a copy of the Draft EA, a compact disc (CD) containing both the Draft and Final EA is provided at the back of this document.

- The Executive Summary provides an overview of the Draft and Final EA. It includes a summary of the purpose and need, the Proposed Action and alternatives, environmental consequences by resource, and identifies the No Action Alternative. References cited in the Executive Summary are included in Chapter 6.0 of the Draft EA.

- Chapter 1.0 provides the errata and clarifications to the Draft EA. Errata rectify minor errors found in the Draft EA ranging from misspellings to inserting words or phrases omitted from the Draft EA. Clarifications consist of explanatory information designed to enhance understanding of information in the Draft EA.

- Chapter 2.0 presents written comments received during the public comment period for the Draft EA and the Air Force's responses to substantive comments.

Cover Sheet

ENVIRONMENTAL ASSESSMENT

Defense Base Closure and Realignment (BRAC) Commission Recommendations for Shaw Air Force Base (AFB), South Carolina.

a. *Responsible Agency*: United States (U.S.) Air Force (Air Force)

b. *Proposals and Actions*: The Air Force proposes to implement the BRAC Commission recommendations that became law on November 9, 2005 in accordance with Defense Base Closure and Realignment Act of 1990 (Public Law [P.L.] 101-510) as amended. Under the proposed action, Headquarters (HQ) Third U.S. Army would relocate to Shaw AFB, an ALQ-184 Pod Centralized Intermediate Repair Facility (CIRF) would be established at Shaw AFB, and the base-level TF-34 engine intermediate maintenance activities would be relocated to another Air Force location. In order to implement the BRAC actions and improve military capabilities, Shaw AFB will require facilities and infrastructure to house and support HQ Third U.S. Army as well as the ALQ-184 Pod CIRF. As part of an Air Force consolidation the base-level TF-34 engine intermediate maintenance personnel, back shop equipment, engines, and spares would relocate from Shaw AFB to another Air Force facility.

c. *For Additional Information*: Shaw AFB Public Affairs. Telephone inquiries may be made to Shaw AFB Public Affairs at (803) 895-2019.

d. *Designation*: Environmental Assessment

e. *Abstract:* This environmental assessment (EA) has been prepared in accordance with the National Environmental Policy Act (NEPA). The public and agency scoping process focused the analysis on the following environmental resources: air quality, physical resources, biological resources, cultural resources, land use, socioeconomics and environmental justice, noise, and safety. The proposed action includes relocating HQ Third U.S. Army to Shaw AFB, establishing an ALQ-184 Pod CIRF at Shaw, and relocating the base-level TF-34 engine intermediate maintenance activities to another Air Force location. The proposed action includes an increase of approximately 1,518 personnel and 15 projects with an estimated construction expenditure of approximately $132 million. This EA analyzes the impacts associated with implementation of the proposed action, one alternative action, and the no-action alternative. The alternative action includes all elements of the proposed action and the additional closing of the existing skeet range to allow for unencumbered development at the proposed site of the HQ Third U.S. Army facilities. Under the no-action alternative, no new construction would occur, no additional missions would be placed at Shaw AFB, and the ALQ-184 Pod CIRF would not relocate.

FINDING OF NO SIGNIFICANT IMPACT

NAME OF THE PROPOSED ACTION

Implementation of the Defense Base Closure and Realignment Commission (BRAC) recommendations for Shaw Air Force Base (AFB), South Carolina

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The United States Air Force proposes to implement the recommendations of the BRAC Commission at Shaw AFB, SC. Under the proposed action, Headquarters Third U.S. Army would relocate to Shaw AFB, an ALQ-184 Pod Centralized Intermediate Repair Facility (CIRF) would be established at Shaw AFB, and the base-level TF-34 engine intermediate maintenance activities would be relocated to another Air Force location. Combined, the proposed action would result in a net increase of 1,518 personnel and would require 15 construction projects on Shaw AFB. This Environmental Assessment (EA) analyzes the environmental consequences associated with implementation of the proposed action, one alternative action, and the no-action alternative. The alternative action includes all elements of the proposed action and the additional closing of the existing skeet range. Under the no-action alternative, TF-34 engine intermediate activities would remain at Shaw AFB, no additional missions would be placed at Shaw AFB, and no new construction would occur.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The public and agency scoping process focused the analysis of the following environmental resources: land use, infrastructure, socioeconomics and environmental justice, noise, cultural resources, biological resources, water resources, air quality, safety, hazardous materials, and hazardous waste. Details of the environmental consequences can be found in the Draft EA which is hereby incorporated by reference. A summary of the analyses is presented in the Executive Summary; no significant impacts to any resource area were identified.

CONCLUSION

Based on information and analysis presented in the Environmental Assessment conducted in accordance with the requirements of the National Environmental Policy Act, the Council on Environmental Quality regulations, and implementing regulations set forth in 32 CFR 989 (Environmental Impact Analysis Process), as amended, and review of the public and agency comments submitted during the 30-day public comment period, I conclude that implementation of the proposed or alternative actions would not result in significant impacts to the quality of the human or natural environment. For these reasons, a Finding of No Significant Impact (FONSI) is made and preparation of an Environmental Impact Statement (EIS) is not warranted.

24 July 2007

MARK D. WRIGHT
Colonel, USAF
Acting Director of Installations and Mission Support (A7)

DATE

Final Environmental Assessment to Implement the Defense Base Closure and Realignment Commission Recommendations for Shaw Air Force Base, South Carolina

U.S. Air Force
Air Combat Command
20th Fighter Wing

July 2007

TABLE OF CONTENTS

Page

EXECUTIVE SUMMARY ES-1

1.0 ERRATA, CLARIFICATIONS AND CORRECTIONS 1-1

1.1 Section 5.0 CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES 1-1

2.0 COMMENTS AND RESPONSES 2-1

APPENDIX A: DEA DISTRIBUTION A-1

APPENDIX B: COMMENT LETTERS B-1

APPENDIX C: NOTICE OF AVAILABILITY C-1

EXECUTIVE SUMMARY

This Environmental Assessment (EA) describes the potential environmental consequences resulting from a proposal to locate the Headquarters Third United States Army (HQ Third U.S. Army) and establish an ALQ-184 Pod Centralized Intermediate Repair Facility (CIRF) at Shaw AFB in order to implement the recommendations of the Defense Base Closure and Realignment Commission at Shaw Air Force Base (AFB), South Carolina (SC). It also addresses the Base Realignment and Closure (BRAC) directed relocation of base-level TF-34 engine intermediate maintenance activities from Shaw AFB, to Moody AFB, Georgia (GA), and Bradley Air Guard Station, Connecticut (CT). (Shaw currently has TF-34 engine back shop and storage that supports A-10s at Spangdahlem Air Base and Pope AFB).

ENVIRONMENTAL IMPACT ANALYSIS PROCESS

This EA has been prepared by the U.S. Air Force (Air Force), Air Combat Command (ACC) and the 20th Fighter Wing (FW), in coordination with the U.S. Army pursuant to the requirements of the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) regulations implementing NEPA, and Air Force Instruction (AFI) 32-7061 (*The Environmental Impact Analysis Process* (EIAP), as codified in 32 Code of Federal Regulations [CFR] Part 989).

PURPOSE AND NEED FOR ACTION

The purpose of this action is to implement the BRAC Commission recommendations that became law on November 9, 2005 in accordance with Defense Base Closure and Realignment Act of 1990 (Public Law [P.L.] 101-510) as amended.

In order to implement the BRAC actions and improve military capabilities, Shaw AFB needs facilities and infrastructure to house and support HQ Third U.S. Army as well as the ALQ-184 Pod CIRF. As part of an Air Force consolidation, the base-level TF-34 engine intermediate maintenance personnel, back shop equipment, engines, and spares would relocate from Shaw AFB.

PROPOSED ACTION AND ALTERNATIVES

The proposed action includes development of 15 projects to support the relocation of the HQ Third U.S. Army and other actions at Shaw AFB. This element would result in a net increase of approximately 1,518 personnel at Shaw AFB with an estimated construction expenditure of approximately $132 million. This EA analyzes the impacts associated with implementation of the proposed action, one alternative, and the no-action alternative. The alternative action would close the existing skeet range to allow for unencumbered development at the proposed

site of the HQ Third U.S. Army facilities. Under the no-action alternative, no new construction would occur and no additional missions would be placed at Shaw AFB.

DISTRIBUTION AND REVIEW OF THE DRAFT EA

The Draft EA was distributed for public and agency review from 25 May through 25 June 2007. Two letters were received by the Air Force as a result of this review. No concerns were raised in either letter.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

This EA provides an analysis of the potential environmental consequences during the implementation of the proposed action, one alternative, and the no-action alternative. Ten resource categories received thorough evaluation to identify potential environmental consequences. As indicated in Chapter 4.0, implementation of the proposed action would not result in significant impacts to any resource area.

Land Use Resources. Construction of the HQ Third U.S. Army facilities and Air Force-related projects would be consistent with land use planning goals identified in base plans and would comply with the requirements of the South Carolina Stormwater Management and Sediment Reduction Act. No conflicts with existing on-base land uses would result from the construction. The proposed construction would result in the removal of a portion of the existing pine plantation and slightly alter the visual character of the east side of the base. No significant impacts are projected to land use and visual resources from the proposed action or alternatives. With the additional vehicular trips associated with 1,518 new personnel on-base, no adverse impact to the off-base roadway net would occur. Traffic congestion is anticipated to increase at the access gates and at intersections within the base during peak hours. Improvements to the Southeast Gate (not proposed in this action) would allow the use by personal vehicles and would improve operating conditions.

Infrastructure. Demands for electricity, potable water, wastewater treatment, solid waste disposal, and natural gas would increase as a result of the additional 1,518 personnel and facilities associated with the relocation of the HQ Third U.S. Army and other associated BRAC actions. With the construction of additional on-base interconnections, demands can be met from the existing on- and off-base infrastructure without significant impacts to the systems.

Socioeconomics and Environmental Justice. No adverse environmental consequences would be expected with construction activity, employment, and earnings associated with the proposed action and alternatives. The regional economy would be capable of absorbing the beneficial gain resulting from the construction and additional personnel to be stationed at Shaw AFB. Construction of the facilities associated with the HQ Third U.S. Army relocation and other associated BRAC actions would not create any disproportionately high and adverse health and environmental effects on low-income and minority populations on-base or in the vicinity of Shaw AFB.

Cultural Resources. Construction activities are not expected to impact cultural resources at the proposed locations of the HQ Third U.S. Army relocation and other associated BRAC actions. The construction areas have been surveyed for archaeological resources and no resources have been identified. Consultation with the State Historic Preservation Office (SHPO) has been completed. The SHPO concurred with the AF conclusion that no historic properties will be affected.

Biological Resources. Construction activities would have no adverse effects to individual species or native plants or animals at the proposed locations since the only plant or animal species likely to be displaced from this marginal habitat are individuals of common and locally abundant species. Construction associated with the HQ Third U.S. Army relocation and other associated BRAC actions does not have the potential to affect jurisdictional wetlands. No threatened, endangered, or special species/communities would be adversely affected by the proposed action or alternatives. Incidentally occurring listed, proposed, or candidate species are not likely to be adversely affected because no critical habitat exists on Shaw AFB.

Water Resources. Construction of the facilities associated with the HQ Third U.S. Army relocation and other associated BRAC actions would not be expected to significantly affect the water quality of Long Branch Creek with the implementation of standard erosion control construction practices. Construction of the facilities would not occur within the 100-year floodplain of Long Branch Creek. Increased potable water use from Shaw AFB groundwater wells is anticipated; however, adequate capacity is available to meet increased demands. No significant impacts are anticipated to water resources.

Air Quality. Construction-related air emissions would be generated from site clearing, earth-moving and other construction activities both on-base and within the region. These emissions would be well below the regional significance threshold defined as 10 percent of the regional emissions. Shaw AFB is located in Camden/Sumter Intrastate Air Quality Control Region and is considered in attainment for Nitrogen Dioxide (NO_2), Sulfur Dioxide (SO_2), Ozone (O_3), Carbon Monoxide (CO), and particulate matter with diameter less than or equal to 10 microns (PM_{10}), and based on collected data, is expected to be designated as in attainment for the particulate matter with diameter less than or equal to 2.5 microns ($PM_{2.5}$) and the eight-hour O_3 standards. No formal air quality conformity determination would be required for implementation of the proposed action and alternatives and no significant impacts are anticipated.

Hazardous Materials and Waste Management. Construction of the facilities associated with the HQ Third U.S. Army relocation and other associated BRAC actions would have the potential to disturb portions of an Environmental Restoration Program (ERP) site. The Shaw AFB ERP Manager would coordinate waivers from ACC policy concerning construction disturbances on ERP sites. Waivers would identify the appropriate control measures that would be necessary for the activities at the ERP site and no long-term adverse environmental consequences are anticipated. No significant hazardous waste generation is expected with the operation of the new HQ Third U.S. Army complex or other constructed facilities related to the BRAC action.

There will be a temporary increase in the amount of hazardous waste generated should the existing skeet range be closed.

Safety. Construction of the HQ Third U.S. Army facilities would increase safety risks; however, these short-term risks would be reduced with implementation of standard construction safety practices. The facilities will be sited so that structures do not penetrate the airfield imaginary surfaces. No significant environmental consequences are anticipated. Should the skeet range be closed, existing safety arcs would no longer be required, allowing for unrestricted site development and use of the existing truck inspection gate.

Noise. Construction of the HQ Third U.S. Army facilities would have temporary, localized noise effects during the construction phase. These localized noise increases may disrupt base personnel in nearby structures, but disruptions would be temporary and would be limited to daytime hours; therefore, impacts are considered insignificant.

Some of the proposed facilities lie between the 70 and 75 DNL contours. Administrative type facilities are allowed between the 70 and 75 DNL however, construction in this area would require the incorporation of additional sound attenuation materials and methods during construction. Other facilities, located between the 60 and 65 DNL contours could be constructed without the addition of sound attenuation techniques. However, it may be more practical to install sound attenuation in all facilities within the project area. Below the 65 DNL, all proposed land use activities would be compatible with the noise levels associated with aircraft operations.

1.0 ERRATA, CLARIFICATIONS AND CORRECTIONS

1.1 SECTION 5.0 CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

This section is modified to incorporate data received from the Secretary of the Air Force, BRAC Program Management Office.

Page 5-3. Add fourth bullet under "Reasonable Foreseeable Actions that Interact with the Proposed Action and Alternatives" as follows: Congress, in Program Budget Decision number 720 (PBD 720), granted the Air Force authority to reduce manpower authorizations to save money. This Force Shaping Program would ensure the Air Force meets the force reduction mandated by PBD 720, while maintaining mission capability.

Page 5-3, Section 5.1.3. Insert following the first paragraph : With the implementation of PBD 720, the net increase to installation personnel would be approximately 1,006 positions.

You will need a copy of the Draft EA to accompany your review of this Final EA. To ensure that all interested parties who receive a copy of this Final EA have a copy of the Draft EA, we have included a compact disc (CD) containing both documents with each printed copy of the Final EA.

2.0 COMMENTS AND RESPONSES

2.1 COMMENT RECEIPT AND REVIEW

Comment Receipt: Comments on the Draft EA included written correspondence received during the 30-day public comment period. Two comments were received from the State of South Carolina and are paraphrased below. No other comments were received. Copies of this written correspondence are included in Appendix B.

- South Carolina State Historic Preservation Office concurred with the USAF that there are no properties included or eligible for inclusion in the National Register of Historic Places which will be affected by this project.

- South Carolina State Budget and Control Board, Office of State Budget received no comments during the intergovernmental review of this project.

2.2 RESPONSES TO COMMENTS

The Air Force thanks you for your participation in this Environmental Impact Analysis Process. Due to the nature of the comments, no additional responses are required.

APPENDIX A:
DEA DISTRIBUTION

William S. Randolph, Mayor Pro Tem
Sumter County Council
21 North Main Street
Sumter, SC 29150

Honorable Joseph T. McElveen, Mayor
City of Sumter
21 North Main Street
Sumter, SC 29251-1449

Ms. Julie Holling, Heritage Trust Program
South Carolina Dept. of Natural Resources
P.O. Box 167, Rembert C. Dennis Building
Columbia, SC 29202

South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

Phil Degarmo
U.S. Fish and Wildlife Service Ecological Field Office
176 Croghan Spur Road, Suite 200
Charleston, SC 29407-7558

Jean Manheimer, South Carolina State Clearinghouse
Office of State Budget
1201 Main Street, Suite 950
Columbia, SC 29201

South Carolina Dept of Archives and History
South Carolina State Historic Preservation Office
8301 Parklane Road
Columbia, SC 29223-4905

Mr. Gilbert Blue, Chairman
Catawba Indian Tribe
996 Avenue of the Nations
Rock Hill , SC 29704

The Honorable Lindsey Graham
United States Senator
508 Hampton Street, Suite 202
Columbia, SC 29201

The Honorable John Spratt
United States House of Representatives
707 Bultman Drive
Sumter, SC 29150

The Honorable Jim Demint
United States Senator
1901 Main Street, Suite 1475
Columbia SC 29201

The Honorable James E. Clyburn
United States House of Representatives
1703 Gervais Street
Columbia, SC 29201

The Honorable John C. Land III
South Carolina Senate
504 Gressette Building
Columbia, SC 29202

The Honorable J. David Weeks
South Carolina House of Representatives
330A Blatt Building
Columbia, SC 29211

APPENDIX B:
COMMENT LETTERS

STATE OF SOUTH CAROLINA

State Budget and Control Board

OFFICE OF STATE BUDGET

MARK SANFORD, CHAIRMAN
GOVERNOR

THOMAS RAVENEL
STATE TREASURER

RICHARD ECKSTROM
COMPTROLLER GENERAL

HUGH K. LEATHERMAN, SR.
CHAIRMAN, SENATE FINANCE COMMITTEE

DANIEL T. "DAN" COOPER
CHAIRMAN, WAYS AND MEANS COMMITTEE

HENRY J. WHITE
EXECUTIVE DIRECTOR

1201 Main Street, Suite 870
COLUMBIA, SOUTH CAROLINA 29201
(803) 734-2280

LES BOLES
DIRECTOR

June 11, 2007

Linda DeVine
HQ ACC/A7PP
129 Andrews Street, Suite 102
Langley AFB, VA 2365-2769

Project Name: Base Closure & Realignment Environmental Assessment (EA), Shaw Air Force Base (AFB), South Carolina

State Application Identifier: SC070503-218

Dear Ms. Linda DeVine:

The State Clearinghouse, Office of State Budget, has conducted an intergovernmental review of the project referenced above as provided by Presidential Executive Order 12372. All comments received, if any, as a result of the review are enclosed for your information.

The Clearinghouse does not have information on the Federal agency's review status. Please contact your Federal grantor agency with any questions concerning the status of your application.

The State Application Identifier indicated above should be used in any future correspondence with this office.

Sincerely,

Jean Ricard

Jean Ricard
Fiscal Manager, Grant Services

The South Carolina Archives & History Center
History & Heritage For All Generations

June 20, 2007

Ms. Linda DeVine
HQ ACC/A7PP
129 Andrews St., Ste. 102
Langley AFB, VA 23665-2769

Re: Base Closure and Realignment Environmental Assessment
Shaw Air Force Base, Sumter County, South Carolina

Dear Ms. Devine:

Our office received a copy of the draft Environmental Assessment for the above-referenced undertaking on May 23. We appreciate the opportunity to review and comment on this project.

Based on the information provided, our office concurs with the assessment that no properties included in or eligible for inclusion in the National Register of Historic Places will be affected by this project.

We do request that our office be notified immediately if archaeological materials are encountered during any construction activities. Archaeological materials consist of any items, fifty years old or older, which were made or used by man. These items include, but are not limited to, stone projectile points (arrowheads), ceramic sherds, bricks, worked wood, bone and stone, metal and glass objects, and human skeletal materials.

These comments are provided by the State Historic Preservation Office pursuant to Section 106 of the National Historic Preservation Act, as amended. If you have questions, please contact me at (803) 896-6169 or dobrasko@scdah.state.sc.us.

Sincerely,

Rebekah Dobrasko

Rebekah Dobrasko
Review and Compliance Coordinator
State Historic Preservation Office

S.C. Department of Archives & History • 8301 Parklane Road • Columbia • South Carolina • 29223-4905 • 803-896-6100 • www.state.sc.us/scdah

APPENDIX C:
NOTICE OF AVAILABILITY

05/31/2007 16:40 8037751024 OSTEEN PUBLISHING PAGE 01

ATTN: BRAD KOCK
ORIGINAL BEING
MAILED 6/1/07
-Andrea Werley

The Item
Since 1894
Published daily by Osteen Publishing Co., Inc.
P.O. Box 1677 • 20 N. Magnolia Street • Sumter, S.C. 29151 • (803) 775-6331

STATE OF SOUTH CAROLINA
COUNTY OF SUMTER

PRINTER'S AFFIDAVIT

Science Applications Int l Corp.

SAIC Boise Office
405 S. 8th St., Suite 301
Boise ID 83702

Personally appeared before me

Andrea Werley

Andrea Werley

who being duly sworn, says she is a Bookkeeping Clerk of the OSTEEN PUBLISHING CO., Publisher of THE ITEM, A Newspaper published in said state and county and that advertisement

Shaw AFB BRAC EA Notice of Availability

0000221624

was published in said newspaper on

5/25/2007

and a copy of advertisement is attached.

Sworn to before me this 31 st day of May, 2007.

Beverly Langlois

Notary Public for South Carolina
BEVERLY LANGLOIS
My Commission Expires
September 12, 2010

Notice of Availability
U.S. Air Force Environmental Assessment For the Implementation Of The Base Closure and Realignment Commission Recommendations At Shaw Air Force Base, South Carolina

The U.S. Air Force has prepared a Draft Environmental Assessment (EA) and Draft Finding of No Significant Impact (FONSI) analyzing the potential environmental consequences associated with implementation of Defense Base Closure and Realignment Commission recommendations for Shaw Air Force Base (AFB), South Carolina (SC).

This Environmental Assessment (EA) analyzes the potential environmental consequences associated with implementation of the proposed action, one alternative, and the no-action alternative. The proposed action would locate the Headquarters Third U.S. Army and the ACC/184 Pod Centralized Intermediate Repair Facility at Shaw AFB, and remove the TF-34 Engine Intermediate Maintenance. These combined actions would result in a net increase of approximately 1,518 personnel and would require an estimated 15 construction projects at Shaw AFB. The alternative action adds program changes which would allow for the development and use of the area currently within the skeet range safety zone. Under the no-action alternative, no new construction would occur and no additional missions would be placed at Shaw AFB.

A copy of the Draft EA and FONSI/FONPA will be available May 25, 2007 at the Sumter County Library and electronically at www.accplanning.org. A copy of the document may be obtained by calling Shaw AFB Public Affairs at (803) 895-2019. Please provide comments on the Draft EA by June 25, 2007 to:

HQ ACC/A7PP
Attn: Ms. Linda DeVine
129 Andrews Street, Suite 102
Langley AFB VA, 23665-2769

COMMENTS REQUESTED BY JUNE 25, 2007

Draft

ENVIRONMENTAL ASSESSMENT TO IMPLEMENT THE DEFENSE BASE CLOSURE AND REALIGNMENT COMMISSION RECOMMENDATIONS FOR SHAW AIR FORCE BASE, SOUTH CAROLINA

UNITED STATES AIR FORCE

20th Fighter Wing

May 2007

DRAFT FINDING OF NO SIGNIFICANT IMPACT

NAME OF THE PROPOSED ACTION

Implementation of the Defense Base Closure and Realignment Commission (BRAC) recommendations for Shaw Air Force Base (AFB), South Carolina.

DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

The United States Air Force proposes to implement the recommendation of the BRAC at Shaw AFB, SC. Under the proposed action, Headquarters Third U.S. Army would relocate to Shaw AFB, an ALQ-184 Pod Centralized Intermediate Repair Facility (CIRF) would be established at Shaw AFB, and the base-level TF-34 engine intermediate maintenance activities would be relocated to another Air Force location. Combined, the proposed action would result in a net increase of 1,518 personnel and would require 15 construction projects on Shaw AFB. This Environmental Assessment (EA) analyzes the environmental consequences associated with implementation of the proposed action, one alternative, and the no-action alternative. The alternative action includes all elements of the proposed and the additional closing of the existing skeet range. Under the no-action alternative, TF-34 engine intermediate activities would remain at Shaw AFB, no additional missions would be placed at Shaw AFB, and no new construction would occur.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

The public and agency scoping process focused the analysis of the following environmental resources: land use, infrastructure, socioeconomics and environmental justice, noise, cultural resources, biological resources, water resources, air quality, safety, hazardous materials, and hazardous waste. Details of the environmental consequences can be found in the Draft EA which is hereby incorporated by reference. A summary of the analyses is presented in the Executive Summary; no significant impacts to any resource area were identified.

CONCLUSION

Based on information and analysis presented in the Environmental Assessment conducted in accordance with the requirements of the National Environmental Policy Act, the Council on Environmental Quality regulations, and implementing regulations set forth in 32 CFR 989 (Environmental Impact Analysis Process), as amended, and review of the public and agency comments submitted during the 30-day public comment period, I conclude that implementation of the proposed action would not result in significant impacts to the quality of the human or natural environment. For these reasons, a Finding of No Significant Impact (FONSI) is made and preparation of an Environmental Impact Statement (EIS) is not warranted.

_____ _____

MARK D.WRIGHT DATE
Colonel, USAF
Deputy Director of Installations for Civil Engineers (A7)

This page is intentionally blank.

Draft

Environmental Assessment to Implement the Defense Base Closure and Realignment Commission Recommendations for Shaw Air Force Base, South Carolina

U.S. Air Force
Air Combat Command
20th Fighter Wing

May 2007

This page is intentionally blank.

TABLE OF CONTENTS

Page

Finding of No Significant Impact……..……Inside Front Cover
List of Figures.....iii
List of Tables.....iv

EXECUTIVE SUMMARY..... ES-1

1.0 PURPOSE AND NEED.....1-1

1.1 Background.....1-1

1.2 Purpose and Need.....1-3

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES.....2-1

2.1 Proposed Action.....2-1

2.2 Skeet Range Closure Alternative.....2-5

2.3 No-Action Alternative.....2-5

2.4 Alternatives Considered But Not Carried Forward.....2-5

2.5 Environmental Impact Analysis Process.....2-6
2.5.1 Environmental Assessment Process.....2-6
2.5.2 Scope of Resource Analysis.....2-7
2.5.3 Public and Agency Involvement.....2-7

2.6 Comparison of Alternatives.....2-8

3.0 AFFECTED ENVIRONMENT.....3-1

3.1 Land Use Resources.....3-1
3.1.1 Definition of the Resource.....3-1
3.1.2 Existing Conditions.....3-1

3.2 Infrastructure.....3-3
3.2.1 Definition of the Resource.....3-3
3.2.2 Existing Conditions.....3-3

3.3 Socioeconomics and Environmental Justice.....3-8
3.3.1 Definition of the Resource.....3-8
3.3.2 Existing Conditions.....3-8

3.4 Cultural Resources.....3-17
3.4.1 Definition of the Resource.....3-17
3.4.2 Existing Conditions.....3-17

3.5 Biological Resources.....3-18
3.5.1 Definition of the Resource.....3-18
3.5.2 Existing Conditions.....3-19

3.6 Water Resources 3-22
3.6.1 Definition of the Resource 3-22
3.6.2 Existing Conditions 3-22

3.7 Air Quality 3-24
3.7.1 Definition of the Resource 3-24
3.7.2 Existing Conditions 3-24

3.8 Hazardous Materials and Hazardous Waste 3-26
3.8.1 Definition of the Resource 3-26
3.8.2 Existing Conditions 3-27

3.9 Safety 3-30
3.9.1 Definition of the Resource 3-30
3.9.2 Existing Conditions 3-30

3.10 Noise 3-33
3.10.1 Definition of the Resource 3-33
3.10.2 Existing Conditions 3-33

4.0 ENVIRONMENTAL CONSEQUENCES 4-1

4.1 Land Use Resources 4-1
4.1.1 Proposed Action 4-1
4.1.2 Skeet Range Closure Alternative 4-2
4.1.3 No-Action Alternative 4-3

4.2 Infrastructure 4-3
4.2.1 Proposed Action 4-3
4.2.2 Skeet Range Closure Alternative 4-6
4.2.3 No-Action Alternative 4-6

4.3 Socioeconomics and Environmental Justice 4-7
4.3.1 Proposed Action 4-7
4.3.2 Skeet Range Closure Alternative 4-9
4.3.3 No-Action Alternative 4-9

4.4 Cultural Resources 4-10
4.4.1 Proposed Action 4-10
4.4.2 Skeet Range Closure Alternative 4-11
4.4.3 No-Action Alternative 4-11

4.5 Biological Resources 4-11
4.5.1 Proposed Action 4-11
4.5.2 Skeet Range Closure Alternative 4-12
4.5.3 No-Action Alternative 4-12

4.6 Water Resources 4-12
4.6.1 Proposed Action 4-12
4.6.2 Skeet Range Closure Alternative 4-13
4.6.3 No-Action Alternative 4-13

4.7 Air Quality 4-13

4.7.1 Proposed Action 4-14
4.7.2 Skeet Range Closure Alternative 4-15
4.7.3 No-Action Alternative 4-15

4.8 Hazardous Materials and Hazardous Waste 4-16
4.8.1 Proposed Action 4-16
4.8.2 Skeet Range Closure Alternative 4-17
4.8.3 No-Action Alternative 4-18

4.9 Safety 4-18
4.9.1 Proposed Action 4-18
4.9.2 Skeet Range Closure Alternative 4-18
4.9.3 No-Action Alternative 4-19

4.10 Noise 4-19
4.10.1 Proposed Action 4-19
4.10.2 Skeet Range Closure Alternative 4-20
4.10.3 No-Action Alternative 4-20

5.0 CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES 5-1

5.1 Cumulative Effects 5-1
5.1.1 Definition of Cumulative Effects 5-1
5.1.2 Past, Present, and Reasonably Foreseeable Actions 5-2
5.1.3 Analysis of Cumulative Effects 5-3

5.2 Irreversible and Irretrievable Commitment of Resources 5-4

6.0 REFERENCES 6-1

7.0 LIST OF PREPARERS 7-1

APPENDIX A: INTERAGENCY/INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING (IICEP) LETTERS A-1

APPENDIX B: AIR QUALITY B-1

LIST OF FIGURES

Page

FIGURE 1-1. SHAW AFB VICINITY MAP 1-2
FIGURE 2-1. PROPOSED PROJECT LOCATIONS 2-2
FIGURE 2-2. EA PROCESS 2-6
FIGURE 3-1. SHAW AFB INFRASTRUCTURE 3-7
FIGURE 3-2. EMPLOYMENT AND UNEMPLOYMENT, SUMTER COUNTY, 1990-2005 3-9
FIGURE 3-3. UNEMPLOYMENT RATE, SUMTER COUNTY, 1990-2005 3-10
FIGURE 3-4. ENVIRONMENTAL AND SAFETY CONSTRAINTS 3-29
FIGURE 3-5. SHAW AFB NOISE CONTOUR MAP 3-35

LIST OF TABLES

Page

TABLE 2-1. PROJECTS TO SUPPORT BRAC COMMISSION RECOMMENDATIONS 2-3
TABLE 2-2. EXISTING AND PROJECTED BASE PERSONNEL AUTHORIZATIONS.....2-4
TABLE 2-3. HQ 3RD U.S. ARMY VEHICLE AND EQUIPMENT REQUIREMENTS 2-4
TABLE 2-4. SUMMARY OF POTENTIAL ENVIRONMENTAL CONSEQUENCES.....2-8
TABLE 3-1. TOTAL EMPLOYMENT BY INDUSTRY, SUMTER COUNTY, 2004 3-10
TABLE 3-2. MAJOR EMPLOYERS, SUMTER COUNTY, 2006 3-11
TABLE 3-3. UNEMPLOYMENT RATE, SUMTER MSA, 2006 3-11
TABLE 3-4. EARNINGS BY INDUSTRY (IN THOUSANDS), SUMTER COUNTY, SOUTH CAROLINA, 2001-2004 3-12
TABLE 3-5. PER CAPITA PERSONAL INCOME, SUMTER, SC.....3-13
TABLE 3-6. POPULATION, SUMTER COUNTY 3-13
TABLE 3-7. OCCUPIED AND VACANT HOUSING UNITS 3-14
TABLE 3-8. SCHOOL INFORMATION, SUMTER AND SOUTH CAROLINA, 2006.....3-15
TABLE 3-9. SCHOOL DISTRICT REVENUES AND EXPENSES, 2005 3-15
TABLE 3-10. NUMBER OF SCHOOLS AND TOTAL ENROLLMENT IN SOUTH CAROLINA PUBLIC AND PRIVATE SCHOOLS 3-16
TABLE 3-11. ENDANGERED, THREATENED, AND SPECIAL CONCERN SPECIES KNOWN IN SUMTER COUNTY, SC 3-21
TABLE 3-12. BASELINE EMISSIONS INVENTORY FOR SUMTER COUNTY, SC 3-25
TABLE 3-13. CY05 AIR EMISSIONS INVENTORY, SHAW AFB.....3-25
TABLE 3-14. QUANTITY-DISTANCE ARCS 3-33
TABLE 4-1. PROPOSED ACTION ESTIMATED CONSTRUCTION AIR EMISSIONS BY ACTIVITY 4-14
TABLE 4-2. PERCENTAGE OF PROPOSED ACTION EMISSIONS COMPARED TO SUMTER COUNTY 4-15
TABLE 4-3. TYPICAL EQUIPMENT SOUND LEVELS 4-20

LIST OF ACRONYMS, ABBREVIATIONS, AND SYMBOLS

ACAM	Air Conformity Applicability Model
ACC	Air Combat Command
ACHP	Advisory Council on Historic Preservation
ADP	Area Development Plan
AFB	Air Force Base
AFH	Air Force Handbook
AFI	Air Force Instruction
AFOSH	Air Force Occupational Safety and Health
AICUZ	Air Installation Compatible Use Zone
AMU	Aircraft Maintenance Unit
AST	Aboveground Storage Tank
AT/FP	Anti-Terrorism/Force Protection
BAQ	Bureau of Air Quality
BMP	Best Management Practice
BOS	Base Operating Support
BRAC	Base Realignment and Closure
BREC	Black River Electric Cooperative
BX	Base Exchange
CAA	Clean Air Act
CENTAF	US Air Forces US Central Command
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CIRF	Centralized Intermediate Repair Facility
Cm	Centimeter(s)
CME	Contract Manpower Equivalent
CO	Carbon Monoxide
CP&L	Carolina Power and Light Company
CRMP	Cultural Resources Management Plan
dB	Decibel(s)
dBA	A-weighted Decibels
DD	Decision Document
DNL	Day-Night Average Sound Level
DoD	Department of Defense
DOPAA	Description of Proposed Action and Alternatives
DRMO	Defense Reutilization and Marketing Office
EA	Environmental Assessment
EAC	Early Action Compact
EBS	Environmental Baseline Survey
ECR	Electronic Combat Range
ECU	Environmental Control Unit
EECP	Early Entry Command Post
EIAP	Environmental Impact Analysis Process
EO	Executive Order
EP	Extraction Procedure
EPA	Environmental Protection Agency
EPCRA	Emergency Planning and Community Right-to-Know Act
ERP	Environmental Restoration Program
ESA	Endangered Species Act
ETSC	Endangered/Threatened/Special Concern
FEIS	Final Environmental Impact Statement
FOEA	Final Overseas Environmental Assessment
FONSI	Finding of No Significant Impact

ft	Feet
FW	Fighter Wing
FY	Fiscal Year
GOV	Government Owned Vehicles
g/m^3	Grams per Square Meter
gpm	Gallons Per Minute
HAP	Hazardous Air Pollutant
HMMP	Hazardous Material Management Process
HQ	Headquarters
HQ 3rd U.S. Army	Headquarters Third U.S. Army
hr(s)	Hour(s)
HUD	Department of Housing and Urban Development
Hz	Hertz
IICEP	Interagency and Intergovernmental Coordination for Environmental Planning
in	Inch(es)
INRMP	Integrated Natural Resources Management Plan
ISDN	Integrated Services Digital Network
JCLUS	Joint Compatible Land Use Study
kgal	Kilogallon(s)
kHz	Kilohertz
KWH	Kilowatt Hours
lb(s)	Pound(s)
L_{dn}	Day-Night Average Sound Level
$\mu g/m^3$	Microgram per Cubic Meter
MCL	Maximum Contaminant Level
MCP	Main Command Post
MFH	Military Family Housing
mgd	Million Gallons Per Day
MILCON	Military Construction
MILVAN	Military Van
MOA	Military Operating Area
MSA	Metropolitan Statistical Area
MSL	Mean Sea Level
MTR	Military Training Route
NAAQS	National Ambient Air Quality Standards
NEI	National Emissions Inventory
NEPA	National Environmental Policy Act
NEW	Net Explosive Weight
NHPA	National Historic Preservation Act
NO_2	Nitrogen Dioxide
NO_x	Nitrogen Oxide
NPDES	National Pollution Discharge Elimination System
NPS	Non-Point Source
NRHP	National Register of Historic Places
O_3	Ozone
OEA	Overseas Environmental Assessment
ORW	Outstanding Resources Waters
OSHA	Occupational Safety and Health Administration
OWS	Oil-Water Separator
PAH	Polycyclic Aromatic Hydrocarbons
PAI	Primary Aircraft Inventory
PCBs	Polychlorinated Biphenyls
PDU	Power Distribution Unit
PL	Public Law
$PM_{2.5}$	Particulate Matter with Diameter Less Than or Equal To 2.5 Microns

PM_{10}	Particulate Matter with Diameter Less Than or Equal To 10 Microns
PMAI	Primary Mission Aircraft Inventory
POL	Petroleum, Oil, and Lubricant
POV	Privately Owned Vehicles
ppm	part per million
PSD	Prevention of Significant Deterioration
Q-D	Quantity-Distance
RCRA	Resource Conservation and Recovery Act
ROI	Region of Influence
SAT	Scholastic Aptitude Test
SCDHEC	South Carolina Department of Health and Environmental Control
SCDNR	South Carolina Department of Natural Resources
SCIAA	South Carolina Institute of Archaeology and Anthropology
SCPDES	South Carolina Pollutant Discharge Elimination System
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
SO_2	Sulfur Dioxide
Sq. ft.	Square feet
SR	State Route
SWPPP	Storm Water Pollution Prevention Plan
TCE	Trichloroethylene
TCR	Traditional Cultural Resources
UFC	Unified Facilities Criteria
U.S.	United States
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDCESA	United States Department of Commerce, Economics, and Statistics Administration
USFWS	U.S. Fish and Wildlife Service
UST	Underground Storage Tank
VOC	Volatile Organic Compound
WMA	Wildlife Management Area
WWTP	Wastewater Treatment Plant

This page is intentionally blank.

EXECUTIVE SUMMARY

This Environmental Assessment (EA) describes the potential environmental consequences resulting from a proposal for construction of facilities to support the relocation of the Headquarters Third United States (U.S.) Army (HQ 3rd U.S. Army) in order to implement the recommendation of the Defense Base Closure and Realignment Commission at Shaw Air Force Base (AFB), South Carolina (SC). It also addresses the Base Realignment and Closure (BRAC)-directed establishment of an ALQ-184 Pod Centralized Intermediate Repair Facility (CIRF) at Shaw AFB. Also included is the relocation of base-level TF-34 engine intermediate maintenance activities from Shaw AFB, to both Moody AFB, Georgia (GA), and Bradley Air Guard Station , Connecticut (CT). (Shaw currently has TF-34 engine back shop and storage that supports A-10s at Spangdahlem Air Base and Pope AFB).

ENVIRONMENTAL IMPACT ANALYSIS PROCESS

This EA has been prepared by the U.S. Air Force (Air Force), Air Combat Command (ACC) and the 20th Fighter Wing (FW), in coordination with the U.S. Army pursuant to the requirements of the National Environmental Policy Act (NEPA) of 1969, the Council on Environmental Quality (CEQ) regulations implementing NEPA, and Air Force Instruction (AFI) 32-7061 (*The Environmental Impact Analysis Process* (EIAP), as codified in 32 Code of Federal Regulations [CFR] Part 989).

PURPOSE AND NEED FOR ACTION

The purpose of this action is to implement the BRAC Commission recommendations that became law on November 9, 2005 in accordance with Defense Base Closure and Realignment Act of 1990 (Public Law [P.L.] 101-510) as amended.

In order to implement the BRAC actions and improve military capabilities, Shaw AFB needs facilities and infrastructure to house and support HQ 3rd U.S. Army as well as the ALQ-184 Pod CIRF. As part of an Air Force consolidation, the base-level TF-34 engine intermediate maintenance personnel, back shop equipment, engines, and spares would relocate from Shaw AFB.

PROPOSED ACTION AND ALTERNATIVES

The proposed action includes development of 15 projects to support the relocation of the HQ 3rd U.S. Army and other actions at Shaw AFB. This element would result in a net increase of approximately 1,518 personnel at Shaw AFB with an estimated construction expenditure of approximately $132 million. This EA analyzes the impacts associated with implementation of the proposed action, one alternative, and the no-action alternative. The alternative action would close the existing skeet range to allow for unencumbered development at the proposed

site of the HQ 3rd U.S. Army facilities. Under the no-action alternative, no new construction would occur and no additional missions would be placed at Shaw AFB.

SUMMARY OF ENVIRONMENTAL CONSEQUENCES

This EA provides an analysis of the potential environmental consequences during the implementation of proposed action, one alternative, and the no-action alternative. Ten resource categories received thorough evaluation to identify potential environmental consequences. As indicated in Chapter 4.0, implementation of the proposed action would not result in significant impacts to any resource area.

Land Use Resources. Construction of the HQ 3rd U.S. Army facilities and Air Force-related projects would be consistent with land use planning goals identified in base plans and would comply with the requirements of the South Carolina Stormwater Management and Sediment Reduction Act. No conflicts with existing on base land uses would result from the construction. The proposed construction would result in the removal of a portion of the existing pine plantation and slightly alter the visual character of the east side of the base. No significant impacts are projected to land use and visual resources from the proposed action or alternatives. With the additional vehicular trips associated with 1,518 new personnel on base, no adverse impact to the off-base roadway net would occur. Traffic congestion is anticipated to increase at the access gates and at intersections within the base during peak hours. Improvements to the Southeast Gate (not proposed in this action) would allow the use by personal vehicles and would improve operating conditions.

Infrastructure. Demands for electricity, potable water, wastewater treatment, solid waste disposal, and natural gas would increase as a result of the additional 1,518 personnel and facilities associated with the relocation of the HQ 3rd U.S. Army and other associated BRAC actions. With the construction of additional on-base interconnections, demands can be met from the existing on- and off-base infrastructure without significant impacts to the systems.

Socioeconomics and Environmental Justice. No adverse environmental consequences would be expected with construction activity, employment, and earnings associated with the proposed action and alternatives. The regional economy would be capable of absorbing the beneficial gain resulting from the construction and additional personnel to be stationed at Shaw AFB. Construction of the facilities associated with the HQ 3rd U.S. Army relocation and other associated BRAC actions would not create any disproportionately high and adverse health and environmental effects on low-income and minority populations on base or in the vicinity of Shaw AFB.

Cultural Resources. Construction activities are not expected to impact cultural resources at the proposed locations of the HQ 3rd U.S. Army relocation and other associated BRAC actions. The construction areas have been surveyed for archaeological resources and no resources have been identified. Consultation with the State Historic Preservation Office (SHPO) has been initiated.

Biological Resources. Construction activities would have no adverse effects to individual species or native plants or animals at the proposed locations since the only plant or animal

species likely to be displaced from this marginal habitat are individuals of common and locally abundant species. Construction associated with the HQ 3rd U.S. Army relocation and other associated BRAC actions does not have the potential to affect jurisdictional wetlands. No threatened, endangered, or special species/communities would be adversely affected by the proposed action or alternatives. Incidentally occurring listed, proposed, or candidate species are not likely to be adversely affected because no critical habitat exists on Shaw AFB.

Water Resources. Construction of the facilities associated with the HQ 3rd U.S. Army relocation and other associated BRAC actions would not be expected to significantly affect the water quality of Long Branch Creek with the implementation of standard erosion control construction practices. Construction of the facilities would not occur within the 100-year floodplain of Long Branch Creek. Increased potable water use from Shaw AFB groundwater wells is anticipated; however, adequate capacity is available to meet increased demands. No significant impacts are anticipated to water resources.

Air Quality. Construction-related air emissions would be generated from site clearing, earth-moving and other construction activities both on base and within the region. These emissions would be well below the regional significance threshold defined by 10 percent of the regional emissions. Shaw AFB is located in Camden/Sumter Intrastate Air Quality Control Region and is considered in attainment for Nitrogen Dioxide (NO_2), Sulfur Dioxide (SO_2), Ozone (O_3), Carbon Monoxide (CO), and particulate matter with diameter less than or equal to 10 microns (PM_{10}), and based on collected data, is expected to be designated as in attainment for the particulate matter with diameter less than or equal to 2.5 microns ($PM_{2.5}$) and the eight-hour O_3 standards. No formal air quality conformity determination would be required for implementation of the proposed action and alternatives and no significant impacts are anticipated.

Hazardous Materials and Waste Management. Construction of the facilities associated with the HQ 3rd U.S. Army relocation and other associated BRAC actions would have the potential to disturb portions of an Environmental Restoration Program (ERP) site. The Shaw AFB ERP Manager would coordinate waivers from ACC policy concerning construction disturbances on ERP sites. Waivers would identify the appropriate control measures that would be necessary for the activities at the ERP site and no long-term adverse environmental consequences are anticipated. No significant hazardous waste generation is expected with the operation of the new HQ 3rd U.S. Army complex or other constructed facilities related to the BRAC action. There will be a temporary increase in the amount of hazardous waste generated should the existing skeet range be closed.

Safety. Construction of the HQ 3rd U.S. Army facilities would increase safety risks; however, these short-term risks would be reduced with implementation of standard construction safety practices. The facilities will be sited so that structures do not penetrate the airfield imaginary surfaces. No significant environmental consequences are anticipated. Should the skeet range be closed, existing safety arcs would no longer be required, allowing for unrestricted site development and use of the existing truck inspection gate.

Noise. Construction of the HQ 3rd U.S. Army facilities would have temporary, localized noise effects during the construction phase. These localized noise increases may disrupt base personnel in nearby structures, but disruptions would be temporary and would be limited to daytime hours; therefore, impacts are considered insignificant.

Some of the proposed facilities lie between the 70 and 75 DNL contours. Administrative type facilities are allowed between the 70 and 75 DNL however, construction in this area would require the incorporation of additional sound attenuation materials and methods during construction. Other facilities, located between the 60 and 65 DNL contours could be constructed without the addition of sound attenuation techniques. However, it may be more practical to install sound attenuation in all facilities within the project area. Below the 65 DNL, all proposed land use activities would be compatible with the noise levels associated with aircraft operations

1.0 PURPOSE AND NEED

In 2005, the Defense Base Closure and Realignment Commission ("BRAC Commission") issued recommendations that included specific recommendations at Shaw Air Force Base (AFB), South Carolina (SC). These recommendations were approved by the President on September 15, 2005, and forwarded to Congress. Congress did not alter any of the Commission's recommendations, and on November 9, 2005, the recommendations became law. The Commission's recommendations must now be implemented as provided for in the Defense Base Closure and Realignment Act of 1990 (Public Law [P.L.] 101-510), as amended. The United States Air Force (Air Force), Air Combat Command (ACC) proposes to implement these recommendations as they pertain to the Shaw AFB, SC (see Section 2.1).

This environmental assessment (EA) has been prepared to analyze the potential environmental consequences associated with the proposed action, one alternative, and the no-action alternative in accordance with the requirements of the National Environmental Policy Act (NEPA) (42 United States Code [USC] 4321 et seq.) and its implementing regulations.

Section 1.1 provides background information on Shaw AFB. The purpose and need for the proposed action are described in Section 1.2. A detailed description of the proposed action and the no-action alternative is provided in Chapter 2.0. Chapter 3.0 describes the existing conditions of various environmental resources that could be affected by the proposed action and the no-action alternative. How those resources would be affected by implementation of the proposed action or the no-action alternative is addressed in Chapter 4.0. Chapter 5.0 addresses potential cumulative effects of the proposed action and the no-action alternative, in conjunction with other recent past, current, and future actions that may be implemented in the region of influence (ROI).

Shaw AFB BRAC EA

Chapter 1.0 Purpose and Need
- 1.1 Background
- 1.2 Purpose and Need

Chapter 2.0 Description of Proposed Action and Alternatives
- 2.1 Proposed Action
- 2.2 Skeet Range Closure Alternative
- 2.3 No Action Alternative
- 2.4 Environmental Impact Analysis Process
- 2.5 Regulatory Compliance
- 2.6 Environmental Comparison of Alternatives

Chapter 3.0 Shaw AFB Affected Environment
- 3.1 Land Use Resources
- 3.2 Infrastructure
- 3.3 Socioeconomics/ Environmental Justice
- 3.4 Cultural Resources
- 3.5 Biological Resources
- 3.6 Water Resources
- 3.7 Air Quality
- 3.8 Hazardous Materials and Hazardous Waste
- 3.9 Safety
- 3.10 Noise

Chapter 4.0 Shaw AFB Environmental Consequences
- 4.1 Land Use Resources
- 4.2 Infrastructure
- 4.3 Socioeconomics/ Environmental Justice
- 4.4 Cultural Resources
- 4.5 Biological Resources
- 4.6 Water Resources
- 4.7 Air Quality
- 4.8 Hazardous Materials and Hazardous Waste
- 4.9 Safety
- 4.10 Noise

Chapter 5.0 Cumulative Impacts
- 5.1 Cumulative Effects Analysis
- 5.2 Irreversible and Irretrievable Commitment of Resources

1.1 BACKGROUND

Shaw AFB is located in the east central part of South Carolina, approximately 30 miles east of the capital city of Columbia. The base is located within the city limits of Sumter and is 10 miles west of the city's center (Figure 1-1).

Figure 1-1. Shaw AFB Vicinity Map

The city of Sumter is surrounded by Sumter County, which is naturally bounded by the Wateree River to the west and the Lynches River to the east. The county has a mixture of farmland, forested areas, and wetlands with the main population center in and around the city of Sumter.

The 20th Fighter Wing (FW), the base host wing, operates the 55th, 77th and 79th Fighter Squadrons, and has the primary mission to provide, project, and sustain combat-ready air forces. Headquarters (HQ) 9th Air Force is the major tenant at Shaw AFB. General goals of the base are to sustain the resources and relationships deemed appropriate to pursue national interests, and provide for the command, control, and communications necessary to execute the missions of the Air Force, Air Combat Command (ACC), 9th Air Force, and the 20th FW.

The HQ 3rd U.S. Army mission is to serve as the Army component in a unified command—the United States Central Command—which has responsibility over a vast overseas area covering parts of Africa, Asia, and the Persian Gulf.

The 3rd U.S. Army draws upon a reservoir of Army units and is responsible for planning, exercising, and rapidly deploying these units in crisis situations.

1.2 PURPOSE AND NEED

The purpose of this action is to implement the BRAC Commission recommendations that became law on November 9, 2005 in accordance with Defense Base Closure and Realignment Act of 1990 (P.L. 101-510) as amended.

In order to implement the BRAC actions and improve military capabilities, Shaw AFB will require facilities and infrastructure to house and support HQ 3rd U.S. Army as well as the ALQ-184 Pod Centralized Intermediate Repair Facility (CIRF). As part of an Air Force consolidation the base-level TF-34 engine intermediate maintenance personnel, back shop equipment, engines, and spares would relocate from Shaw AFB to another Air Force facility.

This page is intentionally blank.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

This section describes the relocation of the HQ 3rd U.S. Army and associated BRAC actions to respond to the BRAC Commission recommendations for Shaw AFB. This section also describes the alternative to close the skeet range, and the no-action alternative, which would maintain the current mission structure at Shaw AFB.

2.1 PROPOSED ACTION

The proposed action is to implement the following BRAC Commission recommendations at Shaw AFB. Action includes development of 15 projects as identified in Table 2-1 and shown in Figure 2-1.

The BRAC recommendations include:

- Relocating the HQ 3rd U.S. Army, at Fort McPherson, Georgia (GA) and the 3rd U.S. Army support office at Fort Gillem, GA to Shaw AFB, SC;
- Establishing a CIRF at Shaw AFB, SC for ALQ-184 pods with the addition of 3,540 square feet to an existing facility; and
- Relocating base-level TF-34 engine intermediate maintenance from Shaw AFB.

These elements would result in a net increase of approximately 1,518 personnel at Shaw AFB with an estimated construction expenditure of $132 million. Additionally, 3 acres of land would be required adjacent to the HQ 3rd U.S. Army area to support the Early Entry Command Post (EECP)/Main Command Post (MCP) Army tactical support vehicle storage. Also during periods of deployment, HQ 3rd U.S. Army would require a surge area for approximately 30 shipping containers (20 feet x 8 feet) occupying four acres near the HQ 3rd U.S. Army motor pool. The 15 projects identified to implement BRAC Commission recommendations include three projects totaling approximately 306,305 square feet to be located in the southeastern portion of the base to support the relocation the HQ 3rd U.S. Army (see Figure 2-1), six base operating support projects totaling 83,110 square feet, and five housing projects that include approximately 77,204 square feet and 24 single family housing units (57, 600 square feet). Construction activities are proposed to begin in Fiscal Year 2007 (FY07) and be completed by FY12.

Construction. Prior to the start of building construction, each building site would be graded and sediment and erosion would be controlled by the use of standard construction practices. These practices would include the installation of a silt fence, storm drain inlet protection, temporary sediment traps, and diversion dikes within project limits prior to commencement of any on-site work.

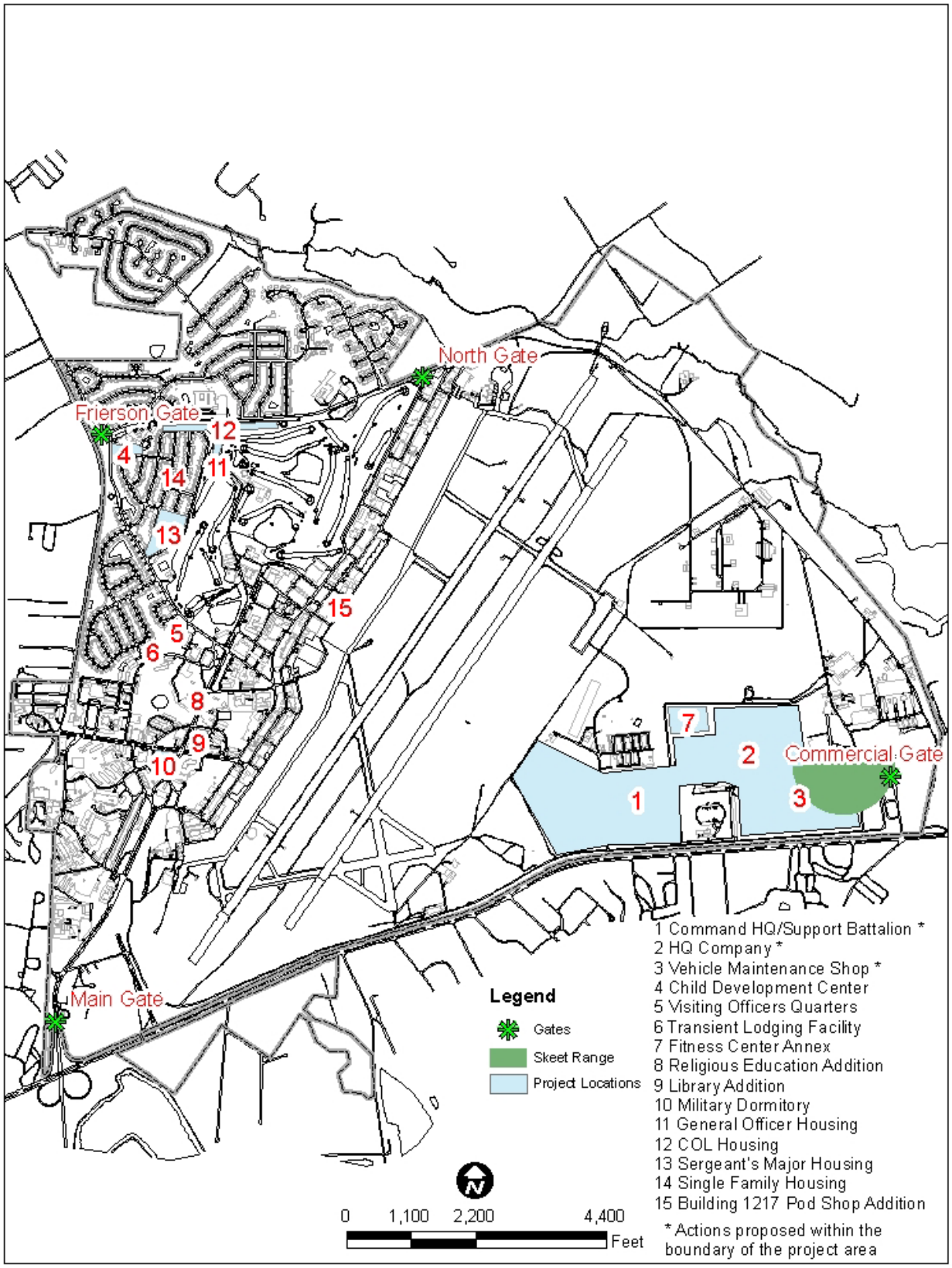

Figure 2-1. Proposed Project Locations

Table 2-1. Projects to Support BRAC Commission Recommendations

Figure 2-1 Number	BRAC Projects	Area (sq. ft.)
HQ 3rd U.S. Army Headquarters Projects		
1	Command HQ/ Support Battalion	267,800
2	HQ Company	23,500
3	Vehicle Maintenance Shop/Motor Pool	15,005
Base Operating Support Projects		
4	Child Development Center	19,790
5	Visiting Officer Quarters	20,790
6	Transient Lodging Facility	10,840
7	Fitness Center Annex	25,000
8	Religious Education Addition	4,790
9	Library Addition	1,900
Military Family Housing Projects		
10	Military Dormitory (96 persons)	69,320
11	General Officer Housing (1 Unit)	3,584
12	Colonel (Col) Housing (1 Unit)	2,400
13	Sergeant's Major Housing (1 Unit)	1,900
14	Single Family Housing – 24 units (each one 2,400 sq. ft.)	57,600
Centralized Intermediate Repair Facility Project		
15	Building 1217 Pod Shop Addition	3,540

Gravel would be placed at the entrance to the construction site to reduce the amount of soil tracked onto the paved roads. Similarly, fugitive dust would be controlled by the use of standard construction practices.

All construction operations would comply with the requirements of the South Carolina Stormwater Management and Sediment Reduction Act. The construction contractor would apply for and receive a permit from the South Carolina Department of Health and Environmental Control (SCDHEC) - Bureau of Water, prior to the start of construction. All areas disturbed by construction activities would be graded, seeded, fertilized, and mulched upon completion of proposed construction activities.

Connections to the existing water supply system would provide adequate domestic and fire protection water systems for various building additions and to the new housing and HQ 3rd U.S. Army HQ complex. Wastewater generated by these facilities would be discharged to the existing sewer system and directed to the base wastewater treatment plant. Storm water would be directed through vegetated swales and storm sewers to the existing drainage system. Electric connections to the existing system are available in the immediate vicinity of each project area.

Manpower. There are over 5,600 military assigned to and over 600 civilians and 438 Contract Manpower Equivalents (CMEs) currently employed at Shaw AFB. The HQ 3rd U.S. Army manpower authorization is included in Table 2-2 and would be in place by FY12. The ALQ-184

CIRF requires 24 maintenance personnel (based on Intermediate Level Maintenance). The TF-34 engine Propulsion Flight relocation (approximately 62 authorizations with 37 military assigned) would cause a reduction in base personnel.

Table 2-2. Existing and Projected Base Personnel Authorizations

	Military	Civilian	Contract Manpower Equivalents (CMEs)	Total
Existing Base Population	5,600	600	438	6,638
Proposed Personnel	1,097	199	222	1,518
Projected Base Population	**6,697**	**799**	**660**	**8,156**

The relocation of the HQ 3rd U.S. Army would require the transfer of tactical support vehicles to Shaw AFB. The majority of the vehicles would be parked in the proposed motor pool. As shown in Table 2-3, the EECP/MCP consists of 22 Military Vans (MILVANS), two generator sets, five environmental control units (ECUs), and two power distribution units (PDUs) and would be positioned in the EECP area which will probably be adjacent to the 3rd U.S. Army Headquarters. No EECP equipment is included in the totals below except for the ECUs and PDUs. U.S. Army would require a surge area for approximately 30 shipping containers (20 feet by eight feet) occupying four acres near the HQ 3rd U.S. Army motor pool.

Table 2-3. HQ 3rd U.S. Army Vehicle and Equipment Requirements

Vehicles and Equipment	Quantity
TRUCK, 5-TON FMTV (EXPANDABLE)	1
COMMUNICATION SYSTEM (TROJAN SPIRIT)	1
TRAILER, TANK WATER 400 GAL 1.5T	4
TRAILER, CARGO LMTV W/ DROPSIDES	3
TRAILER, CARGO 1 ¼ TON	4
TRAILER, CARGO W/ DROPSIDES	1
TRUCK, WRECKER 5T FMTV	2
TRUCK, UTILITY 1 ¼ TON 4X4 HMMWV	47
TRUCK, CARGO 5-TON FMTV	3
TRUCK, CARGO 4X4 2 ½ T LMTV	8
TRUCK, UTILITY 1 ¼ TON 4X4 HMMWV (HEAVY VARIANT)	1
CONTAINER, GENERAL CARGO MILVAN, 20 X 8	49
SHELTER, TUN, NON-EXPANDABLE FOR HMMWV	1
GENERATOR SET, DIESEL 5 kW MOUNTED	5
GENERATOR SET, DIESEL 10 kW MOUNTED	2
GENERATOR SET, DIESEL 3kW	6
GENERATOR SET, DIESEL 10kW	1
GENERATOR SET, DIESEL 500kW	2

2.2 SKEET RANGE CLOSURE ALTERNATIVE

Under this alternative, all actions contained in the proposed action would occur. Additionally, the use of the existing skeet range would be discontinued, and the skeet range would be closed. This would require demolition of the existing structures and removal of lead shot and other related debris. Closure of the skeet range and lifting safety arcs associated with the range would allow the Southeast (commercial) Gate to be used without restriction and would facilitate the movement of personal vehicles through that gate at all times. The closure would also allow for flexibility in siting the proposed HQ 3rd US Army facilities by removing the necessity of a safety arc currently required by the skeet range.

Lead Removal. Spent lead contained in the surface soil and construction debris containing lead would be managed in accordance with applicable federal and state requirements for lead and lead containing materials. Removal contractors or reclaimers (as a preconstruction submittal) would be required to submit a work plan outlining their proposed best management practices applicable to small arms ranges for separating the lead from soil. Some methods available to remove lead from the shot fall area include soil washing (gravity separation, pneumatic separation, wet screening), dry screening, and vacuuming. The soil would then be tested to determine if it is a Resource Conservation and Recovery Act (RCRA) hazardous waste. Construction debris from the site would be tested by the contractor to determine appropriate disposal requirements. Additional requirements such as groundwater monitoring may be imposed by the South Carolina Department of Natural Resources (SCDNR).

2.3 NO-ACTION ALTERNATIVE

The no-action alternative for this EA means that implementation of the BRAC Commission recommendations would not occur at Shaw AFB at this time. Analysis of the no-action alternative provides a benchmark and enables decision-makers to compare the magnitude of the environmental effects of the proposed action. Section 1502.14(d) of NEPA requires an EA to analyze the no-action alternative. For this EA, the no-action alternative is the baseline conditions which currently support the existing F-16 squadrons at Shaw AFB. The no-action alternative would maintain the environmental status quo; however, it would not allow the Army to comply with the decisions of the BRAC in 2005, which is legally binding, nor allow the ALQ-184 pod CIRF to support the workload. Many BRAC actions are tied together. Not performing these actions would have a ripple effect across several other BRAC actions.

2.4 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD

In addition to the proposed action, skeet range closure alternative, and the no-action alternative, discussed above, the base civil engineering personnel reviewed the Shaw AFB General Plan to determine if any alternative siting locations could be considered in this analysis. There are two alternatives that were considered.

Alternative A. One proposed alternative would locate the HQ 3rd Army on the west side, with operations split between the bowling center/Communities Activities Center/Old Club Shaw Site, and some office operations would be located on the west side of the base, while motor pool and support would be located on the east side. All of the base operating support (BOS) projects and the military housing projects would be required with Alternative A.

Alternative B. Another possible alternative would locate the HQ 3rd Army on the west side -– split operations on west side -– housing area, site for some HQ operations on west side, motor pool and support on east side. All of the BOS projects and the military housing projects would be required with Alternative B. Additional construction would be required to replace functions currently located on sites proposed for construction in this alternative.

Both of these alternatives were not carried forward for analysis after a review of alternative development opportunities and the environmental and operational constraints delineated in the General Plan and emerging requirements known to Shaw AFB. Given the Army's need for co-location of facilities and approximately 10 acres of developable land, opportunities were limited to the areas east of the runway. Development constraints on the east side of the runway include runway clear zones, explosive quantity-distance (Q-D) arcs, and Environmental Restoration Program (ERP) sites.

No other locations were identified that would provide an area outside of the runway clear zone and the occupied structures would not be affected by the explosive Q-D arcs based on the types and amounts of explosives stored at various base locations

2.5 ENVIRONMENTAL IMPACT ANALYSIS PROCESS

This EA for the implementation of BRAC recommendation at Shaw AFB has been prepared in accordance with NEPA (42 USC 4321-4347), Council on Environmental Quality (CEQ) Regulations (40 Code of Federal Regulations [CFR] § 1500–1508), and 32 CFR Part 989, et seq., *Environmental Impact Analysis Process* (Air Force Instruction [AFI] 32-7061). NEPA is the basic national requirement for identifying environmental consequences of federal decisions. NEPA ensures that environmental information is available to the public, agencies, and the decision-maker before decisions are made and before actions are taken.

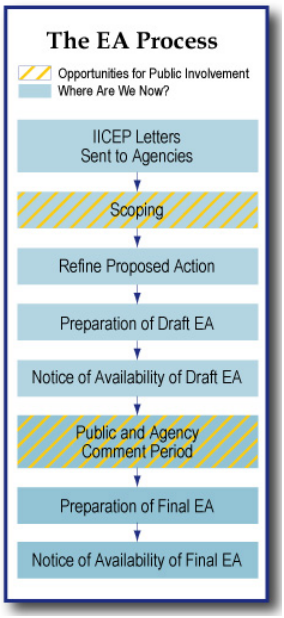

Figure 2-2. EA Process

2.5.1 Environmental Assessment Process

Compliance with NEPA guidance for preparation of an EA involves several steps, depicted in Figure 2-2.

The environmental analysis process includes public and agency review of information pertinent to the proposed action and

alternatives and provides a full and fair discussion of potential consequences to the natural and human environment. Interagency and Intergovernmental Coordination for Environmental Planning (IICEP) letters were sent, and responses received through December 30, 2006 are in Appendix A.

The environmental impact analysis process includes the review of all information pertinent to the proposed action and no-action alternative and provides a full and fair discussion of potential consequences to the natural and human environment. The process includes involvement with the public and agencies to identify possible consequences of an action, as well as the focusing of analysis on environmental resources potentially affected by the proposed action or no-action alternative.

2.5.2 Scope of Resource Analysis

The proposed action and the no-action alternative have the potential to affect certain environmental resources. These potentially affected resources have been identified through scoping, communications with state and federal agencies, and review of past environmental documentation. Specific environmental resources with the potential for environmental consequences include noise, safety, air quality, physical resources, biological resources, cultural resources, land use, socioeconomics, and environmental justice.

2.5.3 Public and Agency Involvement

In December 2006, the Air Force contacted local, state, tribal, and federal agencies to inform them of the Air Force intent to prepare an EA for the implementation of the BRAC Commission recommendations at Shaw AFB (refer to Appendix A). Through this scoping process, the Air Force obtained information regarding pertinent environmental issues the agencies felt should be addressed in the environmental impact analysis. Community leaders and legislative representatives from potentially affected communities in South Carolina were contacted. Agencies associated with the management of cultural and biological resources, primarily for compliance with the Endangered Species Act (ESA) and National Historic Preservation Act, were notified of the intent to prepare an EA. Their responses are included in Appendix A.

REGULATORY COMPLIANCE AND PERMIT REQUIREMENTS

This EA has been prepared to satisfy the requirements of NEPA (Public Law [PL] 91-190, 42 USC 4321, et seq.) as amended in 1975 by P.L. 94-52 and PL 94-83. The intent of NEPA is to protect, restore, and enhance the environment through well-informed federal decisions. In addition, this document was prepared in accordance with the requirements of the NEPA of 1969, (42 USC 4321-4347), Council on Environmental Quality (CEQ) Regulations for Implementing the Procedural Provisions of NEPA (40 CFR § 1500–1508), and 32 CFR Part 989, et seq., *Environmental Impact Analysis Process* (formerly known as AFI 32-7061).

Implementation of the proposed action would require concurrence from several regulatory agencies. Compliance with the ESA involves communication with the Department of the

Interior (delegated to the USFWS) in cases where a federal action could affect the listed, threatened, or endangered species, species proposed for listing, or species that could be candidates for listing. A letter was sent to the appropriate USFWS agencies as well as their state counterparts, informing them of the proposed action and alternatives and requesting data regarding applicable protected species.

The preservation of cultural resources falls under the purview of the State Historic Preservation Office (SHPO), as mandated by the National Historic Preservation Act (NHPA) and its implementing regulations. A letter was sent to the South Carolina SHPO and the Catawba Tribe informing them of the proposed action and no-action alternative. Other regulatory or permit requirements include a stormwater National Pollutant Discharge Elimination System Permit issued by the SCDHEC. Appendix A includes copies of relevant coordination letters sent by the Air Force.

2.6 COMPARISON OF ALTERNATIVES

Table 2-4 summarizes the potential environmental impacts of the proposed action and alternatives, based on the detailed impact analyses presented in Chapter 4.0.

Table 2-4. Summary of Potential Environmental Consequences

Resources	Proposed Action	Skeet Range Closure Alternative	No Action Alternative
Land Use	+	+	0
Visual Resources	–	0	0
Noise	0	+	0
Biological Resources	0	0	0
Cultural Resources	0	0	0
Water Resources	0	0	0
Earth Resources	-	0	0
Hazardous Materials and Waste Management	–	-	0
Safety	0	+	0
Air Quality	0	0	0
Infrastructure	+	0	0
Socioeconomics	+	-	0

Notes: " – " indicates an adverse but not significant impact; " + " indicates a positive/beneficial impact; and " 0 " indicates no change.

3.0 AFFECTED ENVIRONMENT

This chapter describes the affected environment at Shaw AFB and the potentially affected region. Based on the operational characteristics of the proposed action (Chapter 2.0), it was determined that the following resources could possibly be affected: land use, infrastructure, socioeconomics and environmental justice, noise, air quality, cultural resources, biological resources, water resources, hazardous material and waste management, safety, and noise. The existing environmental conditions within the expected geographic extent of potential impacts, known as the ROI, are addressed for each environmental resource in this chapter.

RESOURCES ELIMINATED FROM DETAILED CONSIDERATION

Airspace management and air traffic control were not evaluated in this EA because it was determined that implementation of the proposed action is unlikely to affect these resources.

3.1 LAND USE RESOURCES

3.1.1 Definition of the Resource

The attributes of land use addressed in this analysis include land use, visual resources, and transportation. Land use focuses on general land use patterns (including recreational areas), ownership, management plans, policies, ordinances, and regulations. These provisions determine the types of uses that are compatible and identify appropriate design and development standards to address specific designated or environmentally sensitive areas. Visual resources present the natural and manufactured features that constitute the aesthetic qualities of an area. Transportation includes the road and rail networks providing access between the local community and the base as well as within the base. The ROI for transportation includes the roadway network within Shaw AFB and the off-base network providing direct access to Shaw AFB.

3.1.2 Existing Conditions

LAND USE

Shaw AFB's main cantonment area encompasses 3,354 acres and is located within the city limits of Sumter, approximately 10 miles west of the city center, as depicted on Figure 1-1. Shaw AFB groups land uses by function in geographic areas. Most of the developed land uses occur north and west of the airfield. Support services and the runway are centrally located and the residential areas on base are located in the northwest portions of the base. Open space and light development, including a munitions storage area and outdoor recreational facilities, are located in the eastern portion of the base.

Several adopted plans and programs guide land use planning on Shaw AFB. Base plans and studies present factors affecting both on- and off-base land use and include recommendations to assist on-base officials and local community leaders in ensuring compatible development.

The *Shaw AFB General Plan* (Shaw AFB, 2006) provides an overall perspective concerning development opportunities and constraints as well as a framework for making effective programming, design, construction, and resource management decisions. Currently, the General Plan is being updated (Air Force, 2006a). An Area Development Plan (ADP) that guides and identifies development opportunities and constraints for the east side of Shaw AFB is currently being prepared. The base's *Integrated Natural Resources Management Plan FY 2001-2005* (Air Force, 2001) is used to coordinate natural resources management on the base.

The *Air Installation Compatible Use Zone (AICUZ) Study* (Air Force, 1994) for Shaw AFB recommends compatible land development patterns in the off-base areas subject to aircraft noise and accident potential. Sumter County, in conjunction with Shaw AFB, has prepared a *Joint Compatible Land Use Study (JCLUS)* that incorporates AICUZ recommendations. The JCLUS also describes existing land uses; identifies encroachment areas around the base; recommends modifications to the county zoning ordinance; addresses long-range infrastructure improvements; and describes twenty-year growth trends for the area (Robert and Company, 1994).

Zoning around the base includes heavy industrial and limited commercial. Varying degrees of residential densities are permitted around the base and general commercial businesses are permitted along the major roads. On the major roads, including U.S. Highways 378/76 and 521 and State Route (S.R.) 441, commercial development occurs.

Land uses within Sumter County include agriculture and forestry, with over 50 percent of the county classified as prime farmland or farmlands of statewide importance (Air Force, 2004a). Special-use areas in the vicinity of the base include Poinsett State Park, a portion of Woods Bay State Park, the Manchester State Forest (including a Wildlife Management Area [WMA]), and a portion of a 44,000-hectare Lake Marion impoundment are all within Sumter County.

VISUAL RESOURCES

Shaw AFB is located on the edge of the city of Sumter and approximately 30 miles east of the capital city of Columbia. The areas on the northwest portion of the base are primarily base housing. The flight line area bisects the base from a northeast to southwest direction through the middle of the installation. Land situated on the southeast side of the installation is predominantly planted pine forest along with the munitions storage facilities (and recreational facilities).

Approximately 160 acres of undeveloped, forested land still exist on Shaw AFB (Air Force, 2004b). This area is located along Spann Branch and Long Branch adjacent to the northern and eastern border of the base. It consists of mature trees, including native oak, pine, maple, and

dogwood, as well as a multitude of shrubs and ground covers native to the area. A pine plantation of more than 300 acres is located east of the runways along the southeastern border of the base (Air Force, 2004b). The trees in this area are approximately 30 years old and enhance the aesthetic qualities of the base as well as provide a buffer between the base and the highway to the south. Headquarters facilities would be located within the pine plantation.

Sumter County is characterized by a mixture of large tracts of agricultural land interspersed with low-density residential development and homesteads. Commercial strip development occurs along U.S. Highway 378/76. With a long history of pine plantations, the landscape is broken up with tracts of pine trees of varying age and height. The area is generally flat to gently sloping, with steeper slopes located near streams and drainage areas. Surface elevation ranges from 200 to 330 feet above sea level (Air Force, 2004a).

TRANSPORTATION

Shaw AFB allows vehicle access to the base via four active security checkpoints: the Main Gate on Shaw Drive, the Frierson Street Gate, the Commercial Gate on SR 378/76 and the North Gate on Frierson Road (Air Force, 2004b). The on-base streets are classified as arterials, collectors, or local streets. The arterials, those streets that carry the majority of traffic, are Polifka Drive, Rhodes Avenue, and Shaw Drive. Six collectors (Condor Country Road, Killian Avenue, Lance Avenue, Patrol Road, Stuart Street, and Sweeney Street) distribute traffic from the arterials to the local streets or directly to intended destinations. The major arterial highway in the area is US 76/378, which borders Shaw AFB on the south and provides access to the Interstate Highway system (Air Force, 2004b).

There is a five-mile rail spur that is used to move petroleum, oil, and lubricant (POL) tank cars from the CSX siding to the POL off-load area (Air Force, 2004b). This rail line crosses US 76/378 and enters the base's southern edge just east of the Main Gate.

3.2 INFRASTRUCTURE

3.2.1 Definition of the Resource

The infrastructure of Shaw AFB includes utility systems (electrical, potable water, sewage/ wastewater, solid waste, storm drainage, heating and cooling, and liquid fuels) and the communications system. The ROI for infrastructure is Shaw AFB and the capacity of the infrastructure systems outside the base to provide necessary services.

3.2.2 Existing Conditions

ELECTRICAL DISTRIBUTION AND NATURAL GAS SYSTEMS

Shaw AFB purchases power from the Carolina Power and Light Company (CP&L) and the Black River Electric Cooperative (BREC). CP&L provides electricity to the main cantonment area and the majority of the housing area, whereas BREC supports the remaining housing and

southeastern portion of the base. The total capacity of the electrical system is 27.6 megawatts and 1999 usage was approximately 16 percent at peak periods. Approximately 53 percent of the distribution system for family housing is owned and maintained by CP&L while the remaining 47 percent is owned and maintained by BREC (Air Force, 2004b). For FY01, Military Family Housing (MFH) consumed 31,257,641 kilowatt hours (KWH) of electricity at a cost of $1,863,400 (Air Force, 2002).

Natural gas for Shaw AFB is provided by South Carolina Pipeline via a four-inch pipeline entering the base at the junction of Frierson Road and Sweeney Street. A metering station divides the supply between MFH areas and industrial facilities. The capacity of the system is 150,000 cubic feet/day and is 21.5 percent utilized. Base records indicate that the MFH area consumed 20,535 million cubic feet of natural gas for FY06 (personal communication, S. Johnson, 2006), a reduction from 36,202 million cubic feet in FY01 (Air Force, 2002).

POTABLE WATER

Shaw AFB produces all of its own water from six on-base wells which withdraw from the Black Creek Aquifer. Wells completed in this aquifer are capable of yielding up to 750 gallons per minute (gpm). The main base is served by Wells 3 and 5 and the Wherry system (housing) is served by Wells 4, 6, and 7. Well 1 is inoperable and must be redrilled in a new location or at a high cost in the current location, while Well 2 has been abandoned (personal communication, S. Johnson, 2006). The functional wells have a capacity to provide 2.4 million gallons per day (mgd), based on a 16-hour pumping day. Average daily production is 0.75 mgd with a daily maximum reported at 1.1 mgd. Water is treated with chlorine, fluoride, and calcium at each well site prior to storage in one of three aboveground storage tanks (ASTs). The total storage capacity for potable water is 900,000 gallons. Additionally, there are two ground-level storage tanks that provide 1,000,000 gallons of potable water to support the fire protection system (personal communication, J. Tucker, 2007).

The installation water supply also has two interconnections with the High Hills Rural Water Company and one interconnection with the City of Sumter Water System. These interconnections are rarely used and are intended for emergencies (HQ ACC, 2006; Air Force, 2004a, 2004b).

SEWAGE

Shaw AFB discharges domestic and industrial wastewater to an on-base wastewater treatment plant (WWTP) that was constructed in the 1940s and is currently operated by a contractor. Five lift stations move the wastewater from the main cantonment and housing areas to the WWTP where preliminary, secondary, and tertiary treatment processes are conducted. Effluent from the filters is disinfected and discharged from the facility after metering and sampling at outfall 001, and thereafter it is directed off-base by a new six-mile-long pipeline into the Wateree River under National Pollution Discharge Elimination System (NPDES) Permit # SC0024970 (expires May 31, 2008). The sludge from the WWTP was formerly dispersed as a Class II fertilizer over

126 acres of forested land on the east side of the base, but since January 2004 sludge has been taken to the City of Sumter (personal communication, S. Johnson, 2006). The permit capacity of the WWTP is 1.2 mgd, and the capacity is generally exceeded twice a year when inflow/infiltration into the wastewater conveyance system occurs as a result of periods of heavy rainfall (HQ ACC, 2006; Air Force, 2004b and 2004d).

SOLID WASTE

Shaw AFB has developed a Solid Waste Management Plan to guide and direct the management of solid wastes. Solid wastes on the installation are either land-filled or recycled (there are no active landfills on the base). Solid waste generated on Shaw AFB is collected by Atlantic Coast Contracting and hauled to the Sumter County landfill 18 miles from the base, and thereafter transported to a landfill in Bishopville, SC. The Sumter County landfill is currently projected to reach capacity within 20 years. From July 2005 through June 2006, approximately 3,088 tons of solid waste was disposed of into the off-base landfill (personal communication, S. Johnson, 2006). A construction contractor handles demolition and construction debris, while recyclable items are collected and transported off-base by another contractor.

The base recycling and reuse program significantly reduces the amount of solid waste that is transported to the landfill. Shaw AFB has a two-year recycling contract with Atlantic Coast Containers. The on-base recycling service is basically composed of two parts: MFH and the Industrial sector. The MFH uses eight-gallon totes to collect all of the commodities. This "mixed collection" container is then left at the curb on the prescribed pick-up day. The Industrial sector collects only mixed paper and cardboard in six- to eight-cubic-yard containers placed around the base. The remaining commodities are taken to the on-base Recycling Center by base personnel by privately owned vehicles (POV) or government owned vehicles (GOV). Recyclables are stored in the six- to eight-cubic-yard containers at the Recycling Center before going off base. Items such as waste tires and lead acid batteries are turned into the Defense Reutilization and Marketing Office (DRMO) for resale/recycling, while household tires are collected for recycling at the Recycling Center. Shaw AFB does not compost yard waste or similar materials as composting is not permitted within two miles of the flightline because of the risk of attracting birds (Air Force, 2004b, and 2005a; HQ ACC, 2006).

STORM DRAINAGE SYSTEM

Surface water features on Shaw AFB consist primarily of ditches, swales, and canals associated with runways and taxiways, as these were created to remove storm water runoff from the airfield and vicinity. Naturally occurring surface waters on the base include Long Branch along the northeast boundary and one of its tributaries, Spann Branch, along the northern boundary, as well as Mush Branch originating at the southwest corner of the base just south of US 76/US 378 (Figure 3-1). Long Branch flows to the southeast and off-base into Booth's Pond, Sawmill Pond, and then into Mush Swamp. Waters from Long Branch and Mush Branch eventually flow into the Pocotaligo River, east of the base. Other surface waters on the

installation include four artificial, recreational impoundments: No. 1 Golf Course Pond, No. 8 Golf Course Pond, Memorial Lake, and Chapel Pond (Air Force, 2004a and 2004b).

The storm drainage system also includes drainage pipes ranging in size from 12 to 72 inches in diameter. Drainage from the housing areas is channeled into three of the above-mentioned lakes located on the Golf Course (Figure 3-1). As mentioned in Section 3.2.3, storm water runoff from the base is regulated by SCDHEC NPDES permit program, which includes a Storm Water Pollution Prevention Plan (SWPPP). Under this permit, storm water is discharged through four permitted storm water outfalls: two into Mush Branch Creek and two into Long Branch Creek. The majority of the area east of the runway discharges through outfall 004 to Long Branch Creek. Additionally, there are four other storm water outfalls that do not require monitoring under the NPDES permit. As part of the NPDES permit and the SWPPP, oil-water separators (OWS) are required throughout the installation. Of the current 31 OWSs, 10 are expected to be removed or abandoned in 2006 and are cleaned as needed. Most of the remaining 21 OWSs are skimmed on a monthly basis and are cleaned annually (personal communication, S. Johnson, 2006). There are approximately 709 acres of impervious surface on the base which include the runways, flightline, ramps, roads, parking lots, and buildings (Air Force, 2004a, 2004b, and 2005c).

HEATING AND COOLING

Shaw AFB has a single gas-fired, central heating plant that provides heat to 22 buildings, including most of the buildings in the 900 area and all of the dormitories in the 400 area. The system can be switched to a 10,000 gallon #2 diesel fuel backup if necessary. Individual dedicated units provide heating and cooling for all other base buildings, while heat exchangers provide heating and cooling for family housing units (Air Force, 2004b).

LIQUID FUELS

Aircraft operations rely on JP-8 jet fuel that is transported to the base by rail. A tank car siding capable of handling 10 tank cars simultaneously is located adjacent to the three jet fuel storage tanks. These tanks have a combined storage capacity of 2.4 million gallons and are connected to a decommissioned flightline hydrant refueling system. Consequently, all aircraft are fueled using tanker trucks. Three other tanks, capable of holding 12,000 gallons each, are available for unleaded gas and diesel fuel. These products are delivered to the base storage area and then on to the military service station by tank trucks (Air Force, 2004b and 2006a). Lastly, #2 heating oil comes on base by truck and stops at all 54 locations that have oil burner heating units and fills the tanks. A heating oil fuel underground storage tank (UST) is located just north of Building 1602 (HQ ACC, 2006 and Air Force, 2005b).

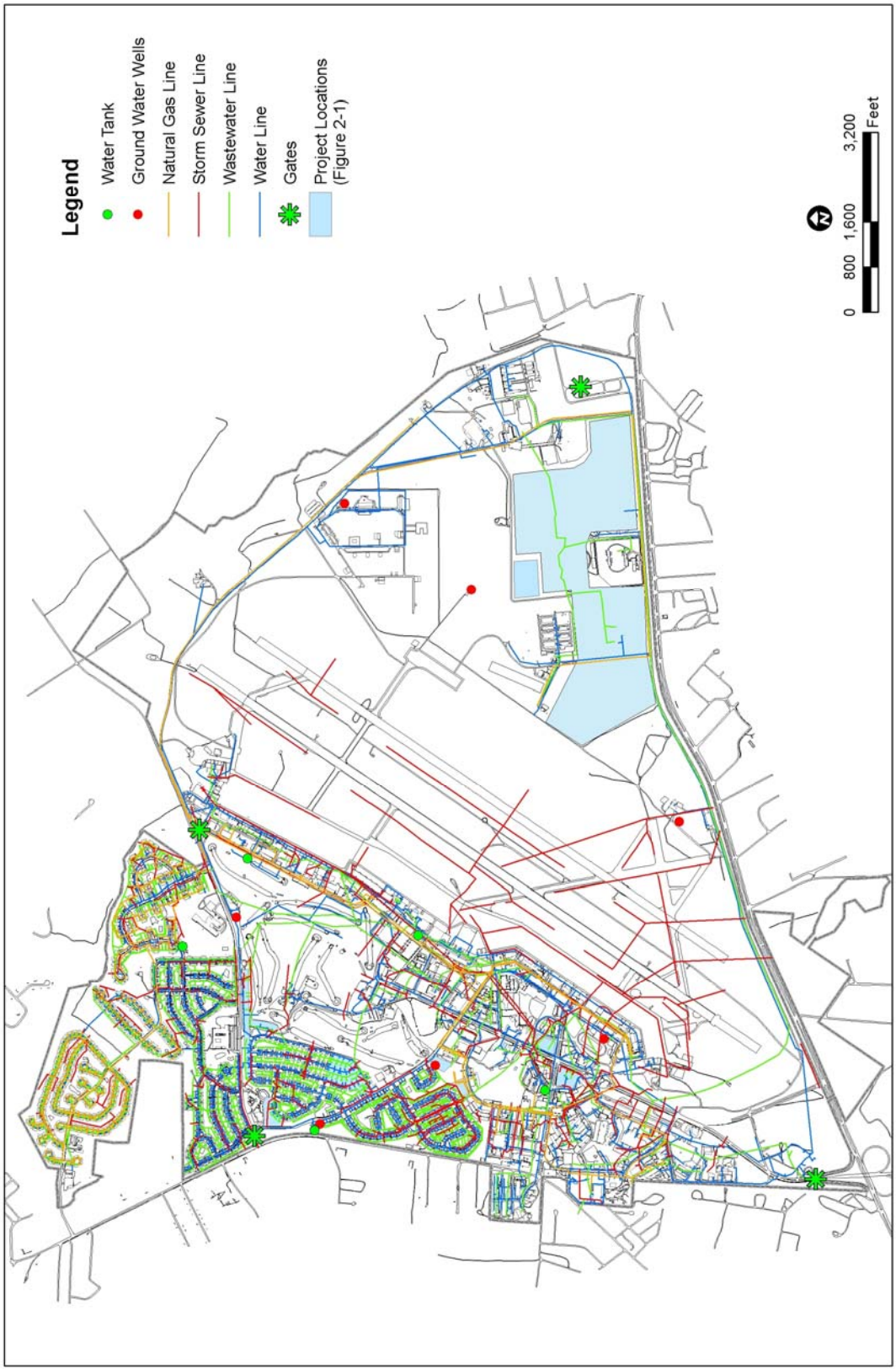

Figure 3-1. Shaw AFB Infrastructure

COMMUNICATIONS SYSTEM

The Command, Control, Communications, Computers, and Intelligence Blueprint for Shaw AFB identifies existing communications and information systems, shortfalls, planned improvements, and transitional and implementation plans. Communications systems at the base include data communications, long haul communications, information transfer, telephone switching, and radio and security systems. The installation maintains a high-capacity digital data network using mode and multimode fiber optics that provides secure networking, electronic messaging (email), and other services. The current telephone switching system fully supports switching needs for mission changes, dial-up local area networks, and additional programs, has ample trunking expansion capacity (Air Force, 2004b).

The Shaw AFB data system network includes classified and unclassified data systems essential to operations of the 20th FW, HQ 9thAF/U.S. Air Forces U.S. Central Command (CENTAF), and tenant units. Long haul communications systems interconnect the voice and data systems with the wide area voice and data networks. These systems are periodically evaluated and improved as new technology becomes available. The base radio system consists of a Land Mobile Radio Network and very high frequency and ultra high frequency radios. These systems, which are vital for tactical control of aircraft, are all in excellent condition. The base also has a flight line video surveillance system and a video teleconferencing system (Air Force, 2004b).

3.3 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

3.3.1 Definition of the Resource

The specific socioeconomic resource areas addressed include employment and earnings, population, housing, schools, and environmental justice. The ROI comprises Shaw AFB and the surrounding area, which encompasses Sumter County, SC. Socioeconomic information is presented for the ROI and, where appropriate, comparisons are presented with conditions for the State of South Carolina. Environmental justice, which concerns the disproportionately high or adverse effects of an action on minority and low-income populations, must be considered for federal actions under the NEPA review process.

3.3.2 Existing Conditions

EMPLOYMENT AND UNEMPLOYMENT

In the ROI, total full- and part-time employment increased from 48,725 jobs in 1990 to 56,856 in 1999, at an average rate of 1.7 percent annually. The largest contributions to employment in 1999 were made by services (22.8 percent), manufacturing (22.0 percent), and government enterprises (21.7 percent). The sectors of the economy exhibiting the greatest relative increase in jobs over the period 1990-1999 were transportation and public utilities, services and manufacturing. For the years 1980, 1990, and 1999, the contribution of the military to total

employment decreased from 13.5 percent to 12.9 percent and 9.7 percent, respectively (USDCESA, 2000).

For the State of South Carolina, full- and part-time employment increased at an average rate of 1.9 percent annually between 1990 and 1999, at which time employment in the state was just over two million jobs. The sectors of the economy contributing the greatest number of jobs in the state over this period were services, retail trade, and manufacturing. Kaydon Bearings, a local manufacturer is expected to increase one of its two plants in Sumter by $18.5 million and anticipates the creation of an additional 50 new jobs (Sumter South Carolina Development Board, 2005).

Total Employment in Sumter County decreased by less than 1 percent between 2000 and 2004 (Table 3-1). Two of the largest employers include the government sector and the manufacturing sector. While the government sector has slightly increased over a four-year period from 12,843 to 12,875 employees, the manufacturing sector has decreased the number of employees from 3,889 to 3,604. The increase in the government sector is due to an increase in military employees. The large military presence comes from Shaw AFB, the number-one employer in Sumter County. Although the total number of employees in manufacturing has decreased over the period, almost half of the top 20 employers in Sumter County are manufacturers (Table 3-2). It is estimated that nearly a quarter of the students graduating from local schools will work for a local manufacturer (Sumter South Carolina Development Board, 2006).

The unemployment rate in Sumter County fluctuated greatly between 1990 and 2005 (Figure 3-2). In 2000, Sumter County experienced its lowest unemployment rate in this 15-year period, dropping to 4.2 percent. However, over the past three years, the unemployment rate has been increasing towards its all time high of 9.1 percent, which it previously experienced in 1991 (Figure 3-3). Although, the unemployment rate for Sumter County has started to decline over the past year, the average is still above the state and country average (Table 3-3).

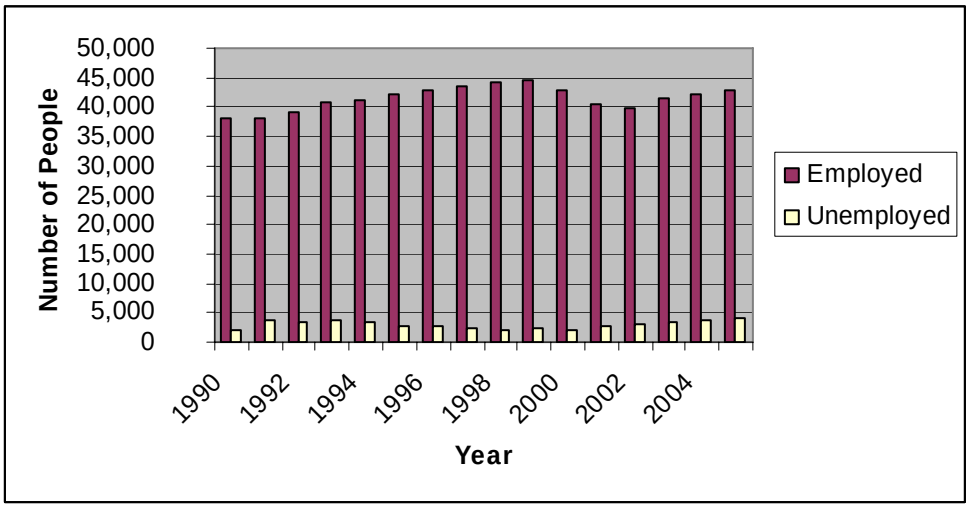

Figure 3-2. Employment and Unemployment, Sumter County, 1990-2005

Source: U.S. Bureau of Labor Statistics, 2006

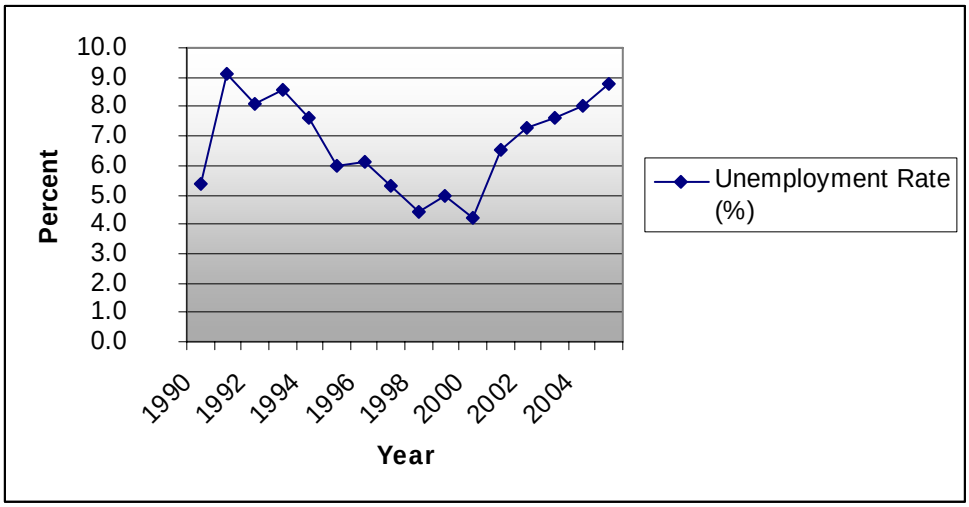

Figure 3-3. Unemployment Rate, Sumter County, 1990-2005

Table 3-1. Total Employment by Industry, Sumter County, 2004

Industry	Number of Employees
Total employment	54275
Farm employment	703
Non-farm employment	53572
Forestry, fishing, related activities, and other	(D)
Mining	(D)
Utilities	95
Construction	3604
Manufacturing	10126
Wholesale trade	795
Retail trade	5776
Transportation and warehousing	1178
Information	468
Finance and insurance	1391
Real estate and rental and leasing	1080
Professional and technical services	1113
Management of companies and enterprises	224
Administrative and waste services	2408
Educational services	820
Health care and social assistance	4501
Arts, entertainment, and recreation	550
Accommodation and food services	2953
Other services, except public administration	3293
Government and government enterprises	12875
Federal, civilian	1078
Military	6013
State and local	5784

Source: U.S. Bureau of Economic Analysis, 2006

Table 3-2. Major Employers, Sumter County, 2006

Employer	Industry	Number of Employees
Shaw Air Force Base	Military	6,866
Goldkist, Inc.	Poultry Processing*	2,210
Tuomey Healthcare System	Hospital	1,519
Sumter School District 17	Public Education	1,410
Sumter School District 2	Public Education	1,200
BD Pre analytical Solutions	Medical Supplies Manufacturer*	804
Santee Print Works	Textiles Manufacturer*	725
Eaton Electrical (Cutler Hammer)	Electrical Services Manufacturer*	665
Sumter County Government	Government	518
City of Sumter	Government	500
Cooper Tools, Sumter Operation	Tools Manufacturer*	495
Wal-Mart	Retail	475
Central Carolina Technical College	Public Higher Education	413
Security Management of SC	Personal Services	389
Bosch Braking Systems	Auto Parts Manufacturer*	350
SC Dept. of Disabilities & Special Needs	State Social Service Agency	300
SAFE Federal Credit Union	Credit Union	267
Color-Fi, Inc.	Plastics Manufacturer*	230
Caterpillar, Inc.-Precision Pins	Equipment Parts Manufacturer*	217
Interlake Material Handling	Steel Shelving Manufacturer*	212

Source: Sumter South Carolina Development Board, 2006
* indicates Manufacturers

Table 3-3. Unemployment Rate, Sumter MSA, 2006

County/State	Unemployment Rate (percent)		
	Sept. 2006	Aug. 2006	Sept. 2005
Sumter County	8.0	8.3	9.1
South Carolina	6.4	6.5	7.0
United States	4.6	4.7	5.1

Source: SC Employment Security Commission, Labor Market Information, Sept. 2006

EARNINGS AND INCOME

In 1999, total earnings in the ROI totaled over $1.4 billion. Industries that contributed the most toward job earnings included government enterprises, manufacturing, services, and retail trade. The same year in South Carolina, total earnings amounted to $63.7 billion. Average earning per job in the ROI amounted to $25,896 while per capita income was $18,238 (USDCESA, 2000). The government remains as the largest generator of earnings for Sumter County followed by manufacturing and health care and social assistance. Nearly 60 percent of those earnings from the government sector are attributed to the military.

Shaw AFB has been a strong component of the economy since it was established in 1941 (Table 3-4). The base and nearby air-to-ground range comprises nearly 16,000 acres. The annual economic impact of Shaw AFB for FY05 to the local economy exceeds $446 million annually (Shaw AFB, 2005). The total annual payroll associated with Shaw AFB is $285 million while another $67 million value is generated from the number of indirect jobs created. The total annual expenditures for construction, services, and supplies equal $93 million (Shaw AFB, 2005).

Table 3-4. Earnings by Industry (in thousands), Sumter County, South Carolina, 2001-2004

Industry	2001	2002	2003	2004
Farm earnings	$13,315	$2,759	$12,804	$17,195
Non-farm earnings	1,629,570	1,732,598	1,811,927	1,911,979
Private earnings	1,074,969	1,093,777	1,140,757	1,215,590
Forestry, fishing, related activities, and other 7/	(D)	(D)	(D)	(D)
Mining	(D)	(D)	(D)	(D)
Utilities	7,640	8,137	8,839	9,861
Construction	116,951	110,594	111,422	122,322
Manufacturing	378,892	379,607	392,211	412,949
Durable goods manufacturing	239,382	238,465	251,227	273,406
Nondurable goods manufacturing	139,510	141,142	140,984	139,543
Wholesale trade	30,239	32,625	30,463	36,295
Retail trade	112,793	112,063	115,646	118,651
Transportation and warehousing	26,970	30,298	33,790	38,765
Information	16,684	16,982	16,599	16,700
Finance and insurance	44,533	49,285	54,708	56,948
Real estate and rental and leasing	11,125	11,721	12,602	13,832
Professional and technical services	32,902	32,615	34,805	40,838
Management of companies and enterprises	10,557	12,512	13,525	15,414
Administrative and waste services	28,801	30,752	38,189	41,627
Educational services	15,110	16,052	17,058	17,938
Health care and social assistance	140,139	144,359	148,074	155,083
Arts, entertainment, and recreation	6,417	6,643	6,952	6,234
Accommodation and food services	33,044	34,838	34,156	37,077
Other services, except public administration	50,605	53,592	60,529	63,458
Government and government enterprises	554,601	638,821	671,170	696,389
Federal, civilian	52,847	57,232	58,578	61,454
Military	288,310	369,998	405,368	422,586
State and local	213,444	211,591	207,224	212,349

Source: U.S. Bureau of Economic Analysis, 2006
(D)- not shown to avoid disclosure of confidential information, but included in totals

Per capita personal income in Sumter County increased by nearly 14 percent between 2001 and 2004 while the State of South Carolina experienced slower growth with approximately 9 percent

growth over the same period (Table 3-5). Although, Sumter County has experienced greater growth it continues to lag behind the states average.

Table 3-5. Per Capita Personal Income, Sumter, SC

State/County	Per capita personal income (dollars)			
	2001	2002	2003	2004
Sumter County	20,841	21,714	22,437	23,732
South Carolina	24,994	25,361	25,972	27,185

Source: U.S. Bureau of Economic Analysis, 2006

POPULATION

In 2000, more than half (62.1 percent) of the population lived inside the urbanized areas while the remainder (37.9 percent) lived in rural areas. The median age in 2000 of the population in Sumter County was 33.4. Statewide the median age was 35.4

The population of Sumter County in 2005 reached 105,517 making it the 15th largest county in South Carolina. Over the past five years the average annual population growth in Sumter County has totaled 175 persons (Table 3-6). South Carolina was ranked as the 25th most populated state in 2005.

The military population at Shaw AFB is composed of approximately 5,600 military personnel, and 1,038 civilian employees.

Table 3-6. Population, Sumter County

	2005	2000	1990	Percent Change (1990-2000)	Percent Change (2000-2005)
Sumter County	105,517	104,646	102,637	0.02	0.01
South Carolina	4,255,083	4,013,012	3,486,703	0.15	0.06
United States	296,410,404	281,421,906	248,709,873	0.13	0.05

Source: U.S. Census Bureau, 2006

HOUSING

Most development in the city of Sumter is on the west end, near Shaw AFB (Dondero, 2005). For the first four months of last year, Sumter County issued 139 new single-family building permits and 146 new manufactured home sitings, and zero multi-family permits. In comparison, the city of Sumter issued 70 new single-family building permits, 13 new manufactured home sitings and 21 multi-family permits during the same period (Dondero, 2005).

Sumter is approximately 20 miles from Columbia, the capital of South Carolina. In Columbia, the occupancy rate averaged between 90 and 92 percent between 2000 and 2005. Forecasts suggest that the occupancy rate in Columbia should increase due to the increase in employment numbers along with a moderate amount of new construction (Apartment Index, 2005). However, the occupancy rate is predicted to remain in the lower 90th percentile. In Sumter County, the occupancy rate has decreased from 90 percent in 2000 to 88 percent in 2005 (Table 3-7). Projections for 2010 suggest that the number of homes will reach 45,688 with an even lower occupancy rate of approximately 85 percent (Sumter County Executive Summary, 2006).

Table 3-7. Occupied and Vacant Housing Units

County/State	Housing Units		Occupied Housing Units		Vacant Housing Units	
	2000	2005	2000	2005	2000	2005
Sumter County	41,751	43,977	37,728	39,002	4,023	4,975
South Carolina	1,753,670	1,927,864	1,533,854	1,635,907	219,816	291,957

Source: U.S. Census Bureau, 2006

Nationally, the number of vacant houses eased in December 2006 indicating that the market is stabilizing. The national trend toward a more stable market should alleviate concerns and build consumer confidence. The national median existing home price, for all housing types was $220,000 in September 2006, while the national median existing single family home price was slightly less at $219,800 (Realty Times Market Conditions, 2006). The average home in the Shaw AFB-Sumter market sells for $100,000 and is typically a single family, one-story home made of brick. The Sumter Metropolitan Statistical Area (MSA) features one of the lowest housing costs of any MSA in the State of South Carolina. Overall, the median price for a house in the South was down 1.6 percent from last year, reaching $184,000. The South experienced higher prices than the Midwest with median prices of $169,000 but lower prices than the West and Northeast with median house prices at $332,000 and $259,000, respectively (Realty Times Market Conditions, 2006)

SCHOOLS

There are two school districts located in Sumter County, SC including School District #2 and School District #17. In Sumter County during 2003-2004 there were 27 public schools grades K-12 with 18,292 students enrolled and 11 private schools with 1,868 students enrolled. Currently there are 22 schools in the city of Sumter with 16,753 students and 1,066 teachers for a student-teacher ratio of 15 (Table 3-8). The student/teacher ration is down from 23:1 and 21:1 for Districts #2 and #17, respectively, since 2004 while enrollment in public schools in Sumter County is up from 17,840 this same year (Sumter South Carolina Development Board, 2005). Scholastic Aptitude Test (SAT) scores in Districts #2 and #17 in 2005 were below the state average score of 993 with averages of 890 and 978, respectively. SAT scores are down from 2004 averages of 939 for District #2 and up from 971 for District #17.

Table 3-8. School Information, Sumter and South Carolina, 2006

	City of Sumter	South Carolina
Number of Schools	22	1,151
Number of Students	16,753	692,956
Number of Teachers	1,066	45,793
Student/Teacher Ratio	15	14.6
Number of Males	5,829	353,347
Number of Females	8,217	336,277

Source: South Carolina Local School Directory, 2006

Forty seven percent of residents age 25 or older has a high school or higher degree. There are three higher education institutes in Sumter County including the University of South Carolina, which is less than an hour away in Columbia. There are also 15 other colleges and universities in the Central South Carolina Region.

Total revenues for School District #17 for the school year 2003–2004 were $72,811,616 (Table 3-9). The general fund accounts for approximately 54 percent of all district revenues which comes from the state legislature and local property taxes. The tax base for School District #17 has increased substantially between 2000 and 2005 by 15.4 percent. The two major goals for the district include improving academic achievement and improving employee compensation (Sumter County School District #17 Comprehensive Annual Financial Report, 2005). Currently, Sumter County Schools District #2 and #17 offer one of the lowest starting salaries in the state of South Carolina.

Expenses for both districts exceeded revenues in 2005. School District #17 attributes the expenses to the increased construction of new facilities. Overall, the financial condition of the districts remains strong.

Table 3-9. School District Revenues and Expenses, 2005

	School District #2	School District #17
Total Revenue	$82,854,696	$77,023,836
State	38,599,209	37,961,061
Local	21,391,829	21,931,168
Federal	11,780,664	11,364,001
Other	10,951,001	5,561,759
Total Expenses	$83,065,892	$79,968,365

Source: South Carolina Department of Education, 2005

Table 3-10. Number of Schools and Total Enrollment in South Carolina Public and Private Schools

School Year	Public Schools			Private Schools		
	Number	Enrollment	% Change (Enrollment)	Number	Enrollment	% Change (Enrollment)
1992-93	1,086	644,358	0.6	393	41,528	-4.3
1993-94	1,076	647,475	0.5	352	41,981	1.1
1994-95	1,074	652,528	0.8	382	45,957	9.5
1995-96	1,074	648,677	-0.6	380	46,768	1.8
1996-97	1,071	656,011	1.1	387	49,453	5.7
1997-98	1,074	662,856	1.0	393	52,484	6.1
1998-99	1,081	666,305	0.5	381	51,513	-1.9
1999-00	1,088	659,572	-1.0	376	53,174	3.2
2000-01	1,091	660,070	0.1	372	54,357	2.2
2001-02	1,094	669,393	1.4	365	53,612	-1.4
2002-03	1,106	671,666	0.3	372	53,414	-0.4
2003-04	1,119	676,282	0.7	367	52,724	-1.3

Source: South Carolina Department of Education, Office of Research, 2004

ENVIRONMENTAL JUSTICE

Disadvantaged groups within the ROI, including low-income and minority communities, are specifically considered in order to assess the potential for disproportionate occurrence of impacts. Based on 2000 Census data, the incidence of persons and families in the ROI with incomes below the poverty level was comparable to state levels (U.S. Bureau of the Census, 2000). In the ROI during 2000, 19.7 percent of persons and 26.9 percent of children were living below the poverty level, compared to 14.9 percent of persons and 23.0 percent of children in the state of South Carolina as a whole.

Minority persons represent just over half the ROI population (50.6 percent). Black or African-American persons account for almost all of the minority population in the ROI, representing 46.7 percent of the county population of 104,646 persons (or 92 percent of the minority population). By comparison, 33.9 percent of the state population is represented by minority persons (U.S. Bureau of the Census, 2000).

The youth population, those individuals age 18 and younger, accounts for 28.1 percent of the ROI population, compared to 25.2 percent at the state level. The senior population, those individuals age 65 and older, accounts for 11.2 percent of the ROI and 12.1 percent of the state population (U.S. Bureau of the Census, 2000).

3.4 CULTURAL RESOURCES

3.4.1 Definition of the Resource

The existing cultural resources at Shaw AFB include historic and prehistoric sites, structures, districts, artifacts, or any other physical evidence of human activities considered important to a culture or community for traditional, religious, scientific, or other reasons. The ROI for cultural resources includes Shaw AFB but does not include Poinsett Electronic Combat Range (ECR). The area of focus within the ROI is the project locations. Section 106 of the NHPA of 1966, as amended, requires federal agencies to take into account the effects of their actions on historic properties, and requires archaeological surveys prior to surface disturbing activities in areas not previously surveyed. The agencies must allow the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment on any Federal undertakings affecting cultural resources. The Section 106 process is part of the Air Force's EIAP, a program that implements NEPA (Air Force, 2004b and 2006b). Shaw AFB does not have a Memorandum of Agreement with the State Historic Preservation Officer (SHPO); it is done on a case-by-case basis. In the event that a project results in an adverse impact to cultural resources, during the Section 106 process a Memorandum of Agreement is drafted to resolve the adverse effects and the agreement document contains a mitigation plan. The plan addresses how the adverse effects caused by the undertaking will be lessened (Air Force, 2006b).

Section 110 of the NHPA requires that federal agencies assume responsibility for identifying, evaluating, nominating, and protecting historic properties under their control. Historic properties are cultural resources that are listed in, or eligible for listing in, the National Register of Historic Places (NRHP). Impacts to cultural resources may be considered adverse if the resources have been determined eligible for listing in the NRHP or have significance for Native American groups.

3.4.2 Existing Conditions

ARCHITECTURAL RESOURCES

Two studies have been completed on Shaw's Cold War era resources (1946–1989). One study performed a reconnaissance survey of 127 resource types built between 1945 and 1989. One resource, a documentary collection, was selected for documentation and evaluation. A second study, part of the Department of Defense's (DoD's) Legacy Demonstration Project, sought to establish historic contexts for Cold War era resources on DoD facilities throughout South Carolina. Neither study fulfills Section 110 requirements, but they do lay the groundwork for future evaluations of Cold War era resources at Shaw (Air Force, 2006b).

The last evaluation of architectural resources was conducted in 1996. Resources that have attained 50-year-old status since that time require evaluation in order for Shaw AFB to satisfy its Section 110 of the NHPA requirement. ACC is presently assisting Shaw AFB with completing a Cold War architecture inventory to comply with Section 110 of the NHPA. The Air

Force considers buildings constructed between 1946–1989 as Cold War era structures (Air Force, 2006b).

There is one architectural site (Hangar B611) that is eligible for listing on the NRHP. This structure is located along the southwestern edge of the flightline. Hangar B611 was built in 1942 and is historically significant as an important example of a form of industrial construction that occurred during World War II (Air Force, 2004b, 2005a, and 2005c). Additionally, by the end of FY07 there will be approximately 45 buildings and structures that will be at least 50 years old (Air Force, 2006b).

ARCHAEOLOGICAL RESOURCES

The first large-scale archaeological investigation within the project area occurred in the early 1980s and intensified in the 1990s. To date, 147 sites have been identified on Shaw AFB and Poinsett ECR. A total of 18 cultural resource management studies and reports have been produced as a result of the work that has been done at Shaw AFB. The reports are stored in the office of the CRM at Shaw AFB in the Environmental Flight Office. Additional copies are on file with the South Carolina Institute of Archaeology and Anthropology (SCIAA) (Air Force, 2006b).

Currently, there is one site on Shaw AFB, 38SU299 (FS-1), which is potentially eligible for listing on the NRHP. This site is not located within the project area (Johnson, 2007).

TRADITIONAL RESOURCES

Traditional resources are identified by Native American tribes or other groups and include properties of religious or cultural importance to an Indian tribe or native Hawaiian organization (Air Force, 2004b). No formal surveys for Traditional Cultural Resources (TCR) or sacred sites have been conducted, nor have any tribes come forward and notified Shaw AFB of the presence of such sites (Air Force, 2006b). The federally recognized tribe nearest to Shaw AFB is the Catawba Indian Nation, near Rock Hill, SC (Air Force, 2005a).

3.5 BIOLOGICAL RESOURCES

3.5.1 Definition of the Resource

The existing biological resources at Shaw AFB include terrestrial and aquatic communities, including wetlands, as well as individual flora and fauna species, of which some are locally, regionally, and/or nationally rare. The ROI includes Shaw AFB, but not Poinsett ECR, with a focus on the proposed project areas. The following sections describe these biological resources as a baseline to understanding the potential impacts to each by the proposed action. Detailed information on the installation's biological resources is available in the Integrated Natural Resources Management Plan (INRMP) (Air Force, 2001).

3.5.2 Existing Conditions

TERRESTRIAL COMMUNITIES

Shaw AFB is located within the Southeastern Mixed Forest Province, also known as the Middle Atlantic Coastal Forest. The original forested areas were cleared in the 1940s when the base was commissioned. Because of subsequent extensive disturbance, few natural communities remain on the installation. Consequently, the base is now dominated by a disturbed/urbanized community (84 percent), while pine plantation (13 percent) and oak/hickory forest (less than one percent) account for the remaining terrestrial communities (Air Force, 2004b and 2005a). Further discussion of these terrestrial communities follows.

Disturbed/Urbanized. Aside from structures and pavement, improved and semi-improved landscaped areas include mowed lawn and field areas, as well as horticultural trees and shrubs (Air Force, 2004b). Wildlife adapted to such modified lands is rather limited, and typically includes species such as mockingbird, northern cardinal, and American robin (Air Force, 2005a).

Pine Plantation. This terrestrial community covers approximately 300 acres within the southeastern corner of the installation. The predominant species is loblolly pine of some 30 years of age. Understory vegetation includes wild plum, hawthorn, blackberry, primrose, and broomsedge (Air Force, 2004b). Wildlife expected to occur within pine forest habitat includes species such as fence lizard, black racer, striped skunk, opossum, white-tailed deer, red-eyed vireo, and Carolina wren (Air Force, 2004b and 2005a).

Oak/Hickory Forest. The oak/hickory forest community is locally restricted to the northern portion of Shaw AFB adjacent to housing. In addition to a dominance of white oak, pignut hickory, and mockernut hickory, other associated woody species include flowering dogwood, sparkleberry, loblolly pine, and winged elm (U.S. Air Force, 2004). Species of wildlife that may inhabit this forest community include gray squirrel, southern flying squirrel, pileated woodpecker, and blue jay (Air Force, 2004b and 2005a).

WETLAND AND FRESHWATER AQUATIC COMMUNITIES

Wetlands are subject to regulatory authority under Section 404 of the Clean Water Act, Executive Order (EO) 11990- *Protection of Wetlands*, and EO 11988- *Floodplain Management*. Jurisdictional wetlands must meet the three wetland criteria as defined in the 1987 U.S. Army Corps of Engineers' (USACE's) *Wetlands Delineation Manual*. Shaw AFB contains approximately 100 acres (slightly more than one percent) of its area as wetland and freshwater aquatic communities. The biological habitats that occur in these communities are small stream forest and ponds, which are described in greater detail below (Air Force, 2004 and 2005a).

Small Stream Forest. Small stream forest wetland occurs along Long Branch where it crosses the northeast corner of the base within the runway approach, and in Mush Swamp in the southwest corner of the base south of U.S. 76/378. At the former location, hydrophytic

(water-loving) species of trees within the wetland includes river birch, sweetgum, water oak, and red maple. At the latter location, dominant canopy trees include laurel-leaf oak, hackberry, red maple, and ash. Understory species in both areas include native species such as wax myrtle, common elderberry, willows, and greenbriar, and non-native invasive species such as Japanese privet and Chinese privet. Wildlife typical of these wetlands include species such as two-toed amphiuma, muskrat, beaver, raccoon, white-tailed deer, wood duck, and various frogs, toads, snakes, and turtles (Air Force, 2004b and 2005a).

Ponds. Pond wetlands occur only as artificial-constructed features within the installation. Each of the four constructed ponds is located within the developed western portion of the base. Two of the ponds occur on the golf course, one is adjacent to the golf course, and the other is behind the chapel. These ponds are managed for recreation (fishing and picnicking) and aesthetics, and their margins are regularly mowed and trimmed of tall vegetation. Shallow areas fringing the ponds often support emergent wetland vegetation that includes species such as meadow beauty, smartweeds, seedbox, bugleweed, nama, and water-spider orchid. Wildlife expected in these open water habitats includes stocked fish such as various sunfish, bullhead catfish, and largemouth bass, and birds such as resident Canada geese, mallards, and kingfishers (Air Force, 2004b).

ENDANGERED, THREATENED, AND SPECIAL CONCERN (ETSC) SPECIES

Section 7 of the federal Endangered Species Act, as amended, requires each federal agency to ensure that "any action authorized, funded, or carried out by such agency… is not likely to jeopardize the continued existence of any endangered species or threatened species or result in the destruction or adverse modification of habitat of such species… unless such agency has been granted an exemption for such action…" Additionally, animals designated by South Carolina as endangered or threatened are granted legal protection by the state. The South Carolina Heritage Trust Database was accessed to produce a list of rare flora and fauna known to occur within Sumter County, and which have the potential to occur on Shaw AFB. Table 3-11 provides information on 27 Endangered, Threatened, and Special Concern (ETSC) species, including their legal status (if any) and habitat typical for each species (Air Force, 2004b).

Federal listed candidate species are not known to occur on Shaw AFB. The only known ETSC species on the installation is the Least Tern, which nests on the flat roof of the Base Exchange building (personal communication, S. Johnson 2006). The Least Tern is listed as threatened in the state, and this breeding colony is the farthest inland breeding colony recorded for South Carolina. This bird preys exclusively on live fish captured by plunge-diving into water bodies. The species prefers to nest along coastal beaches, but has adapted to nesting on flat, graveled rooftops where ideal habitat is overly disturbed (Air Force, 2004b).

Table 3-11. Endangered, Threatened, and Special Concern Species Known in Sumter County, SC

Scientific Name	Common Name	Legal Status	Special Concern Status*	Habitat
Plants				
Aristida condensata	Piedmont three-awned grass	—	SC	sandridges
Carex decomposita	Cypress-knee sedge	—	SC	swamps and lake margins on floating logs
Carya myristiciformis	Nutmeg hickory	—	RC	wet floodplain forests
Chamaedaphne calyculata	Leatherleaf	—	SC	wetlands and bogs
Cyperus lecontei	Leconte's flatsedge	—	SC	sand dune swales; pond margins
Echinodorus parvulus	Dwarf burhead	—	SC	shallow pools and ponds
Echinodorus tenellus	Dwarf burhead	—	SC	shallow pools and ponds
Eleocharis robbinsii	Robbin's spikerush	—	SC	pine savanna ponds
Eupatorium recurvans	Coastal-plain thorough-wort	—	SC	depressions
Lobelia boykinii	Boykin's lobelia	—	SC	cypress ponds; swamp margins
Nestronia umbellata	Nestronia	—	SC	oak-hickory-pine woods; often in transition areas between flatwoods and uplands
Oxypolis canbyi	Canby's dropwort	FE/SE	SC	cypress ponds and sloughs; wet savannas
Rhexia aristosa	Awned meadow-beauty	—	SC	pond margins and wet savannas
Rhexia cubensis	West Indian meadow-beauty	—	SC	wet savannas including cutthroat seeps, flatwoods, and bogs
Rhynchospora scirpoides	Long-beaked baldrush	—	SC	floating mats in ponds; pond margins
Ruellia caroliniensis	Wild petunia	—	SC	woods and wood margins
Sagittaria isoetiformis	Slender arrow-head	—	SC	sandy ponds and bogs
Schwalbea americana	Chaffseed	FE/SE	—	pond margins and wet savannas; land ridge forest
Scleria baldwinii	Baldwin's nutrush	—	SC	wetlands
Amphibians				
Acris crepitans crepitans	Northern cricket frog	—	SC	margins of shallow ponds or marshy areas
Reptiles				
Micrurus fulvius	Eastern coral snake	—	SC	hardwood forest; pine flatwoods; marshes

Table 3-11. Endangered, Threatened, and Special Concern Species Known in Sumter County, SC, Cont.

Scientific Name	Common Name	Legal Status	Special Concern Status*	Habitat
Mammals				
Corynorhinus rafinesquii	Rafinesque's big-eared bat	SE	—	pine and hardwood forest; caves; abandoned buildings
Ursus americanus	Black bear	—	SC	large undeveloped wooded tracts
Birds				
Haliaeetus leucocephalus	Bald eagle	FT/SE	—	edges of lakes and large rivers; seacoasts
Ictinia mississippiensis	Mississippi kite	—	SC	woodlands and brushy areas; near water
Picoides borealis	Red-cockaded woodpecker	FE/SE	—	open pine woods; pine savannas
Sterna antillarum	Least tern	ST	—	sandy beaches; sandbars

FE= Federal Endangered; FT= Federal Threatened; SE= State Endangered; ST= State Threatened (animals only); SC= Of Special Concern; RC= Of Regional Concern (plants only).

* The status designations in this column do not confer legal protection; these species of are special concern in the state because their populations may be declining.

— No status designation

Source: South Carolina Heritage Trust website accessed October 19, 2006; data last updated 1/17/2006; [http://www.dnr.sc.gov/pls/heritage/county_species.list?pcounty=sumter] Habitat descriptions obtained from various sources [Table 3-1 adapted from Air Force, 2004b].

3.6 WATER RESOURCES

3.6.1 Definition of the Resource

Water resources include surface waters and groundwater features, stormwater runoff, and floodplains. Surface waters on Shaw AFB include ponds, streams, and other wetlands. Groundwater underlying the base is utilized as a source of potable water and was addressed in Section 3.2.2.2 as a water supply. The ROI for this resource is Shaw AFB.

3.6.2 Existing Conditions

SURFACE WATER

Shaw AFB is located within the Southern Coastal Plain physiographic region of South Carolina. Spann Branch and Long Branch Creeks are the major naturally occurring surface water features on Shaw AFB. Spann Branch flows along the northern boundary of the base into Long Branch. Long Branch runs along the northeast edge of the base, into Booth's Pond, Sawmill Pond and then into Mush Swamp. From there, the creeks become part of the headwaters of the Pocotaligo

Swamp, which flows into the Black River, which make its way to the Atlantic Ocean near Georgetown, SC (Air Force, 2004a).

Surface water features within the base consist primarily of canals and ditches associated with runways and taxiways. These ditches were created for the purpose of removing storm water runoff from airfield areas. The base also maintains four artificial impoundments: Chapel Pond, Memorial Lake, No. 1 Hole Golf Course Pond and No. 8 Hole Golf Course Pond. These ponds are maintained for fishing, picnicking, and aesthetic value.

Storm water runoff from the base is regulated by the SCDHEC NPDES permit program. Under the base NPDES permit, storm water is discharged through six permitted storm water outfalls. The majority of the area east of the runway discharges through outfall 004 to Long Branch Creek. The drainage area to outfall 004 consists of approximately 1,230 acres. Approximately 200 acres consisting of runways, roads, and areas of industrial activity are impervious, while the remaining 1,030 acres are undeveloped (Air Force, 2004a).

Surface Water Quality

Surface water resources water quality may be impacted by point and non-point sources of pollutants. Water bodies are classified by the state based on their water quality, and discharges that can affect water quality are regulated through permits.

The Pocotaligo River and its tributaries, including Long Branch, have been designated by South Carolina as Freshwaters, indicating that they are suitable for secondary contact recreation, drinking water supply after conventional treatment, fishing, and the survival and propagation of a balanced indigenous aquatic community of flora and fauna (Air Force, 2004b). No waters are classified as Outstanding Resources Waters (ORW) within one mile of Shaw AFB. Also, Shaw AFB does not have water bodies on or in the immediate vicinity listed on South Carolina's Section 303(d) List of impaired water bodies (Air Force, 2004b).

Unlike pollution from industrial and sewage treatment sources, non-point source (NPS) pollution comes from many non-discrete sources. As rainfall runs off the land and manmade structures, natural and man-made pollutants are picked up, transported, and ultimately deposited into lakes, rivers, wetlands, coastal waters, and groundwater. These pollutants may have harmful effects on water quality, adversely affecting drinking water supplies, recreation, wildlife, and fisheries. Potential NPS pollution at Shaw AFB originates from fertilizers, herbicides, and insecticides used in landscaped and developed areas; hydrocarbon and chemical runoff from parking lots, roadways, and the flight line; and sediment runoff from construction sites and land clearing.

GROUNDWATER

Three aquifer systems are located under Shaw AFB. They consist of the Middendorf Aquifer, Black Creek Aquifer, and the shallow aquifer system, which includes the Lang Syne Formation and the Duplin Formation.

The Middendorf (Tuscaloosa) Aquifer is the most productive of the aquifer systems in the western portion of Sumter County. The aquifer is approximately 250 feet thick and is encountered at about –50 feet mean sea level (MSL) in the Shaw AFB area. The Middendorf Aquifer is confined by a 15- to 75-foot thick clay layer located at the base of the Black Creek Formation (U.S. Air Force, 2004a).

The six water supply wells currently operating at Shaw AFB are screened in the Black Creek Aquifer. The Black Creek Aquifer is separated into upper and lower portions by a confining layer. The upper aquifer is approximately 50 to 70 feet thick while the lower aquifer ranges from 75 to 105 feet thick. Wells completed in the Black Creek Aquifer are capable of yielding up to 750 gpm (Air Force, 2004a).

The Lang Syne Formation of the Black Mingo Group and the Duplin Formation make up the shallow aquifer system in the Shaw AFB area. The Lang Syne Aquifer is located in the northwestern portion of Shaw AFB, northwest of the Orangeburg Scarp, while the Duplin Aquifer is present southeast of the scarp. The two aquifers are not hydraulically connected due to the presence of the fine-grained Sawdust Landing Formation, considered an aquitard, underneath the Lang Syne Aquifer (Air Force, 2004a).

3.7 AIR QUALITY

3.7.1 Definition of the Resource

Identifying the affected area for an air quality assessment requires knowledge of sources of air emissions, pollutant types, emission rates and release parameters, proximity to other emissions sources and local conditions. Refer to Appendix B, Air Quality, for review of air quality and associated methodologies used for emissions calculations.

3.7.2 Existing Conditions

BASELINE AIR QUALITY

Air quality is determined by the type and amount of pollutants emitted into the atmosphere, the size and topography of the air basin and the prevailing meteorological conditions. The levels of pollutants are generally expressed on a concentration basis in units of part per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). For this air quality analysis, the ROI centers on Sumter County for both the proposed action and alternative sites located on Shaw AFB.

The baseline standards for pollutant concentrations are the National Ambient Air Quality Standards (NAAQS) and state air quality standards. These standards represent the maximum allowable atmospheric concentration that may occur and still protect public health and welfare. Further discussion of the NAAQS and state air quality standards are included in Appendix B.

For analysis purposes, the emissions from the proposed action will be compared to the Sumter County emissions obtained from the USEPA's 2002 National Emissions Inventory (NEI), which are presented in Table 3-12, Baseline Emissions Inventory for Sumter County, SC. The county data includes emissions data from point sources, area sources, and mobile sources. *Point sources* are stationary sources that can be identified by name and location. *Area sources* are point sources whose emissions are too small to track individually, such as a home or small office building or a diffuse stationary source, such as wildfires or agricultural tilling. *Mobile sources* are any kind of vehicle or equipment with gasoline or diesel engine, an airplane, or a ship. Two types of mobile sources are considered: on-road and non-road. *On-road* sources consist of vehicles such as cars, light trucks, heavy trucks, buses, engines, and motorcycles. *Non-road* sources are aircraft, locomotives, diesel and gasoline boats and ships, personal watercraft, lawn and garden equipment, agricultural and construction equipment, and recreational vehicles (USEPA, 2005).

Table 3-12. Baseline Emissions Inventory for Sumter County, SC

	Emissions (tons/year)				
Source Type	**CO**	**NO_x**	**PM_{10}**	**SO_2**	**VOC**
Area Source	4,301	553	14,974	726	4,875
Non-Road Mobile	6,015	665	7,433	53	504
On-Road Mobile	23,443	2,786	7,508	104	1,840
Point Source	127	271	114	0	0
Total	*33,886*	*4,275*	*30,030*	*884*	*7,219*

CO = Carbon Monoxide NO_x = Nitrogen Oxide; PM_{10} = Particulate Matter with Diameter Less Than or Equal To 10 Microns; SO_2 = Sulfur Dioxide; VOC = Volatile Organic Compound
Source: USEPA, 2002

Shaw AFB 2005 Annual Air Emissions Report summarizes the emissions generated from all point sources located on the installation. The CY05 emissions are summarized in Table 3-13.

Table 3-13. CY05 Air Emissions Inventory, Shaw AFB

Emissions (tons/ year)					
CO	**NO_x**	**HAPs**	**PM_{10}**	**SO_2**	**VOC**
18.856	24.402	0.505	2.266	1.056	9.274

HAPs = Hazardous Air Pollutants
Source: Air Force, 2006

REGULATORY SETTING

The Federal Clean Air Act of 1963 and its subsequent amendments establish air quality regulations and the NAAQS and delegate the enforcement of these standards to the states. The SCDHEC enforces air pollution regulations and sets guidelines to attain and maintain the national and state ambient air quality standards within the state of South Carolina. For nonattainment regions, states are required to establish a State Implementation Plan (SIP) that is designed to reduce emissions to a level that will bring the regions into compliance with the NAAQS by specific deadlines. Control measures proposed in the SIP and adopted by the SCDHEC are incorporated into the SCDHEC *Regulation 61-62 – Air Pollution Control Regulations And Standards* (SCDHEC 2003).

The USEPA recently implemented the new eight-hour O_3 and 24-hour and annual $PM_{2.5}$ national standards (see Air Quality, Appendix B). An area will attain this standard if its three-year running average of the annual fourth-highest daily maximum eight-hour O_3 concentration remains below 0.085 ppm. The USEPA will not revoke implementation of the one-hour O_3 standard in a given area until that area achieves this standard. Otherwise, as is the case for South Carolina, implementation of the eight-hour standard will replace the existing one-hour standard. In South Carolina, 18 of 23 O_3 monitors, particularly those in the more populated urban areas, regularly exceed the 8-hour O_3 standard (SCDHEC, 2004). Upon final designation of these nonattainment areas, the SCDHEC will have to submit a plan to the USEPA that demonstrates how they will bring the areas into attainment of the 8-hour O_3 standard. Sumter County and Shaw AFB are located in an air quality attainment district (Environmental Quality Control Region 4).

3.8 HAZARDOUS MATERIALS AND HAZARDOUS WASTE

3.8.1 Definition of the Resource

Hazardous materials are identified and regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA); the Occupational Safety and Health Administration (OSHA); and the Emergency Planning and Community Right-to-Know Act (EPCRA). Hazardous materials have been defined in AFI 32-7086, *Hazardous Materials Management*, to include any substance with special characteristics that could harm people, plants, or animals.

Hazardous waste is defined in the Resource Conservation and Recovery Act (RCRA) as any solid, liquid, contained gaseous or semisolid waste, or any combination of wastes that could or do pose a substantial hazard to human health or the environment. Waste may be classified as hazardous because of its toxicity, reactivity, ignitibility, or corrosivity. In addition, certain types of waste are "listed" or identified as hazardous in 40 CFR Part 263. The ROI for hazardous materials and waste management is Shaw AFB.

3.8.2 Existing Conditions

HAZARDOUS MATERIALS

The majority of hazardous materials used by Air Force and contractor personnel at Shaw AFB are controlled through an Air Force pollution prevention process called Hazardous Material Management Process (HMMP). This process provides centralized management of the procurement, handling, storage, and issuing of hazardous materials and turn-in, recovery, reuse, or recycling of hazardous materials. The HMMP includes review and approval by Air Force personnel to ensure users are aware of exposure and safety risks.

HAZARDOUS WASTE

The Shaw AFB *Hazardous Waste Management Plan,* dated 1 August 2001, governs the Shaw AFB Hazardous Waste Management Program. The plan sets forth specific procedures for handling hazardous wastes. Shaw AFB is a large-quantity hazardous waste generator. Hazardous wastes generated during operations and maintenance activities include solvents, metal-contaminated spent acids, and sludge from wash racks. Shaw AFB recycles all lubricating fluids, batteries, oil filters, and shop rags. During 2006 approximately 34,320 pounds of hazardous wastes were generated and removed from the base in accordance with state and federal regulations (personal communication, J. Johnson, 2007).

Environmental Restoration Program (ERP)

The DoD developed the ERP to identify, investigate, and remediate potentially hazardous material disposal sites that existed on DoD property prior to 1984. The *Shaw Air Force Base Environmental Restoration Program Site Status Summaries dated December 2005* (Air Force, 2005b) summarizes the current status of the base environmental programs and presents a comprehensive strategy for implementing actions necessary to protect human health and the environment. This strategy integrates activities under the ERP and the associated environmental compliance programs that support full restoration of the base.

ACC policy requires that any proposed project on or near a Shaw AFB ERP site be coordinated through the Shaw ERP Manager. The alignment of the proposed action would have the potential to be on or near ERP sites WP-12, FT-07, FT-06 SD-29 and SS-35.

ERP Site WP-12 is the Land Spreading Sludge Area located along the southern edge of the Base (see Figure 3-4). Between 1976 and May 1992, approximately 280 tons of dried and liquid sludge were disposed of at this site annually. Use of this site was discontinued in May 1992. Soil and composite sludge samples indicated concentrations of contaminants within the typical background concentrations. Soils underlying the sludge throughout the area contained no detectable amounts of contaminants, therefore, no groundwater contamination was evident and no monitoring wells were installed during this investigation. A Decision Document (DD) recommending no further investigation/no further action at the site was submitted in March

1993 and was approved by the EPA on March 24, 1993, and by SCDHEC in July 1995. The site was closed and included in the July 9, 1999 RCRA permit update.

ERP Site FT-07 is the former Fire Training Area No. 2 located approximately 1,600 feet east of the main runway near the southeast corner of the current munitions unload pad (see Figure 3-4). Fire training operations were conducted at this site from 1970 to 1981. The only flammable material used at this site is thought to be JP-04. Low concentrations of ethyl benzene, xylenes, 2-methylnaphthalene, TCE, and/or styrene were detected during the remedial investigation in the soil samples collected from the center of the former fire training pit. No contaminant plume was delineated at this site. The RCRA permit modification for the site was completed July 8, 1999. This site is closed with no further action required.

ERP Site FT-06 is the former Fire Training Area No. 3 located in a clearing 3,000 feet east of the runway and 1,200 feet south of the ammunition storage area (see Figure 3-4). Fire training operations were conducted at this site from 1981 to 1989. Prior to training exercises, the surface of the earthen pit was sprayed with water to retard seepage of oil into the ground. Screening and remedial investigation was conducted and no significant volatile organic compound contamination was detected. The site monitoring well was purged and sampled on two separate occasions. None of the samples detected concentrations of contaminants. The RCRA permit modification for the site was completed on July 9, 1991. This site is closed with no further action required.

ERP Site SD-29 site is located between Building 1200 and Building 708, west of the flight line and parking apron. Two releases of JP-4 at SD-29 are known to have occurred. A passive interim remedial action system was installed in March 1995 to recover the free- phase JP-4. The system has since been shut down after more than 6 million gallons of groundwater had been extracted and treated. SCDHEC approved the discontinuation of active product recovery, while continuing the use of passive bailers for product recovery on March 1, 2004.

ERP Site SS-35 is located near Buildings 1205 and 1200 along the flight line. The site was separated from SD-29 by the ERP site designation SS-35, SWMU No. AOC-H, OU-2D, since it is associated with TCE contamination in the OU-2B site. The Remedial Investigation/RCRA Facility Investigation delineated chlorinated solvents in both the upper and lower portions of the Duplin Aquifer, as well as the Upper Black Creek Aquifer. The Air Force has proposed injection of potassium permanganate into shallow aquifer hot spot/source area; continue hydraulic containment in Upper Black Creek Aquifer with ground water treatment at the OT-16B facility; develop an optimized Long Term Monitoring program (install more wells), which will be included in a Corrective Measures Study, Statement of Basis Corrective Measures and Implementation Work Plan.

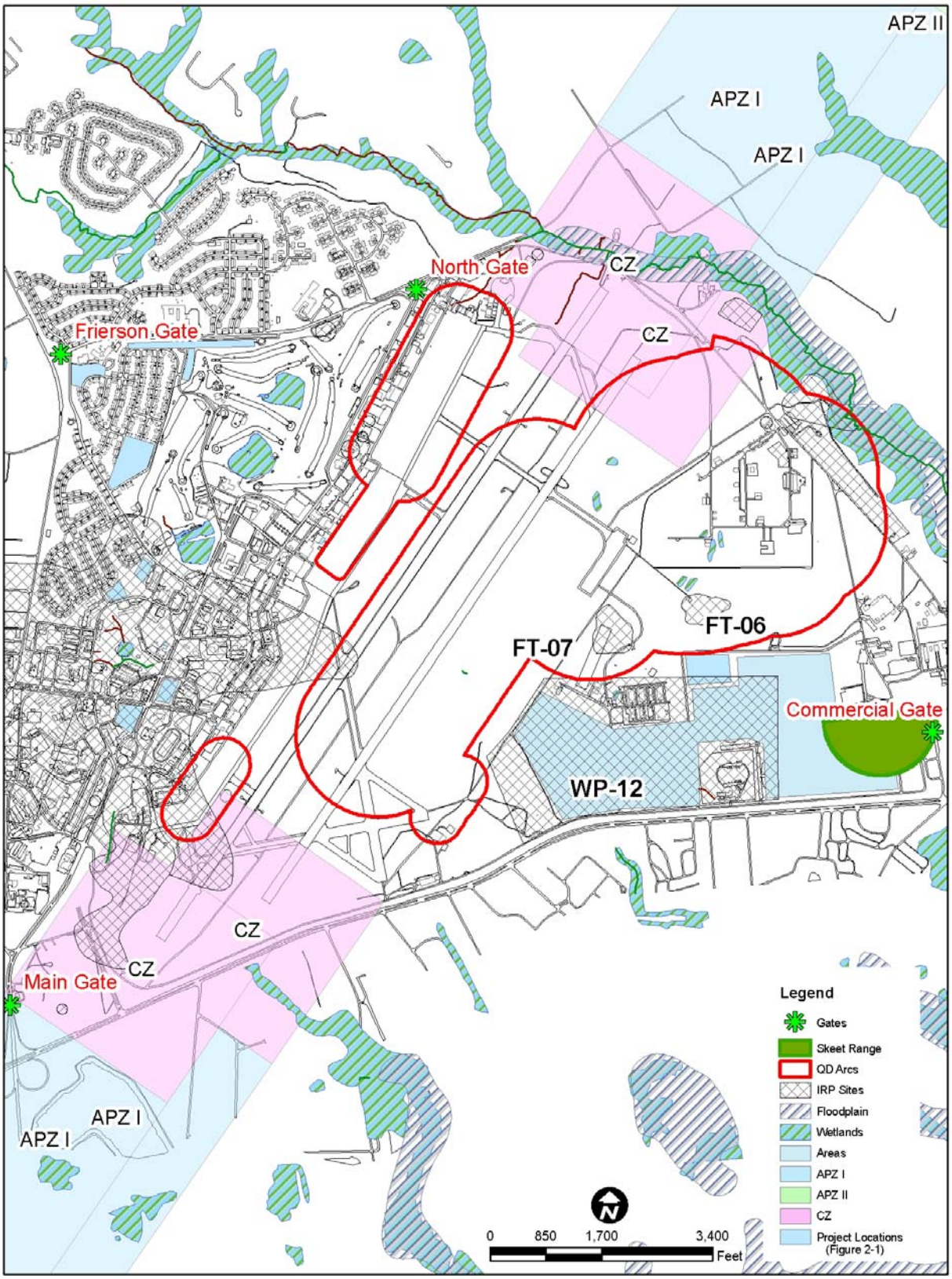

Figure 3-4. Environmental and Safety Constraints

3.9 SAFETY

3.9.1 Definition of the Resource

Ground and flight safety involving aviation operations conducted by the 20th FW are addressed in this section. Because of the proposal to construct within portions of the airfield environment, the focus of this section is on safety-of-flight issues associated with airfield operations. Within the *ground safety* section, issues involving operations and maintenance activities that support operation of the airfield are addressed. Also considered in this section is the safety of personnel and facilities on the ground that may be placed at risk from flight operations. Within the *flight safety* section, aircraft flight risks and safety issues associated with the conduct of aviation activities at the installation are addressed.

Although ground and flight safety are addressed independently, it should be noted that, in the immediate vicinity of the runway, risks associated with safety-of-flight issues are interrelated with ground safety concerns. Any aircraft accident at the airfield would have direct impacts on the ground in the immediate vicinity of the mishap as a result of explosion, fire, and debris spread. The ROI for safety in this EA includes Shaw AFB.

3.9.2 Existing Conditions

GROUND SAFETY

Ground safety includes safety as it pertains to construction and demolition, airfield operations and potential accident zones as well as force protection.

Air Force day-to-day operations and maintenance activities completed by the 20th FW and their tenants in the use and operation of the airfield are performed in accordance with applicable Air Force and ACC safety regulations, published Air Force Technical Orders, and standards prescribed by Air Force Occupational Safety and Health (AFOSH) requirements.

Clear Zones (CZs) and Accident Potential Zones (APZs) are surface areas, described geographically on the ground. Specific dimensions, geophysical and topographic standards, and approved land uses are discussed in detail in *Unified Facilities Criteria* (*UFC) 3-260-01, Airfield and Heliport Planning and Design*; *AFI 32-7063;* and *Air Force Handbook (AFH) 32-7084*. The Air Force has conducted several studies over many years assessing aircraft accidents occurring in the vicinity of airfields to support the definition of CZs and APZs. The studies show that approximately 27 percent of the accidents occurred on, or within an area 1,000 feet on either side of the runway; approximately 29 percent occurred within 3,000 feet from the end of the runway and 1,500 feet on either side of the extended runway centerline. Extending the 3,000-foot wide region another 5,000 feet accounted for an additional 18 percent of the accidents, and further extending it 7,000 feet accounted for an additional 5 percent.

The CZ is basically a square that is 3,000 feet long and 3,000 feet wide at both ends of the runway (extends 3,000 feet out from the end of the runway and 1,500 feet on either side of the runway centerline (Shaw AFB has two parallel runways). It is 206 acres in size at each end of the runway and includes the 46 acres of the Graded Area. UFC 3-260-01 dictates that within the CZ (and outside of the Graded Area), there can be no permanent facilities. Brush and trees are allowed in this area; however, they may not penetrate the approach/departure slope, or the Transitional Surface slope.

The Graded Area is an area within the Clear Zone that is 1,000 feet in length and 2,000 feet wide; it extends 1,000 feet from the end of the runway and 1,000 feet on either side of the runway centerline. The Graded Area is 46 acres at each end of the runway. UFC 3-260-01 dictates that the Graded Area must be clear of all aboveground obstacles (including roadbeds) and vegetation (except grass [herbaceous]). It must also have no abrupt surface irregularities, such as ditches or ponds. The maximum allowable slope of the Graded Area is +/- 2 percent.

Force protection is a security program designed to protect Air Force personnel, civilian employees, family members, facilities, and equipment, in all locations and situations. The program is accomplished through the planned and integrated application of antiterrorism measures, physical security, operations security, and personal protective services. It is supported by intelligence, counterintelligence, and other security programs. In response to terrorist attacks and the need to improve force protection, the DoD in the late 1990s required the development of Anti-Terrorism/Force Protection (AT/FP) guidelines for new construction. That requirement was partially implemented in 1999 when the DoD promulgated AT/FP Construction Standards (DoD, 1999) to ensure that force protection standards are incorporated into the planning, programming, and budgeting for the design and construction of Military Construction (MILCON) funded facilities. These standards are integrated at Shaw AFB into the new construction and major renovation projects to which they apply.

Force protection at Shaw AFB also is maintained through the use of the entry gates to control access to the base. Personal vehicles enter and exit the base through four active security checkpoints: the Main Gate on Shaw Drive, the Frierson Street Gate, and the North Gate on Frierson Road. A commercial gate is located off of US 76/378 for use by commercial vehicles entering Shaw AFB. Personal vehicles can use this gate, however, it is largely used for commercial vehicle access. Existing gate facilities are inadequate in several respects. The Main Gate on Shaw Drive is located adjacent to an off-base wooded area to the west and does not provide adequate space for search and inspection of suspected vehicles. The current location of the Main Gate also causes traffic to back up onto US 76/378, increasing the potential for vehicle accidents.

FLIGHT SAFETY

As with ground safety, day-to-day flying operations are conducted by highly trained and qualified flight crews in accordance with detailed operational procedures. Since takeoff and

landing operations constitute the most critical phases of flight, there are numerous requirements applicable to the airspace through which an aircraft flies during these operations. These requirements focus on the configuration of the airspace which extends from the end of the runway and is best described as a plane which rises on given gradients forming a floor, or an imaginary surface for the airspace used during these operations.

UFC 3-260-01 defines and describes these imaginary surfaces. The imaginary surfaces of concern in this assessment are referred to as the Approach/Departure Slope and the Transitional Surface Slope. The Approach/Departure Slope rises at a rate of 40:1, starting 200 feet from the end of the runway. The Transitional Surface is an imaginary surface that extends outward and upward at right angles to the runway centerline and extended runway centerline at a slope ratio of 7:1 (for every seven feet horizontally there can be a one-foot increase vertically). The Transitional Surface connects the primary and the approach/departure clearance surfaces to the inner horizontal, the conical and the outer horizontal surfaces. UFC 3-260-01 dictates that the vertical height of vegetation and other fixed or mobile obstacles (such as construction equipment) will not penetrate the Transitional Surface to be compatible. At Shaw AFB there are 88 obstacles waived, 27 deviations, and 32 exempt items (Air Force, 2005a).

EXPLOSIVES SAFETY

The 20th FW controls, maintains, and stores all ordnance and munitions required for mission performance. Ordnance is handled and stored in accordance with Air Force explosive safety directives (AFI 91-201), and all munitions maintenance is carried out by trained, qualified personnel using Air Force approved technical data. Ample storage facilities exist and all facilities are fully licensed for the ordnance they store. No storage facility waivers are currently in effect.

Safety clearance zones protect areas where munitions are stored, maintained, and handled. These zones are geographically defined as Q-D arcs, and are based on the types and amounts of explosive material involved. Shaw AFB has constructed nine facilities where a variety of munitions are stored or handled. The Safety Office has established Q-D arcs based on the types and amounts of explosives to be stored at each location (Table 3-14). The arcs shown in Figure 3-4 are a result of munitions storage and handling at the locations identified in Table 3-14. Construction of inhabited buildings within Shaw AFB Q-D arcs has been limited to those facilities essential to effective mission accomplishment. Due to proximity to the installation boundary, one safety arc in the munitions storage area extends off the east side of the installation. However, no waiver is required because the Air Force has established easements with the property owner to ensure protection of the area (Air Force, 2002a).

Table 3-14. Quantity-Distance Arcs

Location	Radius (feet)
Building 1803	1,250
Building 1815	1,250
Building 1816	1,250
Building 1824	2,115
Building 1870	1,250
Hot Cargo Pad	1,400
EOD Range	500
All Aircraft Parking Ramps	400
Runway 04R/22L	1,400

Source: Air Force, 2004a

There is also a skeet range located to the west of Condor Country Road near the truck gate that has a safety zone impacting development within the HQ 3rd U.S. Army site with associated weapons safety footprint. This impact area extends 900 feet in a 180-degree arc centered on the shooting stations. No facilities can be located within the impact area. The Skeet Range could be relocated to allow development of land currently within its impact area, or new facilities could be relocated so as not to be located within the skeet range safety footprint.

3.10 NOISE

3.10.1 Definition of the Resource

Noise is defined as any sound that is undesirable because it interferes with communication, is intense enough to damage hearing, or is otherwise annoying. Human response to noise varies according to the type and characteristics of the noise source, distance between source and receptor, receptor sensitivity, and time of day. The ROI for noise includes the area surrounding each project location that may be affected by construction noise and noise from on-going operations.

Sound is measured with instruments that record instantaneous sound levels in decibels (dB). A-weighted sound level measurements (often denoted dBA) are used to characterize sound levels that are heard especially well by the human ear. All sound levels analyzed in this EA are A-weighted; thus, the term dB implies dBA unless otherwise noted.

3.10.2 Existing Conditions

At Shaw AFB, noise contributions from aircraft operations and ground engine run-ups at the airfield have been calculated using the NOISEMAP model, the standard noise estimation methodology used for military airfields. NOISEMAP uses the following data to develop noise contours: aircraft types, runway utilization patterns, engine power settings, airspeeds, altitude profiles, flight track locations, number of operations per flight track, engine run-ups, and time of day. The AICUZ Program has been developed in an effort to protect local citizens from the

noise exposure and accident potential associated with flying activities and to prevent degradation of the Air Force's capability to achieve its mission by promoting compatible land use planning.

The most recent AICUZ Study for Shaw AFB was published in 1994 (Air Force, 1994). An updated AICUZ Study is under way and is scheduled to be completed in 2007. This study provides noise contours associated with aircraft operations and promotes compatible land development in areas subject to aircraft noise (Figure 3-5). Because the same level of noise is more intrusive at night than it would be during the day, the Air Force uses the Day-Night Average Sound Level (L_{dn} or DNL) to describe noise. The L_{dn} averages the sound energy from aircraft operations over a 24-hour period and assigns an additional 10-dB penalty to noises that occur between 10:00PM and 7:00AM. The noise contours mapped as part of the 1994 AICUZ Study for Shaw AFB were updated by HQ ACC in February 2004. About 85 percent of the area within the installation boundary is within noise level zones that exceed the L_{dn} of 65 dB (the level of concern for residential land use).

The AICUZ Study (Air Force, 1994) defines compatible and non-compatible land uses adjacent to Shaw AFB. Generally, residential uses are considered incompatible within L_{dn} 75 dB. Below L_{dn} 65 dB, there are usually no restrictions recommended on residential land uses due to noise. Areas between L_{dn} 65 dB and 75 dB may not qualify for federal mortgage insurance according to Department of Housing and Urban Development (HUD) Regulations (24 CFR Part 51B). Moreover, residences may require additional noise attenuation measures be incorporated into their construction.

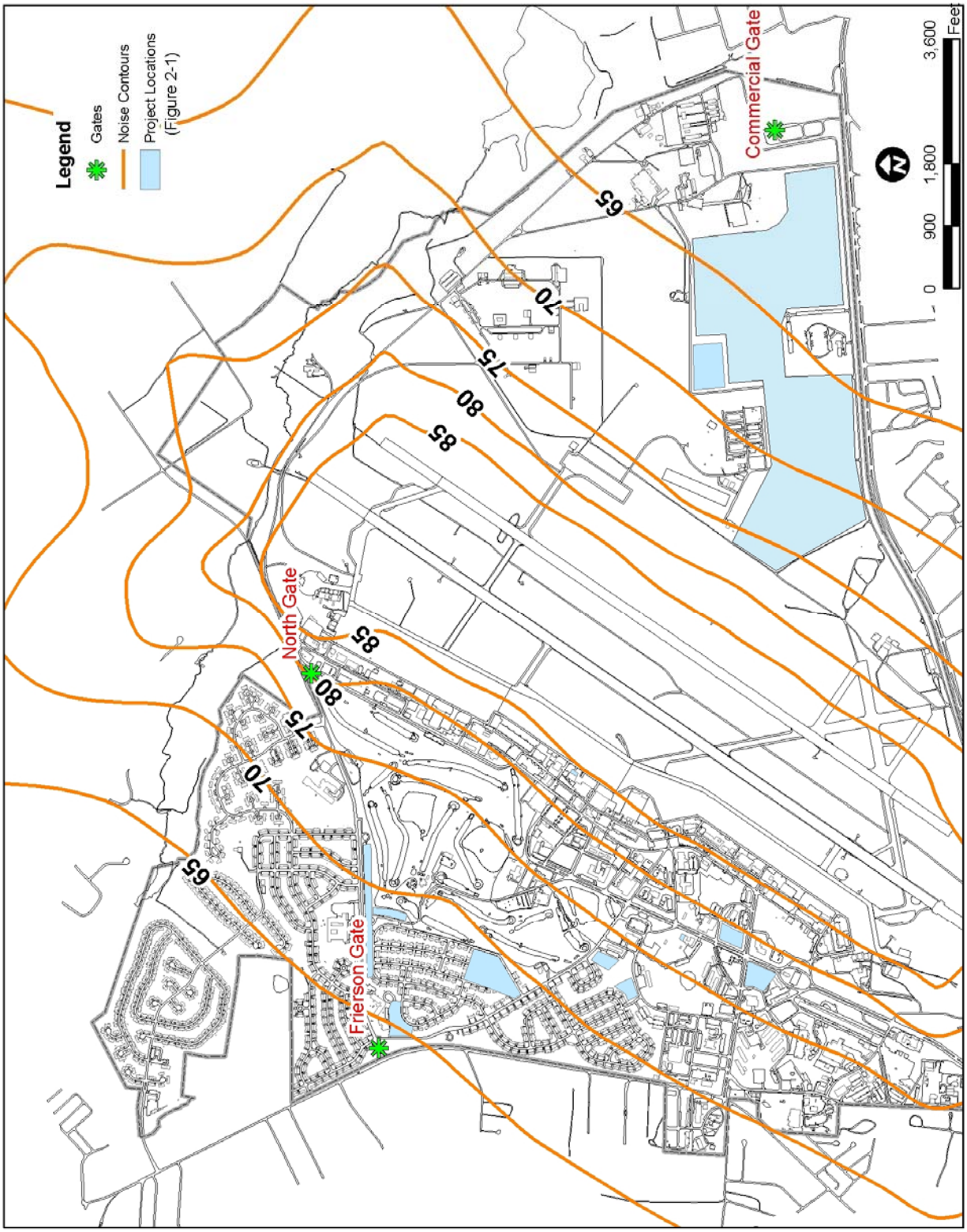

Figure 3-5. Shaw AFB Noise Contour Map

This page is intentionally blank.

4.0 ENVIRONMENTAL CONSEQUENCES

Chapter 4.0 presents the environmental consequences of the implementation of the BRAC Commission recommendations at Shaw AFB for each of the resource areas discussed in Chapter 3.0. To define potential direct and indirect impacts, this chapter evaluates the project elements described in Chapter 2.0 against the affected environment provided in Chapter 3.0. Cumulative effects of the proposed action with other foreseeable future actions are presented in Chapter 5.0.

Under each resource subject the environmental consequences of the proposed action are discussed. This is followed by a discussion of the skeet range closure alternative. Under the skeet range alternative all environmental consequences of the proposed action would occur in addition to those consequences discussed specifically as a result of skeet range closure.

4.1 LAND USE RESOURCES

Potential impacts to land use are evaluated by determining if an action is compatible with existing land use and in compliance with adopted land use plans and policies. In general, land use impacts would be considered significant if they were to (1) be inconsistent or noncompliant with applicable land use plans and policies; (2) prevent continued use or occupation of an area; or (3) be incompatible with adjacent or nearby land use to the extent public health or safety is threatened.

4.1.1 Proposed Action

LAND USE

Construction to support the relocation of the HQ 3rd U.S. Army would occur on both sides of the runways, with the main complex proposed for an area currently identified as a mixture of industrial and administrative land uses. Other supporting projects would be constructed within the main base cantonment which is a mixture of community and administrative land uses. These projects would be compatible with existing land uses/classifications and no significant impacts to land use are anticipated. Housing projects to support the HQ 3rd U.S. Army relocation are proposed in areas that either currently support housing or on lands designated as open space/outdoor recreational.

VISUAL RESOURCES

Construction of the HQ 3rd U.S. Army facilities on the east side of the base would occur within an area that was planted with a pine plantation approximately 30 years ago. Removal of a portion of these trees would reduce the planted buffer adjacent to near by recreational facilities. A planted buffer would remain between the perimeter road and the HQ 3rd U.S. Army facilities. Additional BOS and MFH projects would occur within a developed portion of the base and would not affect the visual resources of the cantonment area. With the implementation of the

proposed action, the base would be able to concentrate development of an office park-like setting within one area versus scattering them throughout the base. This development, with a consistent architectural design, would benefit the visual resources of the base with minimal effect of the existing visual and natural character of the base.

TRANSPORTATION

Implementation of the proposed action would add up to approximately 1,518 additional personnel to Shaw AFB. The number of personnel added to the base can be used to estimate the increase in traffic to be expected. Transportation engineering generally determines the expected function of the roadway in the design peak hour. Methods contained in the *Trip Generation Handbook* and *Trip Generation 7th Edition* by the Institute of Transportation Engineers (Trip Generation) were used to estimate the expected design peak hour traffic**.** The expected traffic can vary depending on the time of the day and week. The weekday peak morning hours would have the largest expected impact since entering traffic would be slowed by the requirements of security for base access and would impact both the public road and the base access gate. At this time, the estimate is approximately 590 trips which could be potentially split among the four existing access points to the base. Currently the Northwest and Southwest (Main) Gates are operating at a rate that is resulting in congestion and delay at the gates during peak traffic. While there is congestion at the gate during peak traffic hours, it does not normally impact passer-by traffic on state highway 378/76. Under the proposed action, the additional traffic entering the Shaw AFB would increase congestion on the roadways providing direct (entering) access to Shaw, but it is not expected to impact adjacent public roadways used by passerby traffic.

As part of the project, improvements would be constructed to the Southeast (commercial) Gate to allow for the movement of personal vehicle through that gate, however, safety concerns are associated with the nearby Skeet Range; however, this is not expected to be a significant concern and can be resolved by scheduling the use of the skeet range to non-high-traffic periods. Existing roads off Shaw AFB are capable of supporting the anticipated increase in traffic.

4.1.2 Skeet Range Closure Alternative

LAND USE

Closure of the Skeet Range would allow for unencumbered development of the proposed HQ 3rd US Army site by removing the necessity of a safety arc currently required by the skeet range.

VISUAL RESOURCES

This demolition of the skeet range and possible construction of new facilities with a consistent architectural design would benefit the visual resources of the base with no negative effect to the existing visual and natural character of the base.

TRANSPORTATION

Closure of the skeet range and lifting safety arcs associated with the range would allow the Southeast (commercial) Gate to be used without restriction. This would facilitate the movement of personal vehicles through that gate at all times.

4.1.3 No-Action Alternative

No impacts to land use, visual resources and transportation are anticipated under the no-action alternative since the new construction would not occur and all existing structures and uses would remain unchanged.

4.2 INFRASTRUCTURE

Level of service is the primary utility service issue. Criteria for evaluating impacts to utility service include potential for disruption and/or permanent degradation of the resource.

4.2.1 Proposed Action

Implementation of the proposed action would require additional demands on some infrastructure components at Shaw AFB. The net increase in building and associated parking and roadways square footage that would result from the proposed action is estimated to be approximately 10 to 12 acres depending on the final layouts of the facilities. Effects of the proposed action on each infrastructure system are described below.

ELECTRICAL DISTRIBUTION

The proposed action would not result in significant impacts to electrical distribution system. The proposed action would involve a long-term increase in demand for electrical power which would be available from CP&L and BREC in the immediate future. The peak usage in 1999 was approximately 16 percent of capacity (when there was a greater base population) and, therefore, there would be capacity remaining for additional growth.

POTABLE WATER

The proposed action would not result in significant impacts to potable water resources. The potable water system is currently operating at approximately 54 percent of its capacity and is, therefore, capable of supporting substantial growth on the base. The proposed action would not require that the water system be improved to the east side of the base for the HQ 3rd U.S. Army. If more drinking water capacity is required on the east side of the base, the 200,000 gallon elevated water tank that is currently used for fire fighting would be converted for domestic use (personal communication, Cox, 2007).

Average water production is 0.75 mgd with a five-well pumping capacity of 2.4 mgd. Therefore, excess pumping capacity is approximately 1.65 mgd (personal communication, J. Tucker, 2007

and personal communication, McKay, 2007a). Based on a potable water usage of approximately 84 gpd by base population (0.75 mgd divided by a base population of approximately 8,900, including base population of 5,748 and a secondary population of 3,156) (personal communication, Tucker, 2007 and personal communications, McKay, 2007a and 2007b) and an excess pumping capacity of 1.65 mgd, there is pumping capacity to serve an additional base population of approximately 18,500.

The proposed action would result in a net increase of approximately 1,518 permanent party personnel plus about 2,500 dependents (some of which would not reside on base), or a total increase of approximately 4,000 people. The projected well pumping capacity does not take into account capacity limitations associated with areas served by each of the wells, the down time for repairs or maintenance of the wells, and how the additional population is distributed, but does demonstrate sufficient capacity to serve the new population.

SEWAGE

The proposed action could result in an increase in wastewater output that exceeds the permitted capacity of the WWTP (1.2 mgd). Over the last five years of discharge monitoring data, the average reported value of discharge from the WWTP has been 0.77 mgd (770,000 gpd). During periods of heavy rainfall, inflow/infiltration into the existing sanitary sewer lines increases the amount of discharge to the WWTP. The most recent inflow/infiltration estimate is that storm water accounts for 20 to 40 percent of the WWTP influent during heavy rainfall. Because the permit deals with single events, not just averages, it cannot be assumed that there is 0.43 mgd of available capacity (personal communication, McKay, 2007). It is suggested that a rate of 1.1 mgd be used for the base's maximum flow with the current population (personal communication, McKay, 2007). Therefore, excess capacity during maximum flows would be 0.1 mgd (100,000 gpd).

Using an average flow rate of 86.5 gpd (770,000 gpd/8,900 people [population from the 2006 Sanitary Survey]) for base population, this would allow for an additional 1,156 people (100,000 gpd/86.5 gpd) to be added to the base population. (Note: if there were 0.43 mgd of capacity, the base could support an additional population of almost 5,000 people). The proposed action would result in a net increase of approximately 1,518 permanent party personnel plus about 2,500 dependents (some of which would not reside on base), or a total increase of approximately 4,000 people. It is expected that some of the existing sanitary sewer lines serving the east side of the base would have to be upgraded and new lines would be required to be extended to the location of the HQ 3rd U.S. Army as well as some of the new Base Operating Support project sites. It is expected that a new lift station would not be required, as there are two existing lift stations (on Patrol Road near the former AF warehouse and near the Rod and Gun Club) to support the new development on the east side of the base.

SOLID WASTE

The proposed action would not result in significant impacts to solid waste handling capacity. There is expected to be a short-term increase in solid waste during the construction phase of the proposed action (pine trees removed to clear land, however, would be sold for pulp fiber). In the long-term following construction, however, the increase in solid waste generation by additional personnel would be relatively minor when historical decreases in on-base military family housing and attendant reductions in solid waste are considered. It is expected that the proposed action would generate between approximately 1,250 tons/year of additional solid waste (based on 4.6 pounds/person/day x 1,518 additional people) and 3,350 tons/year of additional solid waste (based on 4.6 pounds/person/day x 4,000 additional people; see Section 4.2.1.2, above). The proposed action is not expected to shorten the useful lifespan of the Sumter County landfill, which is reported to have adequate capacity for approximately 20 more years for construction and demolition waste (personal communication, Nesbitt, 2007). Domestic waste received is transferred to two other landfills.

STORM DRAINAGE SYSTEM

The proposed action would not result in significant impacts to the storm drainage system. Implementation of the proposed action would increase the impervious surface area at the base by approximately 10 to 12 acres, depending on the final layout of new buildings, parking, and roadways. This represents an approximate 3 percent increase over the current 400 acres of impervious surface area but is still considerably less than the 709 acres of impervious surface area that occurred prior to military housing demolitions. The storm water collection system in the proposed area of construction has the capacity, and can be modified, to accommodate the anticipated increase in run-off and sediment load. The proposed action would require an updated NPDES permit and revised SWPPP.

HEATING AND COOLING

The proposed action would not result in significant impacts to heating and cooling systems. The proposed action would involve an increase in the demand for additional heating and cooling as a result of facility construction. The new facilities on the east side of the base would have their own individual systems in accordance with facility needs. It is expected that natural gas distribution lines would have to be modified to service these facilities, but there are no capacity issues. On the west side of the base, new facility construction would either be served by the existing systems of the building or new systems or modification to existing systems would be used to serve heating and cooling demand. All new construction would incorporate energy efficient designs to minimize the increase in energy demand. The increase in demand for heating and cooling by the proposed action is expected to be met by using existing capacity, and all necessary permits would be acquired.

LIQUID FUELS

The proposed action would not result in significant impacts to liquid fuel resources at Shaw AFB. The proposed action would result in an increase in demand for ground transportation fuels (gas and diesel). Consequently, a new service station would be constructed on the east side of the base that would provide these fuels in state-of-the-art ASTs and/or USTs. There would be no change in jet fuel demand by the proposed action. All components of the proposed action involving the storage and distribution of liquid fuels would be conducted in accordance with AFI 23-204.

COMMUNICATIONS SYSTEMS

The proposed action would not result in significant impacts to communication systems at Shaw AFB. The proposed action would require new wiring and some reconfigurations for the various communication systems; this effort would be conducted in accordance with the need of the individual projects. It is expected that all communication capacity needs to serve the BRAC action will be met through planning and system improvements.

4.2.2 Skeet Range Closure Alternative

SOLID WASTE

All utilities would be capped or disconnected. Demolition debris from skeet range structures proposed for demolition would be recycled to the greatest extent practicable.

The demolition contractor would dispose of the remaining materials in an approved landfill in accordance with state and local regulations and utilizing an established haul route for equipment delivery and debris removal.

Spent lead contained in the shot fall area and construction debris containing lead would be managed in accordance with applicable federal and state requirements for lead and lead containing materials.

Construction debris from both the existing range structures would be tested by the contractor prior to disposal to determine appropriate disposal requirements.

4.2.3 No-Action Alternative

Under the no-action alternative, current baseline demands on the infrastructure of Shaw AFB would continue as described in Section 3.2. Under current conditions, the capacities of all of the infrastructure systems and facilities are more than sufficient to meet existing demands, and this would continue under the no-action alternative. Assuming that ongoing maintenance, repair, and upgrade of infrastructure components continue and the quality of the systems and facilities is maintained, the level of impact of this alternative on the infrastructure of Shaw AFB would be negligible.

4.3 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

In order to assess the potential socioeconomic impacts of the proposed action, demographic and economics characteristics at Shaw AFB and the surrounding region were analyzed, as presented in Section 3.3. Potential socioeconomic consequences were assessed in terms of effects of the proposed action on the local economy, typically driven by changes in project personnel or expenditure levels. Economic multipliers, migration ratios, and other factors are utilized to determine the total economic effect of project-related changes on regional socioeconomic attributes.

For this environmental assessment, potential socioeconomic impacts are evaluated for factors associated with BRAC recommendations at Shaw AFB, including facility modifications and personnel changes. Construction activity associated with facility modifications on base generates temporary economic benefits to the region in terms of employment and income, lasting, however, only for the duration of the construction period. Personnel changes associated with the proposed action may generate population changes in the region, induced employment and income, and related changes in housing and service demand.

In order to assess potential environmental justice issues associated with the proposed action, minority and low-income populations in the vicinity of Shaw AFB were identified, as presented in Section 3.3. Environmental justice analysis applies to adverse environmental impacts. Potential disproportionate impacts to minority or low-income populations are assessed only when adverse environmental consequences to the human population are anticipated, otherwise no analysis is required. The facility modifications and personnel changes associated with the proposed action are not expected to create significant adverse environmental or health effects to the human population; consequently no environmental justice concerns are anticipated.

4.3.1 Proposed Action

4.3.1.1 Construction-Related Consequences

Implementation of the BRAC recommendations at Shaw AFB would require additional facilities. The proposed action includes a total of 15 construction projects to be implemented over the period from FY07 to FY12 with an estimated cost of $132 million. These construction activities would generate a number of jobs during the construction period and contribute to local earnings and induced spending.

Potential direct impacts associated with the proposed construction projects would include 1,849 construction jobs over the entire construction period and $57.4 million in direct earnings. Secondary employment effects related to the goods and services demand of the construction projects and household spending of construction workers would generate an additional 925 jobs and $34.8 million in secondary earnings. The total employment effect over the five-year construction period would amount to 2,774 total jobs and total earnings of $92.2 million.

Construction-related economic effects would be beneficial to the region, but of minimal consequence given the likelihood that construction workers would come from the existing labor pool in the region. Furthermore, the employment and earnings effects would be temporary, only occurring for the duration of the construction period. No permanent or long-lasting socioeconomic impacts are associated with construction under the proposed action.

4.3.1.2 Operations-Related Consequences

Implementation of the BRAC recommendations, including establishing the HQ 3rd U.S. Army, would require an additional 1,518 personnel stationed at Shaw AFB. This total comprises 1,097 active duty military, 199 civilians, and 222 contract manpower equivalents (see Table 2-2). An increase of this magnitude represents 22.8 percent of the current base employment of 6,638 positions. The anticipated increase in base employment would have direct and secondary effects on other socioeconomics resources in the region, as described in the following paragraphs.

Population

Based on existing demographic characteristics of the Shaw AFB population, it is estimated that 2,588 family members would accompany the incoming 1,518 personnel, yielding a total direct population increase of 4,106 persons. An increase of this size represents about 23.3 percent of the Shaw AFB population and 3.9 percent of the Sumter County population. Shaw AFB is a dynamic installation with regular changes in missions and personnel, hence it is anticipated that the proposed level of employment and population change would be accommodated without significant adverse effects to base operations.

The increase in base operations and related incoming personnel would generate economic activity in the region, inducing secondary employment and potential population increases in the region. Assuming that all secondary employment would be filled by workers relocating from outside the region (see *Employment* section below), it is estimated that as many as 1,338 additional persons may relocate to the region as a result of secondary economic effects. Consequently, the total population impact to the region could reach a combined total of 5,444 persons, or 5.2 percent of the county population.

Employment

As described above, the direct effects on employment would be the addition of 1,518 military and civilian personnel associated with implementation of the BRAC recommendations at Shaw AFB. The economic activity generated by the household spending of these incoming personnel would generate an additional 499 induced jobs in the region. Although it is likely this additional employment demand would be accommodated by existing regional labor, it is assumed that these jobs would be filled by workers relocating to the area in order to estimate the maximum potential population effect (see *Population* section above). The total employment

impact to the region is anticipated to be 2,017 jobs, an increase of 3.7 percent in the existing regional employment of 54,275 jobs.

Housing

With regard to the housing demand associated with the direct employment impact, it is assumed that each additional job generated in the region as a result of the proposed action would represent one household unit. Therefore, the direct housing impact would be an increase in demand for 1,518 housing units. Although construction of additional military housing is included in the proposed action, a substantial number of the incoming personnel would likely require off-base, private sector housing. For the incoming population related to induced employment, the number of housing units is estimated by applying the regional average number of workers per household, a calculation that yields an increased housing demand of 487 units. The total number of housing units required to meet the demand associated with both the direct and induced populations is estimated to be 2,005 units, representing 4.5 percent of the existing housing stock of 43,977 units and 40.3 percent of the 4,975 vacant housing units in the region (U.S. Census Bureau, 2006).

Schools

Of the 2,588 family members anticipated to accompany the incoming Shaw AFB personnel, 895 are presumed to be spouses and 1,693 are presumed to be school-aged children. The incoming child dependents would contribute to an increase in the student population in each school district in the region, with most of the children expected to enroll in either School District #2 or School District #17. The induced population impact related to the proposed action would yield an additional 234 students. The total increase in the student population would be 1,927 students, an increase of 9.6 percent above existing enrollment levels in Sumter County schools.

4.3.2 Skeet Range Closure Alternative

Temporary employment and earnings increases would occur as a result of demolition and lead reclamation activities associated with closure of the range. Base employees currently working at the range would be reassigned to other base Morale, Welfare, and Recreation jobs. No long-term or adverse socioeconomic effects are anticipated as a result of the skeet range closure alternative.

4.3.3 No-Action Alternative

With the no-action alternative, construction and land-clearing activities would not occur and the base population would not increase other than normal base growth. No increase in construction spending would take place and no additional economic effects would occur in Sumter County with adoption of the no-action alternative.

4.4 CULTURAL RESOURCES

A number of federal regulations and guidelines have been established for the management of cultural resources. Section 106 of the NHPA, as amended, requires federal agencies to take into account the effects of their undertakings on historic properties. Historic properties are cultural resources that are listed in, or eligible for listing in, the NRHP. Eligibility evaluation is the process by which resources are assessed relative to NRHP significance criteria for scientific or historic research, for the general public, and for traditional cultural groups. Under federal law, impacts to cultural resources may be considered adverse if the resources have been determined eligible for listing in the NRHP or have significance for Native American groups.

Analysis of potential impacts to cultural resources considers both direct and indirect impacts. Direct impacts may occur by physically altering, damaging, or destroying all or part of a resource; altering characteristics of the surrounding environment that contribute to the resource's significance; introducing visual or audible elements that are out of character with the property or alter its setting; or neglecting the resource to the extent that it deteriorates or is destroyed. Direct impacts are assessed by identifying the types and locations of proposed activity and determining the exact location of cultural resources that could be affected. Indirect impacts result primarily from the effects of project-induced population increases.

A letter was sent to the South Carolina SHPO informing them of the proposed action and no-action alternative. A letter dated December 21, 2006 was received from the SHPO. The letters requested the EA draw upon the databases and site information retained by Shaw AFB to assess the potential for impact from the proposed project. The Draft EA will be distributed to the SHPO.

4.4.1 Proposed Action

If unanticipated archaeological resources were to be encountered during construction, the Air Force would comply with Section 106 of NHPA and the *Shaw Air Force Base Cultural Resources Management Plan (2001)*, including consulting with the SHPO.

Adverse impacts to historic architectural and archaeological resources are not expected under the proposed action because construction activities associated with the BRAC action would not disturb architectural or archaeological resources.

No impacts to traditional resources are likely under the proposed action. No traditional resources have been identified at Shaw AFB. There are no federally recognized Indian lands or resources at Shaw AFB, and no issues have been identified by the Catawba Indian Nation, a federally recognized Indian tribe, in South Carolina.

4.4.2 Skeet Range Closure Alternative

With the skeet range closure alternative, demolition and lead reclamation activities would occur. However there are no identified cultural (architectural or archaeological) resources on the site of the skeet range. Therefore cultural resources would not be affected as defined under Section 106 of the NHPA. All such resources would continue to receive protection as described under Section 3.4.

4.4.3 No-Action Alternative

With the no-action alternative, construction and land-clearing activities would not occur. Therefore cultural resources would not be affected as defined under Section 106 of the NHPA. All such resources would continue to receive protection as described under Section 3.4.

4.5 BIOLOGICAL RESOURCES

This section analyzes the potential for impacts to biological resources from implementation of the proposed action or alternative. Impacts potentially result from the projected changes in operations at Shaw AFB. Analysis of impacts focuses on whether and how ground-disturbing activities and mission activities may affect biological resources. Determination of the significance of potential impacts to biological resources is based on 1) the importance (i.e., legal, commercial, recreational, ecological, or scientific) of the resource, 2) the proportion of the resource that would be affected relative to its occurrence in the region, 3) the sensitivity of the resource to proposed activities, and 4) the duration of ecological ramifications. Impacts to biological resources are significant if species or habitats of concern are adversely affected over relatively large areas or disturbances cause reductions in population size or distribution of a sensitive species.

4.5.1 Proposed Action

The proposed action would not result in significant impacts to biological resources at Shaw AFB. No federally listed or state-listed species are known to occur within the project areas. There is no critical habitat on the main base, only at the Poinsett Range (Johnson, 2007). Therefore, there would be no effect to federally listed or state-listed species.

Pine plantation on the east side of the base would be removed for the HQ 3rd U.S. Army projects. This monoculture of pines is of minimal value to wildlife, especially as its dense shade prevents a natural understory habitat. All BOS and MFH projects on the west side of the base occur within the highly developed cantonment area (having limited habitat value) where impacts would be limited to removal of some landscape trees and conversion of mowed lawn areas to building sites. New landscaping with trees and shrubs would be incorporated into all proposed action projects.

Because the proposed action projects would not be located in or near wetlands, streams, or ponds (Figure 3-2), no impact to these water bodies would be expected.

4.5.2 Skeet Range Closure Alternative

Implementation of the skeet range closure alternative would result in no short- and long-term impacts to biological resources including ETSC species, wildlife habitat, and wetlands. In the short-term, some biological resources may be minimally impacted by effects from on-going demolition and lead reclamation activities, while long-term impacts would be negligible.

4.5.3 No-Action Alternative

Implementation of the no-action alternative would result in no short- and long-term impacts to biological resources including ETSC species, wildlife habitat, and wetlands. In the short-term, some biological resources may be minimally impacted by effects from on-going construction activities, while long-term impacts would be negligible.

4.6 WATER RESOURCES

Analysis for water resources includes the identification and description of resources that could potentially be affected, the examination of the potential effects an action may have on the resource, the assessment of the significance of potential impacts, and the provision of mitigation measures to reduce the potential for impacts. Impacts can be avoided or minimized by proper construction techniques, erosion control measures, project design, and project siting. Impervious surfaces (paved areas and roofs) may contribute to increases in stormwater runoff when they are constructed in locations previously composed of more natural ground cover because no precipitation can infiltrate the soil, resulting in 100 percent runoff.

4.6.1 Proposed Action

Construction of the HQ 3rd U.S. Army facilities would be outside the limits of the 100-year floodplain of the Long Branch. Prior to the start of construction, silt fences, storm drain inlet and outlet protection, and other appropriate standard construction practices would be instituted in accordance with the Shaw *SWPPP* (Air Force, 1998).

Since more than one acre would be disturbed by the construction of the 3rd Army facilities, a South Carolina Pollutant Discharge Elimination System (SCPDES) Stormwater General Permit would be required. Under the permit, the construction contractor(s) would obtain the permit and provide a SWPPP that describes standard construction practices to be implemented to eliminate or reduce sediment and non-storm water discharges. With the implementation of the SWPPP and the standard practices, environmental consequences from erosion and sedimentation would be negligible. There would be no impacts to water resources from point or non-point sources with implementation of the proposed action.

There would be an increase in the use of groundwater from the existing Base wells. With the system operating at 54 percent of capacity, there would be available capacity to meet the

increased demands associated with the relocation of the HQ 3rd U.S. Army facilities without a significant adverse effect to water resources.

4.6.2 Skeet Range Closure Alternative

Implementation of the skeet range closure alternative would result in no short- and long-term impacts to water resources

4.6.3 No-Action Alternative

With the no-action alternative, construction and land-clearing activities would not occur and the base population would not increase other than normal, minor administrative, base growth. No impacts would occur to water resources for the no-action alternative.

4.7 AIR QUALITY

This section discusses the potential impacts to air quality because of the proposed action, alternative action and no-action alternative. For the analysis of the various proposed actions, a threshold on an individual pollutant-by-pollutant basis was established. The proposed action and alternatives will occur at Shaw AFB, located in Sumter County, SC, which will be considered the ROI.

The emissions sources analyzed for the proposed action includes heavy construction machinery, semi-tractor trailer rigs, dust (particulate matter) from unpaved roads, and vehicle exhaust emissions from contracted employees personal vehicles.

In order to evaluate the air emissions and their impact to the overall ROI the emissions associated with the project activities were compared to the total emissions on a pollutant-by-pollutant basis for the ROI's 2002 National Emission Inventory data. Potential impacts to air quality are identified as the total emissions of any pollutant that equals 10 percent or more of the ROI's emissions for that specific pollutant. The 10 percent criteria approach is used in the General Conformity Rule as an indicator for impact analysis for non-attainment and maintenance areas and although Sumter County is attainment, the General Conformity Rule's impact analysis was utilized to provide a consistent approach to evaluating the impact of construction and aircraft emissions. To provide a more conservative evaluation, the impacts screening in this analysis, used a more restrictive criteria than required in the General Conformity Rule. Rather than comparing emissions from construction activities to regional inventories (as required in the General Conformity Rule), emissions were compared to the individual county (Sumter) potentially impacted, which is a smaller area.

A Department of Defense developed model, the Air Conformity Applicability Model (ACAM), used by the U.S. Air Force for conformity evaluations was utilized to provide a level of consistency with respect to emissions factors and calculations. Air emissions estimated using ACAM was compared to the established 10 percent criterion for Sumter County as represented

in the USEPA 2002 NEI (USEPA, 2002). Emissions associated with construction activities are the main issues generated by the proposed action and were the focus of the air analysis. Air quality issues associated with operational activities at Shaw AFB after the completion of construction are not included in this evaluation.

Fugitive dust (PM_{10}), nitrogen oxide (NO_x), and CO constitute the majority of the emissions from construction activities and the project overall. A construction operation incorporates grading operations, construction worker trips, stationary equipment (e.g., generators and saws), mobile equipment, non-residential architectural coatings, and acres paved. CO and PM_{10} are the primary pollutants of concern, constituting 78 percent of overall project emissions. A majority of the CO emissions are associated with stationary equipment (e.g., saws and generators), while the PM_{10} emissions are primarily associated with grading operations.

4.7.1 Proposed Action

The proposed action consists of the BRAC construction-related projects of HQ 3rd U.S. Army (306,605 square feet), BOS (83,100 square feet), and MFH (144,404 square feet), including the BRAC-directed establishment of an ALQ-184 Pod Centralized Intermediate Repair Facility (CIRF). The construction, grading, and paving activities are considered when calculating the effects on the regional air quality. The estimated construction emissions during the construction period for the project are summarized in Table 4-1, Proposed Action Estimated Construction Air Emissions by Activity.

Table 4-1. Proposed Action Estimated Construction Air Emissions by Activity

Source Categories		Emissions (tons/year)				
		CO	**NO_x**	**PM_{10}**	**SO_2**	**VOC**
Maximum Annual Emissions FY07-FY12	Acres Paved	0.000	0.000	0.000	0.000	0.00036
	Grading Operations	0.000	0.000	47.338	0.000	0.000
	Mobile Equipment	14.235	33.945	2.7375	4.198	3.103
	Non-Residential Architectural Coatings	0.000	0.000	0.000	0.000	0.110
	Residential Architectural Coatings	0.000	0.000	0.000	0.000	1.038
	Stationary Equipment	96.543	2.500	0.073	0.128	3.6135
	Workers Trips	11.161	0.639	0.094	0.000	0.68157
	Total	**121.938**	**37.084**	**50.242**	**4.325**	**8.546**

The additional personnel associated with the proposed action are included in the analysis and the projected mobile source increases. Increase in population affects the number of personnel commuting to and from work therefore increasing vehicular emissions. These emissions are included in the mobile source totals in Table 4-2, Percentage of Proposed Alternative Emissions Compared to Sumter County.

As indicated in Table 4-2, Percentage of Proposed Action Emissions Compared to Sumter County, the individual pollutant emissions from the project will not exceed 10 percent of the

total Sumter County emissions for each corresponding pollutant. The highest pollutant percentage is for NO_x which is approximately 1.04 percent of Sumter County total emissions based on the USEPA 2002 NEI. The increase in NO_x is primarily due to construction emissions. This slight decrease in local air quality will be temporary. In calculating emissions, certain assumptions were made regarding various variables associated with construction activities. Specific details regarding the assumptions and calculations associated with the emissions estimates are located in Air Quality Appendix. There are no air quality issues anticipated with the proposed action. Air emissions conformity analyses determination is not required since the proposed action or alternatives would not cause an exceedance of *de minimis* levels for National or South Carolina Ambient Air Quality Standards. See Appendix B for a further discussion on the air quality analysis."

Table 4-2. Percentage of Proposed Action Emissions Compared to Sumter County

Emission Activities	CO	NO_x	PM_{10}	SO_2	VOC
Construction Emissions	121.94	37.08	47.34	4.33	8.55
Point Source[1]	8.32	5.05	3.84	1.29	26.39
Mobile Source[2]	24.62	2.19	0.13	0.09	1.50
Total	**154.88**	**44.33**	**51.30**	**5.70**	**36.43**
Sumter County Emissions	33,885.88	4,275.45	30,029.74	883.64	7,219.21
Percentage of County Emissions	***0.46%***	***1.04%***	***0.17%***	***0.65%***	***0.50%***

[1] Point Source – includes facility heating, miscellaneous point sources, and residential space heating.
[2] Mobile Source - includes base employee commute, on-road government owned vehicles, and off-road base support vehicles.

4.7.2 Skeet Range Closure Alternative

Demolition of the existing range and lead reclamation may result in potential exposure to lead dust. Personal Protective Equipment and other mitigation measures contained in 29 CFR Part 1910.1025, *Lead Exposure* and 29 CFR Part 1926.55, *Gases, Vapors, Dusts and Mists,* will be required of all workers during the demolition of the facilities and reclamation of the shot.

Frequent spraying of water on exposed soil during ground disturbance and demolition activities, proper soil stockpiling methods, and prompt replacement of ground cover are standard construction procedures that could be used to minimize the amount of dust generated during demolition. Therefore, implementation of the skeet range closure alternative would result in no short- and long-term impacts to air quality.

4.7.3 No-Action Alternative

With the no-action alternative, construction and land-clearing activities would not occur and the base population would not increase other than normal base growth. No impacts would occur to regional air quality for the no action alternative.

4.8 HAZARDOUS MATERIALS AND HAZARDOUS WASTE

The qualitative and quantitative assessment of impacts from solid waste and hazardous materials management focuses on how and to what degree the alternatives affect hazardous materials usage and management, hazardous waste generation and management, and waste disposal. A substantial increase in the quantity or toxicity of hazardous substances used or generated would be considered potentially significant. Significant impacts could result if a substantial increase in human health risk or environmental exposure was generated at a level that cannot be mitigated to acceptable standards.

Regulatory standards and guidelines have been applied in evaluating the potential impacts that may be caused by hazardous materials and wastes. The following criteria were used to identify potential impacts:

- Generation of 100 kilograms (kg) (or more) of hazardous waste or 1 kg (or more) of an acutely hazardous waste in a calendar month, resulting in increased regulatory requirements.
- A spill or release of a reportable quantity of a hazardous substance as defined by the USEPA in 40 CFR Part 302.
- Manufacturing, use, or storage of a compound requiring notifying the pertinent regulatory agency according to EPCRA.
- Exposure of the environment or public to any hazardous material and/or waste through release or disposal practices.

4.8.1 Proposed Action

Hazardous Materials

Construction of the HQ 3rd U.S. Army complex may require the use of hazardous materials by contractor personnel. In accordance with the base's HMMP, copies of Material Safety Data Sheets must be provided to the base and maintained on the construction site. The base would maintain any hazardous materials used by base personnel in the operation of the complex and no adverse environmental consequences are anticipated. Project contractors would comply with federal, state, and local environmental laws and would employ affirmative procurement practices when economically and technically feasible.

Hazardous Waste

Contractor personnel may generate hazardous waste, such as paints, adhesives, and batteries, during construction of the HQ 3rd U.S. Army complex. Storage and disposal of these wastes would be the responsibility of the site contractor and the base's hazardous waste program. Any hazardous waste generated by Army and other actions covered by this EA during everyday or special event operations will be handled by Shaw AFB Hazardous Waste Managers in

accordance with the Shaw AFB Hazardous Waste Management Plan. Generation points to manage hazardous wastes would be established for the Army Motor Pool and in the additional space constructed for the CIRF at Building 1217 if necessary. Hazardous waste generation associated with the base-level TF-34 engine maintenance would cease. No adverse environmental consequences are expected.

Environmental Restoration Program (ERP)

Location of the proposed action would have the potential to be on or near ERP sites WP-12 FT-07 and FT-06. A Decision Document recommending no further investigation/no further action at Site WP-12 was submitted in March 1993 and was approved by the EPA on March 24, 1993, and by SCDHEC in July 1995. The site was closed and included in the 9 July 1999 RCRA permit update. ERP Site FT-07 is The RCRA permit modification for the site was completed July 8, 1999. This site is closed with no further action required. The RCRA permit modification for ERP Site FT-06 was completed on July 9, 1991. This site is closed with no further action required.

Construction activities related to the proposed action would occur near other ERP sites, such as OT-16, SD-29, and SS-35 located on the west side of Shaw AFB. Construction has and can occur on these sites without impacting the integrating of the sites. Therefore, no adverse impacts are expected.

Coordination with the 20 CES Environmental Restoration Branch would be done prior to any site preparation or construction to assure that any necessary waivers, manifests, approvals and/or permits are in place. Any contaminated material encountered during construction and site preparation on the ERP sites would be removed and properly disposed of.

4.8.2 Skeet Range Closure Alternative

Should the skeet range be closed, lead contained within the skeet range would need to be removed and sent to a qualified recycler, and the soil tested to determine if it was an RCRA hazardous waste.

The clay targets used at the skeet range are composed of approximately 67 percent dolomitic limestone, 32 percent petroleum pitch, and 1 percent fluorescent aqueous paint. There is a potential concern regarding the presence of polycyclic aromatic hydrocarbons (PAHs) which are present in the petroleum pitch. Consequently, PAH could possibly be released to the environment during remediation of the lead shot. Studies have shown, however, that the targets did not exhibit the characteristics of toxicity as determined by the extraction procedure (EP) toxicity test but did contain substantial amounts of PAH. However, results from new and aged targets suggest that PAH are tightly bound in the petroleum pitch and limestone matrix and are unlikely to be readily available in the environment (Stahl, 1995).

Construction debris from both the existing range structures will be tested by the contractor prior to disposal to determine appropriate disposal requirements.

4.8.3 No-Action Alternative

No impacts to hazardous material and waste management are anticipated under the no-action alternative since the new development would not occur and all existing structures and uses would remain unchanged.

4.9 SAFETY

This section addresses potential impacts to safety. The issues that have a potential to affect safety are evaluated relative to the degree to which the activity increases or decreases safety risks to military personnel, the public, and property. Issues addressed in this section are ground safety (including fire resulting from an aircraft mishap), flight safety (including mishap and bird-strike potential), and explosives safety. The potential for the proposed action to increase these risks is assessed, as well as the Air Force's capability to manage these risks.

4.9.1 Proposed Action

Ground Safety

Short-term safety risks associated with renovation and facility construction could occur, but standard safety practices would minimize any potential risks. Siting of facilities should be conducted so that structures do not penetrate the airfield imaginary surfaces. Clear Zones and Accident Potential Zones would not be impacted by the proposed development associated with the relocation of the HQ 3rd U.S. Army facilities.

Flight Safety

Construction of the new HQ 3rd U.S. Army complex would not require any waivers from UFC 3-260-01, which identifies areas that must be kept clear to maintain flight safety. No adverse impacts have been identified from the implementation of the proposed action.

Explosive Safety

The new HQ 3rd U.S. Army facilities would not be located within the 1,400-foot safety clearance zone for the Hot Cargo Pad, or any other Q-D arcs. No adverse impacts have been identified from the implementation of the proposed action.

4.9.2 Skeet Range Closure Alternative

Ground Safety

Closure of the skeet range would allow for removal of the safety arcs currently in place for the range. This would allow for flexible siting and development of the proposed location of the HQ

3rd U.S. Army facilities. Additionally, the Truck Inspection Gate could be utilized full time for entry into the HQ 3rd U.S. Army area.

Flight Safety

No impacts to flight safety are anticipated under the skeet range closure alternative since this skeet range is not located in an area used for flight operations.

Explosive Safety

Safety arcs associated with the existing skeet range would no longer be required. Again, this would allow for flexible siting and development of the proposed location of the HQ 3rd U.S. Army facilities. Additionally, the Truck Inspection Gate could be utilized full time for entry into the HQ 3rd U.S. Army area.

4.9.3 No-Action Alternative

Under the no-action alternative, construction of the new HQ 3rd U.S. Army complex would not occur and all existing structures and uses would remain unchanged. Ground, flight and explosive safety conditions would remain unchanged from those identified in Section 3.9.

4.10 NOISE

Noise impact analyses typically evaluate potential changes to existing noise environments resulting from the proposed construction and demolition activities. This consists of changes in noise levels or the exposed human population, as well as noise impacts on wildlife. Potential changes in the noise environment can be beneficial (i.e., if they reduce the number of sensitive receptors exposed to unacceptable noise levels), negligible (i.e., if the total area exposed to unacceptable noise levels is essentially unchanged), or adverse (i.e., if they result in increased exposure of sensitive receptors to unacceptable noise levels).

4.10.1 Proposed Action

Implementation of the proposed action would have minor, temporary increases in localized noise levels in the vicinity of the project areas during development, including base housing and portions of the cantonment area. The base is an active military facility that typically experiences high noise levels from daily flight operations. Use of construction and demolition equipment for site preparation and development (i.e., demolition, grading, fill, and construction) would generate noise. However, noise would be similar to typical construction and demolition noise, last only the duration of the specific construction and demolition activities, and could be reduced by the use of equipment sound mufflers and restricting construction and demolition activity to normal working hours (i.e., between 7:00AM and 5:00PM). Table 4-3 shows sound levels associated with typical heavy construction equipment under varying modes of operation.

Table 4-3. Typical Equipment Sound Levels

Equipment	Sound Level (in dBA) Under Indicated Operational Mode [1]		
	Idle Power	Full Power	Moving Under Load
Forklift	63	69	91
Backhoe	62	71	77
Dozer	63	74	81
Front-End Loader	60	62	68
Dump Truck	70	71	74

Note: 1. Measured at 125 feet
Source: Air Force, 1998c

Compared with aircraft noise, noise produced by construction and demolition would be relatively lower in magnitude, and spread out during the business day. Noise from truck traffic hauling construction materials to construction location and demolition materials or timber away from project locations would not affect base residents because the Southeast (Commercial) Gate would provide development access. The noise disruptions would be temporary and limited to daytime hours; therefore, impacts are considered insignificant.

Additionally, facilities proposed for the HQ 3rd U.S. Army are slated to be constructed in areas subject to noise from aircraft operations. Noise contours are produced by the computerized Day-Night Average. Using the NOISEMAP modeling program, DoD produces contours showing noise levels generated by current aircraft operations. The relevant Shaw AFB contours are shown in Figure 3-5. Some of the facilities lie between the 70 and 75 DNL contours. Administrative type facilities are allowed between the 70 and 75 DNL however, construction in this area would require the incorporation of additional sound attenuation materials and methods during construction. Other facilities, located between the 60 and 65 DNL contours could be constructed without the addition of sound attenuation techniques. However, it may be more practical to install sound attenuation in all facilities within the project area. Below the 65 DNL, all proposed land use activities would be compatible with the noise levels associated with aircraft operations.

4.10.2 Skeet Range Closure Alternative

Should the skeet range be closed, noise associated with the range in its current location would not continue, resulting in an overall positive benefit.

4.10.3 No-Action Alternative

Under the no-action alternative no new construction would occur and no additional missions would be placed at Shaw AFB. Noise levels would remain unchanged from existing conditions.

5.0 CUMULATIVE EFFECTS AND IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

5.1 CUMULATIVE EFFECTS

This section provides (1) a definition of cumulative effects, (2) a description of past, present, and reasonably foreseeable actions relevant to cumulative effects, (3) an assessment of the nature of interaction of the proposed action, one alternative, and the no-action alternative with other actions, and (4) an evaluation of cumulative effects potentially resulting from these interactions.

5.1.1 Definition of Cumulative Effects

CEQ regulations stipulate that the cumulative effects analysis within an EA should consider the potential environmental impacts resulting from "the incremental impacts of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions" (40 CFR Part 1508.7). Recent CEQ guidance in *Considering Cumulative Effects* affirms this requirement, stating that the first steps in assessing cumulative effects involve defining the scope of the other actions and their interrelationship with the proposed action and alternatives. The scope must consider geographic and temporal overlaps and must also evaluate the nature of interactions among these actions.

Cumulative effects are most likely to arise when a relationship or synergism exists between a proposed action and alternatives and other actions expected to occur in a similar location or during a similar time period. Actions overlapping with or in close proximity to the proposed action would be expected to have more potential for a relationship than actions that may be geographically separated. Similarly, actions that coincide, even partially, in time would tend to offer a higher potential for cumulative effects.

To identify cumulative effects, this EA analysis addresses three questions:

1. Does a relationship exist such that elements of the proposed action might interact with elements of past, present, or reasonably foreseeable actions?

2. If one or more of the elements of the proposed action and another action could be expected to interact, would the proposed action affect or be affected by impacts of the other action?

3. If such a relationship exists, does an assessment reveal any potentially significant impacts not identified when the proposed action is considered alone?

In this EA, an effort has been made to identify all actions that are being considered and that are in the planning phase at this time. To the extent that details regarding such actions exist and

the actions have a potential to interact with the proposed action in this EA, these actions are included in this cumulative analysis. This approach enables decision makers to have the most current information available so that they can evaluate the environmental consequences of the proposed action.

5.1.2 Past, Present, and Reasonably Foreseeable Actions

This EA applies a stepped approach to provide decision makers with not only the cumulative effects of the proposed action and alternatives but also the incremental contribution of past, present, and reasonably foreseeable actions.

PAST ACTIONS RELEVANT TO THE PROPOSED ACTION AND ALTERNATIVES

Shaw AFB is an active military installation that undergoes continuous change in mission and in training requirements. This process of change is consistent with the United States defense policy that must be ready to respond to threats to American interests throughout the world. In the past eight years, two force structure changes have occurred at Shaw AFB. In 1996 the number of A/OA-10s was reduced from 39 to 18 Primary Aircraft Inventory (PAI) aircraft. These aircraft were later relocated to other Air Force installations. The Air Force also increased the number of F-16s at Shaw AFB from 54 to 78 PAI Block 50 aircraft by the end of August 1996. Base personnel increased by a total of 97 from 5,892 to 5,989 as a result of these 1996 actions.

By 2002 Shaw AFB was home to four squadrons of F-16 Block 50 aircraft—three 18 Primary Mission Aircraft Inventory (PMAI) squadrons and one 24 PMAI squadron. In FY03 the Air Force deactivated one of the 18 aircraft squadrons and added 12 newer F-16 Block 50 aircraft to the 20th FW. Each of the three squadrons now has 24 PMAI Block 50 F-16 aircraft. Base personnel amounted to 5,663 after this force structure change.

The base has completed construction of a new building to house the 28th Operational Weather Squadron and a new Dining Facility. EAs for the force structure change and this construction were completed and FONSI were issued. Shaw AFB constructed an extension to their wastewater discharge pipe to the Wateree River. This action required a pumping station and approximately five miles of additional pipeline.

In FY03, a temporary training mission was established at Shaw AFB. To support the mission, approximately 8,400 square feet of trailer space and 5,000 square feet of maintenance area, along with 22 personnel were added to the base. This construction activity was environmentally assessed in 2002. Three Aircraft Maintenance Units (AMUs) were completed by 2005 to provide space for administration, supervision, and training of personnel and storage of tools and supplies to support day-to-day flightline maintenance of fighter aircraft. The new AMUs totaled 36,000 square feet and expenditures were estimated at $6.8 million dollars. This project included the demolition of five facilities totaling 41,000 square feet. This construction activity was environmentally assessed in 2002.

PRESENT ACTIONS RELEVANT TO THE PROPOSED ACTION AND ALTERNATIVES

The base, like any other major institution, also requires occasional new construction, facility improvements, and infrastructure upgrades. Shaw AFB plans on completing in 2007 the construction of a new Library and Deployment Center.

REASONABLY FORESEEABLE ACTIONS THAT INTERACT WITH THE PROPOSED ACTION AND ALTERNATIVES

This category of actions includes Air Force actions that have a potential to coincide, either partially in time or geographic extent, with the proposed action. Information on these actions is included to determine whether these actions would, if implemented, incrementally affect environmental resources. These recently proposed actions include:

- Shaw AFB proposes to privatize on-base MFH. This would involve conveying 1,702 housing units to a private contractor. The contractor would conduct renovation, demolition, and construction, over a seven-year period, resulting in a total of 1,447 military housing units. The demolition/construction would be conducted in phases in order to keep as many units as possible filled during the project. While the majority of the HQ 3rd U.S. Army personnel may choose to live in local off-base or non-military housing, on-base housing would be an option for some. An Environmental Baseline Survey (EBS) and an EA were completed in 2005 and a FONSI signed in June 2005.
- Shaw AFB has been chosen as the site for the establishment of a permanent fighter detachment. An environmental analysis of that proposed action has been completed, and new facilities are being planned to serve this mission. An EA was completed in April 2005 and a FONSI signed on June 6, 2005.
- Shaw AFB is also being considered as a potential location for the beddown of the F-35 Lightning II Joint Strike Fighter. Environmental analysis for that action has not yet begun.

5.1.3 Analysis of Cumulative Effects

The following analysis examines how the impacts of the actions presented above might be affected by those resulting from the proposed action, one-alternative, and no-action alternative at Shaw AFB, and whether such a relationship would result in potentially significant impacts not identified when the proposed action or alternatives are considered individually.

With the no-action alternative, construction and land-clearing activities would not occur and the base population would not increase other than normal base growth.

No specific projects have been identified that would produce incremental impacts when added to other past, present, or reasonably feasible future actions. Shaw AFB is an active military installation that undergoes changes in mission and in training requirements in response to

defense policies, current threats, and tactical and technological advances. The base population experiences periods of decline and growth with changing missions and the current base population is somewhat larger now than in the past. The base, like any other major institution (e.g., university, industrial complex), requires new construction, facility improvements, infrastructure upgrades, and maintenance and repairs. All of these factors (i.e., mission changes, facility improvements, and tenant use) will continue to occur before, during, and after the proposed action if it is selected.

The base actions described in Section 5.1.2 affect very specific areas on base and, for the most part, the scope of the actions is focused within those specific areas**.** None of these on-base actions would be expected to result in more than negligible impacts individually or cumulatively.

The cumulative effects of the proposed construction of a readiness complex and these future actions would remain below the threshold of significance for airspace use and any other resource area.

5.2 IRREVERSIBLE AND IRRETRIEVABLE COMMITMENT OF RESOURCES

NEPA requires that environmental analysis include identification of "...any irreversible and irretrievable commitments of resources, which would be involved in the proposed action should it be implemented." Irreversible and irretrievable resource commitments are related to the use of nonrenewable resource and the effects that the uses of these resources have on future generations. Irreversible effects primarily result from the use or destruction of a specific resource (e.g., energy and minerals) that cannot be replaced within a reasonable time frame. Irretrievable resource commitments involve the loss in value of an affected resource that cannot be restored as a result of the action (e.g., extinction of a threatened or endangered species or the disturbance of a cultural site).

For the proposed action and action alternative, most resource commitments are neither irreversible nor irretrievable. Those limited resources that may involve a possible irreversible or irretrievable commitment under the proposed action and action alternative are discussed below.

Training operations at Shaw AFB associated with Shaw's mission and the proposed facilities construction would continue and involve consumption of nonrenewable resources, such as gasoline and diesel used in vehicles. None of these activities would be expected to significantly decrease the availability of minerals or petroleum resources.

6.0 REFERENCES

Apartment Index. 2005. "Columbia Market." Available at www.aptindex.com. Accessed on 18 Dec. 2006.

Cox, Gary. (Professional Engineer, 20 CES/CEC). 2007. Personal Communication by email from Gary Cox to Samuel Johnson (Environmental Quality Manager, 20 CES/CEV) on March 29, 2007.

Dondero, Richard. 2005. Personal Communication between Richard Dondero, Santee-Lynches Regional Council of Governments and Susan Engelke, SAIC. Discussion of Housing Market near Shaw AFB.

Headquarters Air Combat Command (HQ ACC). 2006. "ESOHCAMP Pre-Visit Questionnaire, Shaw AFB."

Johnson, Samuel L. (Environmental Quality Manager, 20 CES/CEV). 2006. Personal Communication by email with David Dister, Woolpert Inc., on November 2, 2006.

_____ . 2007. Personal Communication by email between Samuel Johnson, Environmental Quality Manager (20 CES/CEV) and David Helter, Woolpert Inc., on May 15, 2007.

McKay, Danny. 2007a. Personal Communication by email from Danny McKay to Sam Johnson (20 CES/CEV) on March 29, 2007.

_____ . 2007b. Personal Communication by email from Danny McKay to David Helter, Woolpert Inc. (20 CES/CEV) on April 9, 2007.

National Register Information System (NRIS). 2003. Sumter and Richland Counties, South Carolina. National Park Service. www.nr.nps.gov.

Realty Times Market Conditions. 2006. "National Summary." Available at: http://realtytimes.com/rtmcrloc/South_Carolina~Sumter. Accessed on 18 Dec. 2006.

Relocate-America Community Directory. 2005. "Shaw AFB, South Carolina." Available at: http://www.relocate-america.com/states/sc/cities/shaw.htm. Accessed on 18 Dec. 2006.

Robert and Company. 1994. Shaw Air Force Base Sumter County Joint Compatible Land Use Study, Sumter County, South Carolina.

Rust Environment & Infrastructure, Inc. 1997. Final Feasibility Study/Corrective Measures Study Report. Operable Unit #2B, TCE Investigation Installation Restoration Program Site No. OT-16B, April 1997.

Shaw AFB. 1999. Shaw Air Force Base General Plan, revised 1999.

Shaw AFB Services. 2005. "20th Services Squadron Commercial Sponsorship." Available at: www.20thservices.com/sponsorship.html. Accessed on 18 Dec. 2006.

South Carolina Department of Health and Environmental Control (SCDHEC). 2003. *Regulation 61-62 – Air Pollution Control Regulations and Standards*. Web site http://www.scdhec.com/eqc/baq/regs/word/R61-62.doc.

_____ . 2004. *Early Action Compact Regulations*. Web site http://www.scdhec.com/eqc/baq/pubs/eacsrnpr.pdf.

South Carolina Department of Education. 2005. "District Information." Available at: http://ed.sc.gov/agency/offices/finance/districtinformation/indexx.html. Accessed on 18 Dec. 2006.

South Carolina Department of Natural Resources (SCDNR). 2002. South Carolina Rare, Threatened & Endangered Species Inventory. Available via the Internet: www.dnr.state.sc.us/pls/heritage/county_species.list?county=sumter . Accessed on 28 Jan. 2003.

South Carolina (SC) Employment Security Commission. 2006. "Labor Market Information." Available at: http://www.sces.org/lmi/index.asp. Accessed on 18 Dec. 2006.

South Carolina Heritage Trust (SCHT). 2002. Geographic Database of Rare and Endangered Species. South Carolina Rare, Threatened and Endangered Species Inventory. Available via a secure Internet site and login. Accessed on 28 and 29 Jan. 2003.

South Carolina Local School Directory. 2006. "Sumter City." Available at: http://sc.localschooldirectory.com/index.php/cPath/41. Accessed on 18 Dec. 2006.

Stahl, Ralph G. Jr., Kevin N. Baer, David G. Hutton, Robert L. Boer, and Timothy J. Ward. 1995. Toxicity evaluation of trap and skeet shooting targets to aquatic test species. *Ecotoxicology Volume 4*, Number 6 Pages 385-392. December.

Sultzman, L. 1996. Cherokee History. www.tolatsga.org/Cherokee1.html .

Sumter County Executive Summary. 2006. Available at: http://www.centralsc.org/shared/docs/0/sumter%20executive%20summary11-13-06.pdf. Accessed on 18 Dec. 2006.

Sumter South Carolina Development Board. 2005. "Worker Training." Available at: http://www.sumteredge.com/work_training.html. Accessed on 18 Dec. 2006.

_____ . 2005a. "News and Headlines: Kaydon Bearings Expands Second Sumter Plant." Available at: http://www.sumteredge.com/news_Kaydon_Plant12_press_release.html. Accessed on 18 Dec. 2006.

_____ . 2005b. "Workforce." Available at: http://www.sumteredge.com/size_labor.html. Accessed on 18 Dec. 2006.

_____ . 2005c. "Major Employers." Available at: http://www.sumteredge.com/major_empoy.html. Accessed on 18 Dec. 2006.

Sumter School District #17 Comprehensive Annual Financial Report. 2005. Available at: http://district.sumter17.k12.sc.us/site_res_view_folder.aspx?id=05e5a889-77cd-471d9816-8c49465cf5e6. Accessed on 18. Dec. 2006.

Tucker, James E. (20 CES/CEOUW). 2007. Personal Communication by email from James Tucker to Danny McKay (20 CES/CEV) on March 29, 2007.

Unified Facilities Criteria (UFC) 3-260-01. 2001. Airfield and Heliport Planning and Design Criteria. November.

United States Air Force (Air Force). 1992. Air Installation Compatible Use Zone (AICUZ) Program Managers Handbook. Headquarters, United States Air Force, Washington, D.C.

_____ . 1994. Air Installation Compatible Use Zone Study (AICUZ) Shaw AFB, Sumter South Carolina, Volume One, July 1994.

_____ . 1996. Environmental Assessment for Proposed Force Structure Change at Shaw Air Force Base, Sumter, South Carolina. March 1996.

_____ . 1998. Storm Water Pollution Prevention Plan For Shaw Air Force Base, South Carolina. November 1998.

_____ . 2001. Integrated Natural Resources Management Plan, Shaw Air Force Base, South Carolina, FY 2001-2005. July 2001.

_____ . 2002b. Draft Environmental Assessment Military Family Housing Privatization Shaw Air Force Base, South Carolina. October 2002.

_____ . 2002c. Environmental Assessment For Force Structure Change at Shaw Air Force Base, South Carolina. November 2002.

_____ . 2004a. Environmental Assessment for New Readiness Complex for Shaw Air Force Base, South Carolina.

_____ . 2004b. Environmental Assessment for Wing Infrastructure Development Outlook (WINDO) Plan, Shaw Air Force Base, South Carolina.

_____ . 2005a. Environmental Assessment for Construction of Physical Security Improvements for Shaw Air Force Base, South Carolina.

_____ . 2005b. Shaw Air Force Base Environmental Restoration Program Site Status Summaries. Shaw Air Force Base, South Carolina. December.

_____ . 2005c. Final Environmental Assessment for a Fighter Detachment Facility, Shaw Air Force Base, South Carolina.

_____ . 2006. Shaw Air Force Base 2005 Air Emissions Inventory. Prepared for 20 CES/CEV Environmental Management Flight, Shaw AFB, SC 29152. November 2006.

_____ . 2006a. Final General Plan. Shaw Air Force Base.

_____ . 2006b. Environmental Baseline Survey, Proposed North Ramp Land Acquisition.

_____ . 2006c. Integrated Cultural Resources Management Plan, Shaw Air Force Base, South Carolina, Shaw AFB Plan 32-7065, August 2006.

United States Army Corps of Engineers (USACE)-Savannah District. Land Spreading Sludge Area July 2003 Semi-Annual Monitoring Report. July 2003.

U.S. Bureau of Economic Analysis. 2006. "Total Employment by Industry." Available at: http://www.bea.gov/bea/regional/reis/default.cfm?catable=CA25. Accessed on 18 Dec. 2006.

_____ . 2006a. "Earnings by Industry." Available at: http://www.bea.gov/bea/regional/reis/default.cfm?catable=CA25. Accessed on 18 Dec. 2006.

_____ . 2006b. "Per Capita Income." Available at: http://www.bea.gov/bea/regional/reis/default.cfm?catable=CA25. Accessed on 18 Dec. 2006.

U.S. Bureau of Labor Statistics. 2006. "State and Local Unemployment." Available at: http://www.bls.gov/lau/home.htm. Accessed on 18 Dec. 2006.

United States Census Bureau. State and County Quick Facts. 2000. Available on-line at www.census.gov.

_____ . 2006. "Quick facts: Sumter County." Available at: http://quickfacts.census.gov/qfd/states/45/45085.html. Accessed on 18 Dec. 2006.

United States Department of Commerce, Economics and Statistics Administration (USDCESA). 2000. Regional Economic Information System (REIS) 1969-1999. Bureau of Economic Analysis. June 2000.

_____ . 2000. Regional Economic Information System (REIS) 1969-1999. Bureau of Economic Analysis. June 2000.

United States Environmental Protection Agency (USEPA). 2002. *U.S. Environmental Protection Agency 2002 National Emissions Inventory Microsoft Access Database.* Accessed May 2006.

_____ . 2005. Transportation and Air Quality., http://www.epa.gov/otaq/. February 10, 2005. Accessed on 18 March 2005.

United States Fish and Wildlife Service (USFWS). 2003, Letter dated April 2, 2003 to Mr. David Dischner, Project Manager, Science Application International Corporation about federally endangered, threatened, and candidate species in Sumter County, South Carolina.

PERSONS AND AGENCIES CONTACTED

Cox, Gary. 2007. 20 CES/CEC Shaw AFB, South Carolina.

Grimes, Jeree. 2004. HQ Air Combat Command-Environmental Quality Branch.

Johnson, Jennifer. 2007. 20 CES/CEVQ Shaw AFB, South Carolina.

Johnson, Samuel. 2007. 20 CES/CEVP Shaw AFB, South Carolina.

McKay, Danny. 2007. 20 CES Shaw AFB, South Carolina.

Nesbitt, Chuck. 2007. Sumter County, South Carolina.

Singleton, Heyward. 2004. Water Programs Manager 20 CES Shaw AFB, South Carolina.

Tucker, James E. 2007. 20 CES/CEOUW Shaw AFB, South Carolina.

This page is intentionally blank.

7.0 LIST OF PREPARERS

John "Jay" Austin, ACC Project Manager
B.A., Biology, University of Virginia, Charlottesville, 1999
Years of Experience: 7

Alysia Baumann, SAIC Air Quality
B.S., Chemical Engineering, Colorado State University, Fort Collins, 2002
Years of Experience: 4

Hilary Brich, SAIC Editor
Years of Experience: 13

David M. Dischner, SAIC Senior Analyst
B.A., 1974, Urban Affairs, Virginia Polytechnic Institute and State University, Blacksburg
Hazardous Materials Management Certificate, 1988, University of California, Riverside
Years of Experience: 32

David C. Dister, Woolpert Environmental Scientist
B.A., Botany, Miami University, Oxford, OH 1975
Secondary Education Teaching Certificate, Biology & Earth Science, University of Cincinnati, Cincinnati, OH 1981
Years of Experience: 25

David Helter, AICP Woolpert
Project Manger
MS, Urban and Regional Planning, Florida State University, 1991
B.S., Geology, Bowling Green State University, 1985
Years of Experience: 15

Stuart Jennings, Woolpert Environmental Scientist/Ecologist
M.A., Biological Sciences, Marshall University, 2001
B.S., Botany, Marshall University, 1997
Years of Experience: 6

Jerry T. Lang, PhD Woolpert
Environmental Scientist
Ph.D., Entomology, The Ohio State University
M.S., Entomology, The Ohio State University
B.A., Zoology, Miami University
Years of Experience: 36

Howard B. Rock, SAIC Senior Analyst
B.A., Virginia Wesleyan College, Norfolk, VA, 1974
Cultural Resources Management Certificate, University of Nevada, Reno, 1990
Years of Experience: 31

Pamela Safford, SAIC Socioeconomics
Years of Experience: 1

APPENDIX A: INTERAGENCY/INTERGOVERNMENTAL COORDINATION FOR ENVIRONMENTAL PLANNING (IICEP) LETTERS

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR COMBAT COMMAND
LANGLEY AIR FORCE BASE, VIRGINIA

DEC 05 2006

The Honorable Lindsey Graham
United States Senate
508 Hampton Street, Suite 202
Columbia, SC 29201

Dear Senator Graham,

The United States Air Force (Air Force) is in the process of preparing an Environmental Assessment (EA) at Shaw Air Force Base (AFB), South Carolina to assess the potential environmental consequences of the Base Realignment and Closure (BRAC) commission recommendations contained within the Defense Base Closure and Realignment Act of 1990 (P.L. 101-510) as amended.

The proposal consists of several elements including relocating the Headquarters (HQ) 3rd US Army, at Fort McPherson, Georgia and the 3rd US Army support office at Fort Gillem, Georgia to Shaw AFB. The proposal also includes establishing a Centralized Intermediate Repair Facility (CIRF) at Shaw AFB for ALQ-184 pods and relocating base-level TF-34 engine intermediate maintenance from Shaw AFB to other Air Force facilities. These elements would result in a net increase of approximately 1,900 personnel and approximately 20 construction projects at Shaw AFB.

We request your assistance in identifying potential areas of environmental impact to be addressed in the EA. If you have any specific items of interest about the proposal, we would like to hear from you by December 30, 2006. Please contact the EA Project Manager, Mr. Jay Austin, at HQ ACC/A7ZP 129 Andrews Street, Suite 102 Langley AFB Virginia 23665-2769 or at (757) 764-9197 with any questions or concerns that you or your staff may have. Thank you for your assistance in this matter.

Sincerely,

VR

TIMOTHY A. BYERS
COLONEL
Director of Installations and Mission Support (A7)

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR COMBAT COMMAND
LANGLEY AIR FORCE BASE, VIRGINIA

DEC 05 2006

The Honorable Jim Demint
United States Senate
1901 Main Street, Suite 1475
Columbia SC 29201

Dear Senator Demint,

The United States Air Force (Air Force) is in the process of preparing an Environmental Assessment (EA) at Shaw Air Force Base (AFB), South Carolina to assess the potential environmental consequences of the Base Realignment and Closure commission recommendations contained within the Defense Base Closure and Realignment Act of 1990 (P.L. 101-510) as amended.

The proposal consists of several elements including relocating the Headquarters (HQ) 3rd US Army, at Fort McPherson, Georgia and the 3rd US Army support office at Fort Gillem, Georgia to Shaw AFB. The proposal also includes establishing a Centralized Intermediate Repair Facility (CIRF) at Shaw AFB for ALQ-184 pods and relocating base-level TF-34 engine intermediate maintenance from Shaw AFB to other Air Force facilities. These elements would result in a net increase of approximately 1,900 personnel and approximately 20 construction projects at Shaw AFB.

We request your assistance in identifying potential areas of environmental impact to be addressed in the EA. If you have any specific items of interest about the proposal, we would like to hear from you by December 30, 2006. Please contact the EA Project Manager, Mr. Jay Austin, at HQ ACC/A7ZP 129 Andrews Street Suite 102 Langley AFB, Virginia 23665-2769 or at (757) 764-9197 with any questions or concerns that you or your staff may have. Thank you for your assistance in this matter.

Sincerely,

TIMOTHY A. BYERS
COLONEL
Director of Installations and Mission Support (A7)

Global Power For America

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR COMBAT COMMAND
LANGLEY AIR FORCE BASE, VIRGINIA

DEC 05 2006

The Honorable John Spratt
United States House of Representatives
5th Congressional District
707 Bultman Drive
Sumter, SC 29150

Dear Mr. Spratt,

The United States Air Force (Air Force) is in the process of preparing an Environmental Assessment (EA) at Shaw Air Force Base (AFB), South Carolina to assess the potential environmental consequences of the Base Realignment and Closure (BRAC) commission recommendations contained within the Defense Base Closure and Realignment Act of 1990 (P.L. 101-510) as amended.

The proposal consists of several elements including relocating the Headquarters (HQ) 3rd US Army, at Fort McPherson, Georgia and the 3rd US Army support office at Fort Gillem, Georgia to Shaw AFB. The proposal also includes establishing a Centralized Intermediate Repair Facility (CIRF) at Shaw AFB for ALQ-184 pods and relocating base-level TF-34 engine intermediate maintenance from Shaw AFB to other Air Force facilities. These elements would result in a net increase of approximately 1,900 personnel and approximately 20 construction projects at Shaw AFB.

We request your assistance in identifying potential areas of environmental impact to be addressed in the EA. If you have any specific items of interest about the proposal, we would like to hear from you by December 30, 2006. Please contact the EA Project Manager, Mr. Jay Austin, at HQ ACC/A7ZP 129 Andrews Street, Suite 102 Langley AFB VA 23665-2769 or at (757) 764-9197 with any questions or concerns that you or your staff may have. Thank you for your assistance in this matter.

Sincerely,

TIMOTHY A. BYERS
COLONEL
Director of Installations and Mission Support (A7)

Global Power For America

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR COMBAT COMMAND
LANGLEY AIR FORCE BASE, VIRGINIA

DEC 05 2006

The Honorable James E. Clyburn
United States House of Representatives
6th Congressional District
1703 Gervais Street
Columbia, SC 29201

Dear Mr. Clyburn,

The United States Air Force (Air Force) is in the process of preparing an Environmental Assessment (EA) at Shaw Air Force Base (AFB), South Carolina to assess the potential environmental consequences of the Base Realignment and Closure (BRAC) commission recommendations contained within the Defense Base Closure and Realignment Act of 1990 (P.L. 101-510) as amended.

The proposal consists of several elements including relocating the Headquarters (HQ) 3rd US Army, at Fort McPherson, Georgia and the 3rd US Army support office at Fort Gillem, Georgia to Shaw AFB. The proposal also includes establishing a Centralized Intermediate Repair Facility (CIRF) at Shaw AFB for ALQ-184 pods and relocating base-level TF-34 engine intermediate maintenance from Shaw AFB to other Air Force facilities. These elements would result in a net increase of approximately 1,900 personnel and approximately 20 construction projects at Shaw AFB.

We request your assistance in identifying potential areas of environmental impact to be addressed in the EA. If you have any specific items of interest about the proposal, we would like to hear from you by December 30, 2006. Please contact the EA Project Manager, Mr. Jay Austin, at HQ ACC/A7ZP 129 Andrews Street, Suite 102 Langley AFB Virginia 23665-2769 or at (757) 764-9197 with any questions or concerns that you or your staff may have. Thank you for your assistance in this matter.

Sincerely,

VR

TIMOTHY A. BYERS
COLONEL
Director of Installations and Mission Support (A7)

Global Power For America

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR COMBAT COMMAND
LANGLEY AIR FORCE BASE, VIRGINIA

DEC 05 2006

MEMORANDUM FOR: The Honorable John C. Land III
South Carolina Senate
504 Gressette Building
Columbia, SC 29202

FROM: HQ ACC/A7-2 (CE)
129 Andrews Street, Suite 102
Langley AFB VA 23665

SUBJECT: Shaw Air Force Base (AFB) Base Realignment and Closure (BRAC) Environmental Assessment.

1. The United States Air Force (Air Force) is in the process of preparing an Environmental Assessment (EA) at Shaw Air Force Base (AFB), South Carolina (SC) to assess the potential environmental consequences of the Base Realignment and Closure (BRAC) commission recommendations contained within the Defense Base Closure and Realignment Act of 1990 (P.L. 101-510) as amended.

2. The proposal consists of several elements including relocating the Headquarters (HQ) 3rd US Army, at Fort McPherson, Georgia (GA) and the 3rd US Army support office at Fort Gillem, GA to Shaw AFB, SC. The proposal also includes establishing a Centralized Intermediate Repair Facility (CIRF) at Shaw AFB, SC for ALQ-184 pods and relocating base-level TF-34 engine intermediate maintenance from Shaw AFB to other Air Force facilities. These elements would result in a net increase of approximately 1,900 personnel and approximately 20 construction projects at Shaw AFB.

3. We request your assistance in identifying potential areas of environmental impact to be addressed in the EA. If you have any specific items of interest about the proposal, we would like to hear from you by 30 December 06. Please contact the EA Project Manager, Mr. Jay Austin, at the above address or at (757) 764-9197 with any questions or concerns that you or your staff may have. Thank you for your assistance in this matter.

TIMOTHY A. BYERS
COLONEL
Director of Installations and Mission Support (A7)

Global Power For America

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR COMBAT COMMAND
LANGLEY AIR FORCE BASE, VIRGINIA

DEC 05 2006

MEMORANDUM FOR: William S. Randolph, Mayor Pro Tem
Sumter County Council
21 North Main Street
Sumter, SC 29150

FROM: HQ ACC/A7-2 (CE)
129 Andrews Street, Suite 102
Langley AFB VA 23665

SUBJECT: Shaw Air Force Base (AFB) Base Realignment and Closure (BRAC) Environmental Assessment.

1. The United States Air Force (Air Force) is in the process of preparing an Environmental Assessment (EA) at Shaw Air Force Base (AFB), South Carolina (SC) to assess the potential environmental consequences of the Base Realignment and Closure (BRAC) commission recommendations contained within the Defense Base Closure and Realignment Act of 1990 (P.L. 101-510) as amended.

2. The proposal consists of several elements including relocating the Headquarters (HQ) 3rd US Army, at Fort McPherson, Georgia (GA) and the 3rd US Army support office at Fort Gillem, GA to Shaw AFB, SC. The proposal also includes establishing a Centralized Intermediate Repair Facility (CIRF) at Shaw AFB, SC for ALQ-184 pods and relocating base-level TF-34 engine intermediate maintenance from Shaw AFB to other Air Force facilities. These elements would result in a net increase of approximately 1,900 personnel and approximately 20 construction projects at Shaw AFB.

3. We request your assistance in identifying potential areas of environmental impact to be addressed in the EA. If you have any specific items of interest about the proposal, we would like to hear from you by 30 December 06. Please contact the EA Project Manager, Mr. Jay Austin, at the above address or at (757) 764-9197 with any questions or concerns that you or your staff may have. Thank you for your assistance in this matter.

DANIEL P. WHALEN
Colonel, USAF
IMA to the Director of Installations (A7)

Global Power For America

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR COMBAT COMMAND
LANGLEY AIR FORCE BASE, VIRGINIA

DEC 05 2006

MEMORANDUM FOR: Phil Degarmo
U.S. Fish and Wildlife Service Ecological Field Office
176 Croghan Spur Road, Suite 200
Charleston, SC 29407-7558

FROM: HQ ACC/A7Z
129 Andrews Street, Suite 102
Langley AFB VA 23665

SUBJECT: Shaw Air Force Base (AFB) Base Realignment and Closure (BRAC) Environmental Assessment.

1. The United States Air Force (Air Force) is in the process of preparing an Environmental Assessment (EA) at Shaw AFB, South Carolina (SC) to assess the potential environmental consequences of the BRAC commission recommendations contained within the Defense Base Closure and Realignment Act of 1990 (P.L. 101-510) as amended.

2. The proposal consists of several elements including relocating the Headquarters (HQ) 3rd US Army, at Fort McPherson, Georgia (GA) and the 3rd US Army support office at Fort Gillem, GA to Shaw AFB, SC. The proposal also includes establishing a Centralized Intermediate Repair Facility (CIRF) at Shaw AFB, SC for ALQ-184 pods and relocating base-level TF-34 engine intermediate maintenance from Shaw AFB to other Air Force facilities. These elements would result in a net increase of approximately 1,900 personnel and approximately 20 construction projects at Shaw AFB.

3. In association with the analysis and in compliance with the Endangered Species Act, we are requesting information regarding federally listed threatened, endangered, candidate, and proposed to be listed species that occur on Shaw AFB. Please provide your response or any specific concerns by 30 December 06 to the EA Project Manager, Mr. Jay Austin, at the above address or at (757) 764-9197. Thank you for your assistance in this matter.

ANTHONY A. FOTI
Colonel, USAF
Chief, Programs Division (A7Z)

Global Power For America

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR COMBAT COMMAND
LANGLEY AIR FORCE BASE, VIRGINIA

DEC 05 2006

MEMORANDUM FOR: Valerie Marcil, Staff Archaeologist
South Carolina Department of Archives and History
South Carolina State Historic Preservation Office
8301 Parklane Road
Columbia, SC 29223-4905

FROM: HQ ACC/A7Z
129 Andrews Street, Suite 102
Langley AFB VA 23665

SUBJECT: Shaw Air Force Base (AFB) Base Realignment and Closure (BRAC) Environmental Assessment.

1. The United States Air Force (Air Force) is in the process of preparing an Environmental Assessment (EA) at Shaw AFB, South Carolina (SC) to assess the potential environmental consequences of the BRAC commission recommendations contained within the Defense Base Closure and Realignment Act of 1990 (P.L. 101-510) as amended.

2. The proposal consists of several elements including relocating the Headquarters (HQ) 3rd US Army, at Fort McPherson, Georgia (GA) and the 3rd US Army support office at Fort Gillem, GA to Shaw AFB, SC. The proposal also includes establishing a Centralized Intermediate Repair Facility (CIRF) at Shaw AFB, SC for ALQ-184 pods and relocating base-level TF-34 engine intermediate maintenance from Shaw AFB to other Air Force facilities. These elements would result in a net increase of approximately 1,900 personnel and approximately 20 construction projects at Shaw AFB.

3. We are beginning the process of identifying applicable cultural resources information for areas within Shaw AFB. We would appreciate any assistance you could provide in identifying and retrieving this important information, as well as concerns you may have about the potential effects of the proposal on significant cultural resources. Please respond to: Science Applications International Corporation (SAIC), Shaw AFB BRAC EA, 22 Enterprise Parkway, Suite 200, Hampton, Virginia, 23666.

4. If you have any specific items of interest about the proposal, we would like to hear from you by 30 December 06. Please contact the EA Project Manager, Mr. Jay Austin, at the above address or at (757) 764-9197 with any questions or concerns that you or your staff may have. Thank you for your assistance in this matter.

ANTHONY A. FOTI
Colonel, USAF
Chief, Programs Division (A7Z)

Global Power For America

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR COMBAT COMMAND
LANGLEY AIR FORCE BASE, VIRGINIA

DEC 05 2006

MEMORANDUM FOR: Mr. Gilbert Blue, Chairman
Catawba Indian Tribe
996 Avenue of the Nations
Rock Hill, SC 29704

FROM: HQ ACC/A7Z
129 Andrews Street, Suite 102
Langley AFB VA 23665

SUBJECT: Shaw Air Force Base (AFB) Base Realignment and Closure (BRAC) Environmental Assessment.

1. The United States Air Force (Air Force) is in the process of preparing an Environmental Assessment (EA) at Shaw Air Force Base (AFB), South Carolina (SC) to assess the potential environmental consequences of the Base Realignment and Closure (BRAC) commission recommendations contained within the Defense Base Closure and Realignment Act of 1990 (P.L. 101-510) as amended.

2. The proposal consists of several elements including relocating the Headquarters (HQ) 3rd US Army, at Fort McPherson, Georgia (GA) and the 3rd US Army support office at Fort Gillem, GA to Shaw AFB, SC. The proposal also includes establishing a Centralized Intermediate Repair Facility (CIRF) at Shaw AFB, SC for ALQ-184 pods and relocating base-level TF-34 engine intermediate maintenance from Shaw AFB to other Air Force facilities. These elements would result in a net increase of approximately 1,900 personnel and approximately 20 construction projects at Shaw AFB.

3. We request your assistance in identifying potential areas of environmental impact to be addressed in the EA. If you have any specific items of interest about the proposal, we would like to hear from you by 30 December 06. Please contact the EA Project Manager, Mr. Jay Austin, at the above address or at (757) 764-9197 with any questions or concerns that you or your staff may have. Thank you for your assistance in this matter.

ANTHONY A. FOTI
Colonel, USAF
Chief, Programs Division (A7Z)

Global Power For America

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR COMBAT COMMAND
LANGLEY AIR FORCE BASE, VIRGINIA

DEC 0 5 2006

MEMORANDUM FOR: South Carolina Department of Health and Environmental Control
2600 Bull Street
Columbia, SC 29201

FROM: HQ ACC/A7Z
129 Andrews Street, Suite 102
Langley AFB VA 23665

SUBJECT: Shaw Air Force Base (AFB) Base Realignment and Closure (BRAC) Environmental Assessment.

1. The United States Air Force (Air Force) is in the process of preparing an Environmental Assessment (EA) at Shaw Air Force Base (AFB), South Carolina (SC) to assess the potential environmental consequences of the Base Realignment and Closure (BRAC) commission recommendations contained within the Defense Base Closure and Realignment Act of 1990 (P.L. 101-510) as amended.

2. The proposal consists of several elements including relocating the Headquarters (HQ) 3rd US Army, at Fort McPherson, Georgia (GA) and the 3rd US Army support office at Fort Gillem, GA to Shaw AFB, SC. The proposal also includes establishing a Centralized Intermediate Repair Facility (CIRF) at Shaw AFB, SC for ALQ-184 pods and relocating base-level TF-34 engine intermediate maintenance from Shaw AFB to other Air Force facilities. These elements would result in a net increase of approximately 1,900 personnel and approximately 20 construction projects at Shaw AFB.

3. We request your assistance in identifying potential areas of environmental impact to be addressed in the EA. If you have any specific items of interest about the proposal, we would like to hear from you by 30 December 06. Please contact the EA Project Manager, Mr. Jay Austin, at the above address or at (757) 764-9197 with any questions or concerns that you or your staff may have. Thank you for your assistance in this matter.

ANTHONY A. FOTI
Colonel, USAF
Chief, Programs Division (A7Z)

Global Power For America

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR COMBAT COMMAND
LANGLEY AIR FORCE BASE, VIRGINIA

DEC 05 2006

MEMORANDUM FOR: Jean Manheimer, South Carolina State Clearinghouse
Office of State Budget
1201 Main Street, Suite 950
Columbia, SC 29201

FROM: HQ ACC/A7Z
129 Andrews Street, Suite 102
Langley AFB VA 23665

SUBJECT: Shaw Air Force Base (AFB) Base Realignment and Closure (BRAC) Environmental Assessment.

1. The United States Air Force (Air Force) is in the process of preparing an Environmental Assessment (EA) at Shaw Air Force Base (AFB), South Carolina (SC) to assess the potential environmental consequences of the Base Realignment and Closure (BRAC) commission recommendations contained within the Defense Base Closure and Realignment Act of 1990 (P.L. 101-510) as amended.

2. The proposal consists of several elements including relocating the Headquarters (HQ) 3rd US Army, at Fort McPherson, Georgia (GA) and the 3rd US Army support office at Fort Gillem, GA to Shaw AFB, SC. The proposal also includes establishing a Centralized Intermediate Repair Facility (CIRF) at Shaw AFB, SC for ALQ-184 pods and relocating base-level TF-34 engine intermediate maintenance from Shaw AFB to other Air Force facilities. These elements would result in a net increase of approximately 1,900 personnel and approximately 20 construction projects at Shaw AFB.

3. We request your assistance in identifying potential areas of environmental impact to be addressed in the EA. If you have any specific items of interest about the proposal, we would like to hear from you by 30 December 06. Please contact the EA Project Manager, Mr. Jay Austin, at the above address or at (757) 764-9197 with any questions or concerns that you or your staff may have. Thank you for your assistance in this matter.

ANTHONY A. FOTI
Colonel, USAF
Chief, Programs Division (A7Z)

Global Power For America

This page is intentionally blank.

STATE AND FEDERAL RESPONSES

This page is intentionally blank.

THE South Carolina Archives & History Center
History & Heritage For All Generations

December 21, 2006

Mr. Jay Austin
SIAC
Shaw AFB EA
22 Enterprise Parkway, Suite 200
Hampton, VA 23666

RE: Shaw Air Force Base (AFB) Base Realignment and Closure (BRAC) Environmental Assessment

Dear Mr. Austin:

This letter is in response to a letter dated December 5, 2006 from Colonel Anthony A. Foti regarding the preparation of an Environmental Assessment to address the BRAC recommendations for Shaw AFB contained within the Defense Base Closure and Realignment Act of 1990 (P.L. 101-510) as amended. We would simply like to note that Shaw AFB has done an excellent job of surveying and evaluating cultural resource both at Shaw and the Poinsett Electronic Weapons Combat Range. As you likely know, there are numerous resources at Shaw and the Combat Range that should be considered. We recommend that the EA draw on the databases and site information retained by Shaw to assess the potential for effects from the proposed undertaking. Additionally, we recommend that the EA make sure that all survey is up to date in identifying and evaluating recent past and Cold War resources.

We will look forward to receipt of a draft EA. Thank you for coordination with our office.

Sincerely,

Valerie Marcil
Staff Archaeologist
State Historic Preservation Office

S.C. Department of Archives & History ◆ 8301 Parklane Road ◆ Columbia ◆ South Carolina ◆ 29223-4905 ◆ 803-896-6100 ◆ www.state.sc.us/scdah

United States Department of the Interior

FISH AND WILDLIFE SERVICE
176 Croghan Spur Road, Suite 200
Charleston, South Carolina 29407
December 27, 2006

Mr. Jay Austin
HQ ACC/A7Z
129 Andrews Street, Suite 102
Langley AFB VA 23665

Re: BRAC Actions
FWS Log. No. 2007-SL-0164
Sumter County, South Carolina

Dear Mr. Austin:

The U.S. Fish and Wildlife Service (Service) has reviewed your letter received on 11 December 2006 regarding the above-referenced projects and offers the following comments.

We are providing a list of federally protected species and species of concern which have the potential to occur in Sumter County to aid you in determining the impacts your project may have on protected species. This list includes known occurrences and areas where the species has a high possibility of occurring. Records are updated continually and may be different from the following. This list should be used only as a guideline, not as the final authority.

Sumter

Bald eagle	Haliaeetus leucocephalus	T	Known
Red-cockaded woodpecker	Picoides borealis	E	Known
Shortnose sturgeon	Acipenser brevirostrum*	E	Known
Canby's dropwort	Oxypolis canbyi	E	Known
Chaff-seed	Schwalbea americana	E	Known
Southern Dusky Salamander	Desmognathus auriculatus	SC	Possible
Dwarf burhead	Echinodorus parvulus	SC	Known
Boykin's lobelia	Lobelia boykinii	SC	Known
Pineland plantain	Plantago sparsiflora	SC	Known
Awned meadowbeauty	Rhexia aristosa	SC	Known
Biltmore greenbrier	Smilax biltmoreana	SC	Known
Bachman's sparrow	Aimophia aestivalis	SC	Known
Henslow's sparrow	Ammodramus henslowii	SC	Known
American kestrel	Falco sparverius	SC	Possible
Loggerhead shrike	Lanius ludovicianus	SC	Possible
Painted bunting	Passerina ciris ciris	SC	Possible

TAKE PRIDE IN AMERICA

Madtom, broadtail	Noturus sp 2	SC	Possible
Rafinesque's big-eared bat	Corynorhinus rafinesquii	SC	Known

T- Federally Threatened, E- Federally Endangered, SC- Species of Concern

Thank you for the opportunity to provide comments on the proposed project. If you require additional assistance, please contact Tera Baird at (843) 727-4707 ext. 225.

Sincerely,

Tera L. Baird

FOR Timothy N. Hall
Field Supervisor

This page is intentionally blank.

APPENDIX B: AIR QUALITY

This appendix presents an overview of the Clean Air Act (CAA) and the State of South Carolina air quality program. The appendix also discusses emission factor development and calculations including assumptions employed in the air quality analyses.

Air Quality Program Overview

National Ambient Air Quality Standards:

- In order to protect public health and welfare, the USEPA has developed numerical concentration-based standards or National Ambient Air Quality Standards (NAAQS) for six "criteria" pollutants (based on health-related criteria) under the provisions of the CAA Amendments of 1970. There are two kinds of NAAQSs: Primary and Secondary standards. Primary standards prescribe the maximum permissible concentration in the ambient air to protect public health including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards prescribe the maximum concentration or level of air quality required to protect public welfare including protection against decreased visibility, damage to animals, crops, vegetation, and buildings *(40 CFR Part 51).*

- The CAA gives states the authority to establish air quality rules and regulations. These rules and regulations must be equivalent to, or more stringent than, the Federal program. The Bureau of Air Quality (BAQ) within the South Carolina Department of Health and Environmental Control (SCDHEC) administers the state's air pollution control program under authority of the Air Pollution Control Regulations and Standards and the Environmental Protection Act (EPA).

- South Carolina has adopted the NAAQS except changes have not been made to reflect the recent standards promulgated for particulate matter. The USEPA has revoked the annual PM_{10} standard, changed the $PM_{2.5}$ standard from 65 grams per cubic meter (g/m^3) to 35 g/m^3. South Carolina standards reflect the old standards and the most stringent standards would be enforced both by federal and state agencies. Federal and State of South Carolina ambient air quality standards are presented in Table B-1 (SCDHEC, 2004).

- Based on measured ambient air pollutant concentrations, the USEPA designates areas of the U.S. as having air quality better than (attainment) or worse than (nonattainment) the NAAQS. In addition, those areas that cannot be classified on the basis of available information as meeting or not meeting the NAAQS for a particular pollutant are called "unclassifiable" and are treated as attainment until proven otherwise. Attainment areas can be further classified as "maintenance" areas. Maintenance areas are those areas previously classified as nonattainment and has successfully reduced air pollutant concentrations below the standard. Maintenance areas are under special maintenance plans and must operate under some of the nonattainment area plans to ensure compliance with the NAAQS. Sumter County is in attainment with the NAAQS, five counties are listed under the SC Early Action Compact (EAC) for eight-hour ozone level, and one county is considered a maintenance area for the eight-hour ozone level (USEPA, 2006).

- Each state is required to develop a state implementation plan (SIP) that sets forth how CAA provisions will be imposed within the state. The SIP is the primary means for the implementation, maintenance, and enforcement of the measures needed to attain and maintain the NAAQS within each state and includes control measures, emissions limitations, and other provisions required to attain and maintain the ambient air quality standards. The purpose of the SIP is twofold. First, it must provide a control strategy that will result in the attainment and maintenance of the NAAQS. Second, it must demonstrate that progress is being made in attaining the standards in each non-attainment area.

  In attainment areas, major new or modified stationary sources of air emissions on and in the area are subject to Prevention of Significant Deterioration (PSD) review to ensure that these sources are constructed without causing significant adverse deterioration of the clean air in the area. A major new source is defined as one that has the potential to emit any pollutant regulated under the CAA in amounts equal to or exceeding specific major source thresholds — 100 or 250 tons/year based on the source's industrial category. A major modification is a physical change or change in the method of operation at an existing major source that causes a significant "net emissions increase" at that source of any regulated pollutant. Table B-2 provides a tabular listing of the PSD significant emissions rate (SER) thresholds for selected criteria pollutants *(*USEPA, 1990*)*. (PSD SER and increment thresholds have been established for PM_{10}, but not for $PM_{2.5}$.). It should be noted that mobile source emissions as well as those associated with construction activities are excluded from the PSD applicability process.

  The goal of the PSD program is to: 1) ensure economic growth while preserving existing air quality, 2) protect public health and welfare from adverse effects which might occur even at pollutant levels better than the NAAQS, and 3) preserve, protect, and enhance the air quality in areas of special natural recreational, scenic, or historic value, such as national parks and wilderness areas. Sources subject to PSD review are required by the CAA to obtain a permit before commencing construction. The permit process requires an extensive review of all other major sources within a 50-mile radius and all Class I areas within a 62-mile radius of the facility. Emissions from any new or modified source must be controlled using Best Available Control Technology. The air quality, in combination with other PSD sources in the area, must not exceed the maximum allowable incremental increase identified in Table B-3. National parks and wilderness areas are designated as Class I areas, where any appreciable deterioration in air quality is considered significant. Class II areas are those where moderate, well-controlled industrial growth could be permitted. Class III areas allow for greater industrial development.

Table B-1. National and State Ambient Air Quality Standards

Criteria Pollutant	Averaging Time	Federal Primary NAAQS(8)	Federal Secondary NAAQS (8)	South Carolina Standards
Carbon Monoxide (CO)	8-hour(1)	9 ppm	No standard	9 ppm
		(10 mg/m^3)		(10 mg/m^3)
	1-hour(1)	35 ppm	No standard	35 ppm
		(40 mg/m^3)		(40 mg/m^3)
Lead (Pb)	Quarterly	1.5 µg/m^3	1.5 µg/m^3	1.5 mg/m^3
Nitrogen Dioxide (NO_2)	Annual	0.053 ppm	0.053 ppm	0.053 ppm
		(100 µg/m^3)	(100 µg/m^3)	(100 µg/m^3)
Particulate Matter $\leq$10 Micrometers (PM_{10})	Annual(2)	Revoked	Revoked	50 µg/m^3
	24-hour(3)	150 µg/m^3	150 µg/m^3	150 µg/m^3
Particulate Matter <2.5 Micrometers ($PM_{2.5}$)	Annual(4)	15 µg/m^3	15 µg/m^3	15 µg/m^3
	24-hour(5)	35µg/m^3	35 µg/m^3	65 µg/m^3
Ozone (O_3)	1-hour(7)	0.12 ppm	0.12 ppm	0.12 ppm
		(235 µg/m^3)	(235 µg/m^3)	(235 µg/m^3)
	8-hour(6)	0.08 ppm	0.08 ppm	0.08 ppm
		(157 µg/m^3)	(157 µg/m^3)	(157 µg/m^3)
Sulfur Dioxide (SO_2)	Annual	0.03 ppm	No standard	0.03 ppm
		(80 µg/m^3)		(80 µg/m^3)
	24-hour(1)	0.14 ppm	No standard	0.14 ppm
		(365 µg/m^3)		(365 µg/m^3)
	3-hour(1)	No standard	0.50 ppm	0.50 ppm
			(1300 µg/m^3)	(1300 µg/m^3)

Source: USEPA, 2006 (federal standards), SCDHEC, 2004 (South Carolina state standards)

(1) Not to be exceeded more than once per year.

(2) Due to lack of evidence linking health problems to long-term exposure to coarse particle pollution, the agency revoked the annual PM_{10} standard in 2006 (effective December 17, 2006).

(3) Not to be exceeded more than once per year on average over 3 years.

(4) To attain this standard, the 3-year average of the weighted annual mean $PM_{2.5}$ concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m^3

(5) To attain this standard, the 3-year average of the 98th percentile of 24-hour concentrations at each population-oriented monitor within an area must not exceed 35 mg/m^3 (effective December 17, 2006)

(6) To attain this standard, the 3-year average of the fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area over each year must not exceed 0.08 ppm.

(7) (a) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is < 1. (b) As of June 15, 2005 EPA revoked the 1-hour ozone standard in all areas except the fourteen 8-hour ozone nonattainment Early Action Compact (EAC) Areas.

(8) Concentration expressed first in the units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25° C and a reference pressure of 760 mm of mercury; ppm refers to parts per million by volume.

Table B-2. Criteria Pollutant Significant Emissions Rate Increases Under PSD Regulations

Pollutant	Significant Emissions Rate (tons/year)
PM_{10}	15
Total Suspended Particulate (TSP)	25
SO_2	40
NO_x	40
Ozone (VOC)	40
CO	100

Source: Title 40 CFR Part 51

Table B-3. Federal Allowable Pollutant Concentration Increases Under PSD Regulations

Pollutant	Averaging Time	Maximum Allowable Concentration (µg/m³)		
		Class I	Class II	Class III
PM_{10}	Annual	4	17	34
	24-hour	8	30	60
SO_2	Annual	2	20	40
	24-hour	5	91	182
	3-hour	25	512	700
NO_2	Annual	2.5	25	50

Source: Title 40 CFR Part 51
µg/m³ = Micrograms per cubic meter

- South Carolina has a statewide air quality-monitoring network that is operated by both state and local environmental programs *(SCDHEC).* The air quality is monitored for carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, sulfur dioxide, total suspended particulate, and fluoride. The monitors tend to be concentrated in areas with the largest population densities and not all pollutants are monitored in those areas. The air quality monitoring network is used to identify areas where the ambient air quality standards are being violated and plans are needed to reduce pollutant concentration levels to be in attainment with the standards, also included are areas where the ambient standards are being met but plans are necessary to ensure maintenance of acceptable levels of air quality in the face of anticipated population or industrial growth (SCDHEC, 2006).

- The end result of this attainment/maintenance analysis is the development of local and statewide strategies for controlling emissions of criteria air pollutants from stationary and mobile sources. The first step in this process is the annual compilation of the ambient air monitoring results, and the second step is the analysis of the monitoring data for general air quality exceedances of the NAAQS as well as pollutant trends. Currently, South Carolina is in attainment for all criteria pollutants except for a few counties which are subject to Subpart 1 EAC or are in moderate non-attainment for eight-hour ozone.

Regulatory Comparisons

- In order to evaluate the air emissions and their impact to the overall region of influence (ROI). The emissions associated with the construction activities were compared to the total emissions on a pollutant-by-pollutant basis for the ROI's 1999 (National Emissions Inventory (NEI) data. Potential impacts to air quality are then identified as the total emissions of any pollutant that equals 10 percent or more of the ROI's emissions for that specific pollutant. The 10 percent criteria approach is used in the General Conformity Rule as an indicator for impact analysis for non-attainment and maintenance areas and although the much of the state of South Carolina is in attainment for all pollutants (vice a few counties subject to the EAC for eight-hour ozone), the General Conformity Rule's impact analysis was utilized to provide a consistent approach to evaluating the impact of construction emissions.

- To provide a conservative evaluation, the impacts screening in this analysis used a more restrictive criterion than that required in the General Conformity Rule. Rather than comparing emissions from construction activities to regional inventories (as required in the General Conformity Rule), emissions were compared to the individual counties potentially impacted, which constitute a smaller area.

Project Calculations:

Construction Emissions:

- Construction emissions calculations were completed using the calculation methodologies described in the U.S. Air Force Air Conformity Applicability Model (ACAM). As previously indicated, a conformity determination is not required since Sumter County is designated "attainment," the ACAM was used to provide a level of consistency with respect to emissions factors and calculations.

- The ACAM evaluates the individual emissions from different sources associated with the construction phases. These sources include grading activities, asphalt paving, construction worker trips, stationary equipment (e.g., saws and generators), non-residential architectural coatings, and mobile equipment emissions *(USAF,* 2003*).*

- As a result of limited information, certain assumptions were made to develop the air quality analysis. It was assumed that one building would be constructed on 1.3 acres of land in Sumter County. Ten percent or 1.2 acres of the 12 acres would be paved. The facilities to be constructed would total 533,809 square feet. Based on these assumptions, the construction emissions were calculated using the following methodology.

Grading Activities:

- Grading activities are divided into grading equipment emissions and grading operation emissions. Grading equipment calculations are combustive emissions from equipment engines and are ascertained in the following manner:

  VOC = .22 (lbs/acre/day) * Acres * DPY_1 / 2000

  NOx = 2.07 (lbs/acre/day) * Acres * DPY_1 / 2000

  PM_{10} = .17 (lbs/acre/day) * Acres * DPY_1 / 2000

  CO = .55 (lbs/acre/day) * Acres * DPY_1 / 2000

  SO2 = .21 (lbs/acre/day) * Acres * DPY_1 / 2000

  Where:

  Acres = number of gross acres to be graded during Phase I construction.

  DPY_1 = number of days per year during Phase I construction which are used for grading

  2000 = conversion factor from pounds to tons

  All emissions are represented as tons per year.

- Grading operations are calculated using a similar equation from the Sacramento Air Quality Management District and the South Coast Air Quality Management Districts *(Air Quality Thresholds of Significance and CEQA Air Quality Handbook)*. These calculations include grading and truck-hauling emissions.

  PM_{10} (tons/yr) =60.7 (lbs/acre/day) * Acres * DPY_1 / 2000

  Where:

  Acres = number of gross acres to be graded during Phase1 construction.

  DPY_1 = number of days per year during Phase I construction which are used for grading

  2000 = conversion factor from pounds to tons

- Calculations used in the EA assumed that there were no controls used to reduce fugitive emissions. Also, it was assumed that construction activities would occur within five years (1825 days) and grading activities would represent 10 percent of that total. Therefore, a 182-day period was the duration established for grading operations. Emissions factors were derived from the Sacramento Air Quality Management District and the South Coast Air

Quality Management District *(Air Quality Thresholds of Significance and CEQA Air Quality Handbook)*.

Architectural Coatings:

- Non-residential architectural coating emissions are released through the evaporation of solvents that are contained in paints, varnishes, primers and other surface coatings.

  VOC_{SF} (lbs/yr) = (SQR_GRSQF * 1.63)/2000

  Where:

  SQR_GRSQF = square root of gross square feet of non-residential building space to be constructed in the given year of construction.

  1.63 = Emissions factor

  2000 = conversion factor from pounds to tons

- It was assumed that construction activities would occur within 1825 days. After subtracting the grading activities from the estimated overall construction time, the actual construction period was reduced to 1643 days. Additionally, it was assumed that the one building was constructed over the period of one year at the specified square footage. Emissions factors were derived from the Sacramento Air Quality Management District and the South Coast Air Quality Management District *(Air Quality Thresholds of Significance and CEQA Air Quality Handbook)*.

Asphalt Paving:

VOC emissions are released during asphalt paving and are calculated using the following methodology:

VOC_{PT} (tons/yr) = (2.62 lbs/acre) * Acres Paved / 2000

Acres Paved = total number of acres to be paved at the site

2000 = conversion factor from pounds to tons

- It was assumed that a minimum of 10 percent of the overall area (12 acres) to be developed for the proposed action would be paved with asphalt. The specific emissions factors used in the calculations were available through Sacramento Air Quality Management and the South Coast Air Quality Management Districts *(Air Quality Thresholds of Significance and CEQA Air Quality Handbook)*.

Construction Worker Trips:

- Construction worker trips during the construction phases of the project are calculated and represent a function of the square feet of commercial construction.

  Trips (trips/day) = .42 (trip/unit/day) * Area of training facilities

  Total daily trips are the applied to the following factors depending on the corresponding years.

  Year 2005 through 2009:

  VOC_E = .016 * Trips

  NO_{xE} = .015 * Trips

  PM_{10E} = .0022 * Trips

  CO_E = .262 * Trips

  Year 2010 and beyond:

  VOC_E = .012 * Trips

  NO_{xE} = .013 * Trips

  PM_{10E} = .0022 * Trips

  CO_E = .262 * Trips

  To convert from pounds per day to tons per year:

  VOC (tons/yr) = VOC_E * DPY_{II}/2000

  No_x (tons/yr) = NO_{xE} * DPY_{II}/2000

  PM10(tons/yr) = PM_{10E} * DPY_{II}/2000

  CO (tons/yr) = CO_E * DPY_{II}/2000

  Where:

  Commercial construction = total square footage of commercial aviation park to be constructed in the given year of construction.

2000 = conversion factor from pounds to tons

DPY_{II} = number of days per year during Phase II construction activities

- It was assumed that the total area of construction is 533,809 square feet. Emissions factors were derived from the Sacramento Air Quality Management District and the South Coast Air Quality Management District *(Air Quality Thresholds of Significance and CEQA Air Quality Handbook)*.

Stationary Equipment:

- Emissions from stationary equipment occur when gasoline-powered equipment (e.g., saws, generators, etc.) is used at the construction site.

$VOC = .198 * (GRSQFT) * DPY_{II} / 2000$

$NO_x = .137 * (GRSQFT) * DPY_{II} / 2000$

$PM_{10} = .004 * (GRSQFT) * DPY_{II} / 2000$

$CO = 5.29 * (GRSQFT) * DPY_{II} / 2000$

$SO_2 = .007 * (GRSQFT) * DPY_{II} / 2000$

Where:

GRSQF = Gross square feet of commercial buildings to be constructed during phase II

DPY_{II} = number of days per year during Phase II construction

2000 = conversion factor from pounds to tons

- It was assumed that the total area of construction was 533,809 square feet. Emissions factors were derived from the Sacramento Air Quality Management District and the South Coast Air Quality Management District *(Air Quality Thresholds of Significance and CEQA Air Quality Handbook)*.

Mobile Equipment:

- Mobile equipment emissions include pollutant releases associated with forklifts, dump trucks, etc. used during Phase II construction.

$VOC = .17 * (GRSQFT) * DPY_{II} / 2000$

$NO_x = 1.86 * (GRSQFT) * DPY_{II} / 2000$

PM_{10} = .15 * (GRSQFT) * DPY_{II}/ 2000

CO = .78 * (GRSQFT) * DPY_{II}/ 2000

SO_2 = .23 * (GRSQFT) * DPY_{II}/ 2000

Where: GRSQF = Gross square feet of training area to be constructed during Phase II

DPY_{II} = number of days per year during Phase II construction

2000 = conversion factor from pounds to tons

- It was assumed that the total area of construction was 533,809 square feet. Emissions factors were derived from the Sacramento Air Quality Management District and the South Coast Air Quality Management District *(Air Quality Thresholds of Significance and CEQA Air Quality Handbook)*.

Demolition Emissions:

- Based on the Description of Proposed Action and Alternatives (DOPAA), no existing buildings are expected to be demolished for the completion of this project.

National Emissions Inventory

- The National Emissions Inventory (NEI) is operated under EPA's Emission Factor and Inventory Group, which prepares the national database of air emissions information with input from numerous state and local air agencies, from tribes, as well as from industry. The database contains information on stationary and mobile sources that emit criteria air pollutants and hazardous air pollutants (HAPs). The database includes estimates of annual emissions, by source, of air pollutants in each area of the country. The NEI includes emission estimates for all 50 States, the District of Columbia, Puerto Rico, and the U.S. Virgin Islands. Emission estimates for individual point or major sources (facilities), as well as county-level estimates for area, mobile and other sources, are available currently for years 1996 and 1999 for criteria pollutants and HAPs.

- Criteria air pollutants are those for which EPA has set health-based standards. Four of the six criteria pollutants are included in the NEI database:

  Carbon Monoxide (CO)

  Nitrogen Oxides (NO_x)

  Sulfur Dioxide (SO_2)

  Particulate Matter (PM_{10} and $PM_{2.5}$)

- The NEI also includes emissions of Volatile Organic Compounds (VOCs), which are ozone precursors, emitted from motor vehicle fuel distribution and chemical manufacturing, as well as other solvent uses. VOCs react with nitrogen oxides in the atmosphere to form ozone. The NEI database defines three classes of criteria air pollutant sources:

    - Point sources - stationary sources of emissions, such as an electric power plant, that can be identified by name and location. A "major" source emits a threshold amount (or more) of at least one criteria pollutant, and must be inventoried and reported. Many states also inventory and report stationary sources that emit amounts below the thresholds for each pollutant.

    - Area sources - small point sources such as a home or office building, or a diffuse stationary source, such as wildfires or agricultural tilling. These sources do not individually produce sufficient emissions to qualify as point sources. Dry cleaners are one example, i.e., a single dry cleaner within an inventory area typically will not qualify as a point source, but collectively the emissions from all of the dry cleaning facilities in the inventory area may be significant and therefore must be included in the inventory.

    - Mobile sources - any kind of vehicle or equipment with a gasoline or diesel engine; airplane; or ship.

- The main sources of criteria pollutant emissions data for the NEI are:

    - For electric generating units - EPA's Emission Tracking System / Continuous Emissions Monitoring Data (ETS/CEM) and Department of Energy fuel use data.

    - For other large stationary sources - state data and older inventories where state data was not submitted.

    - For on-road mobile sources - the Federal Highway Administration's (FHWA's) estimate of vehicle miles traveled and emission factors from EPA's MOBILE Model.

    - For non-road mobile sources - EPA's NONROAD Model.

    - For stationary area sources - state data, EPA-developed estimates for some sources, and older inventories where state or EPA data was not submitted.

    - State and local environmental agencies supply most of the point source data. EPA's Clean Air Market Program supplies emissions data for electric power plants.

References:

40 CFR 51, Code of Federal Regulations, Title 40, Part 51, www.access.gpo.gov/nara/cfr/cfr-retrieve.html#page1.

SCDHEC, 2004. *Regulation61-62.5 Air Pollution Control Standards: Standard No. 2 Ambient Air Quality Standards*. South Carolina Department of Health and Environmental Control Air Pollution Control Regulations and Standards. September 24, 2004. Retrieved from http://www.scdhec.gov/eqc/baq/regs/pdf/R61-62.5S2.pdf on 14 December 2006.

SCDHEC, 2006. *Ambient Air Monitoring Network Design*. South Carolina Department of Health and Environmental Control. Retrieved from http://www.scdhec.gov/eqc/baq/html/ambientairmonitoring.html on 14 December 2006.

U.S. Air Force, 2003. *U.S. Air Force Air Conformity Applicability Model Technical Documentation*, Air Force Center for Environmental Excellence, May.

U. S. Environmental Protection Agency, 1990. *Draft New Source Review Workshop Manual: Prevention of Significant Deterioration and Nonattainment Permitting*, Office of Air Quality Planning and Standards, October.

U. S. Environmental Protection Agency, 1999. *1999 National Emissions Inventory Database*; Office of Air Quality Planning and Standards, Technology Transfer Network, Clearing House for Inventories and Emissions Factors, http://www.epa.gov/ttn/chief/net/1999inventory.html February.

U.S. Environmental Protection Agency, 2006. Currently Designated Non-attainment Areas for All Criteria Pollutants. Last updated March 2, 2006. Retrieved from http://www.epa.gov/oar/oaqps/greenbk/ancl.html#SOUTH%20CAROLINA on 14 December 2006.