FINAL ENVIRONMENTAL ASSESSMENT

Proposed Integrated Water Resources Science and Services

National Water Center

University of Alabama, Tuscaloosa, Alabama

PREPARED FOR:

NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

NATIONAL WEATHER SERVICE

URS PROJECT NO. 28645201

July 2011

URS

EXECUTIVE SUMMARY

To address growing water challenges and guide critical decisions, the National Oceanic and Atmospheric Administration's (NOAA's) National Weather Service (NWS) is leading an interagency consortium called Integrated Water Resources Science and Services (IWRSS). Core partners in the IWRSS include the U.S. Geological Survey and the U.S. Army Corps of Engineers. The goal of the IWRSS is to develop and deliver new and improved hydrological and water resource information for the use of stakeholders and decision-makers.

The proposed action would provide a single facility or National Water Center (NWC) for housing components of the NWS, and establish capabilities to synthesize information technology across the IWRSS consortium. A proposed approximately 58,000 gross square foot facility program has been identified that would support 196 individuals associated with the NWC. On-site services, adjacency of facilities, and IT requirements have been estimated, including additional parking, utilities, and service loading access.

The Preferred Site Alternative for the proposed action is located on Hackberry Lane, northeast of Shelby Hall on the University of Alabama (UA) campus in Tuscaloosa, Alabama. This alternative involves construction and use of a proposed IWRSS NWC on a 3.7-acre parcel currently occupied by the UA Environmental Health and Safety (EHS) building. The subject site is available for lease to NOAA and would require site preparation, including utility abandonment or relocation, and demolition of existing structures by UA.

Except for a No Action Alternative, no other feasible alternatives to the proposed action and the preferred site were identified by NOAA. The No Action Alternative assumes that the proposed NOAA action to construct and operate an IWRSS would not occur and that existing operations at the preferred site would continue or be available for alternative uses planned by others.

This Environmental Assessment (EA) was prepared in accordance with the NOAA Administrative Order 216-6, *Environmental Review Procedures for Implementing the National Environmental Policy Act.* The proposed action under the Preferred Site Alternative and No Action Alternative were assessed in relation to seventeen subject areas. No significant environmental impacts were identified in relation to the No Action Alternative. The following table summarizes the anticipated environmental impacts

identified for the Preferred Site Alternative, and outlines suggested mitigation measures. Except for impacts to cultural resources, the following measures are recommended but not required to support a finding of no significant impact:

IWRSS National Water Center
Summary of Anticipated Environmental Impacts
Preferred Site Alternative

Resource	Anticipated Impacts	Suggested Mitigation
Land Use	Negligible impacts	None
Geological Resources	Seismic impacts – low Other geological resources – no impacts	None
Air Quality	Construction – minor Ongoing Operation - minor	During clearing, grading, earth moving, excavation, or transportation of cut or fill material, water trucks or sprinkler systems are to be used to prevent fugitive dust from leaving the site. During construction, water trucks or sprinkler systems shall be used to keep all affected areas of vehicle movement damp enough to prevent dust from leaving the site. At a minimum, this would include wetting down such areas in the late morning, after work is completed for the day, and whenever wind speed exceeds 15 miles per hour. Soil stockpiled for more than two days shall be covered, kept moist, or treated with soil binders to prevent dust generation.
Water Resources	Negligible impacts	The proposed action would include implementation of best management practices, such as silt fences, for the prevention of sediment release during excavation and construction, and the release of fuels from construction equipment or during IWRSS NWC operations. Specifically, secondary containment structures may be used to contain spills related to equipment or refueling operations. Specific measures minimally required for the National Pollutant Discharge Elimination System permit are recommended (see Section 6.4.3)

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Summary of Anticipated Environmental Impacts
Preferred Site Alternative

Resource	Anticipated Impacts	Suggested Mitigation
Recreational Resources	No impacts	None
Cultural Resources	Adverse impacts	• Create of an accurate and to-scale map on acid-free archival bond paper for the entire Bryce NRHP district as depicted in AHC Site 1TU808. • Cite locations of approximately 20 remaining buildings within the district and associated with Bryce Hospital. A recent aerial photograph will be used as a base map for spatial accuracy and location relative to existing features. • Indicate the date or era of construction, i.e. the original hospital in the 1850s through the final construction period of the 1940s – 1950s. It is understood that the precise date of construction for smaller structures at Bryce Hospital are not well documented and may not be readily available for this effort. • Prepare one (1) archival quality black and white photograph of each remaining buildings' front elevation and key to the map. When possible, multiple buildings may be captured on the same photograph to assist depiction of the historic district's spatial relationships, historic context, and visual narrative. • Prepare one (1) archival quality photograph of the front elevation of the Men's Tuberculosis Building along with two (2) archival quality photographs representing the interior of the Men's Tuberculosis Building (aka EHS building). • Ensure photographs are large-format, 8" x 10", and are accompanied by contact-style prints produced from scanned TIFF images of the negatives. Copies of the negatives will not be required.

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IWRSS National Water Center
Summary of Anticipated Environmental Impacts
Preferred Site Alternative

Resource	Anticipated Impacts	Suggested Mitigation
		Submit up to three (3) printed copies (one unbound) of the map and photographs, as described herein, on 8 1/2 x 11 inch pages and delivered to the AHC.
Flora and Fauna	No impact	None
Wetlands	No impacts	None
Floodplains	No impacts	None
Agricultural Resources	No impacts	None
Noise	Construction – negligible impacts Ongoing operation – minor positive impact	Limit the use of large construction equipment and earthmoving activity to the hours of 6 am to 9 pm daily.
Transportation	Construction – no impacts Ongoing operation - minor	An alternative access route for IWRSS NWC staff should be established with campus police and emergency response organizations.
Utilities and Solid Waste	Minor	None
Visual and Aesthetic Resources	Negligible impacts	None
Hazardous Materials	Construction – potentially significant Ongoing Operation – less than significant	That NOAA ensure that the lease agreement with the university includes conditions requiring that the existing building on site be closed and demolished in accordance with all applicable federal, state and local laws pertaining to hazardous materials handling, storage, transportation and disposal, including (but not limited to) relevant laws pertaining to asbestos and lead-based paint, and that test results for swipes taken from surfaces within the EHS building following decommissioning are provided to NOAA for review. That NOAA investigates the presence of contamination in groundwater at the site, prior

EXECUTIVE SUMMARY

IWRSS National Water Center
Summary of Anticipated Environmental Impacts
Preferred Site Alternative

Resource	Anticipated Impacts	Suggested Mitigation
		to commencing site disturbing activities, in accordance with the recommendations of the Phase I ESA drafted for the Preferred Site Alternative in November 2010 and finalized in January 2011. That all relevant federal, state and local laws pertaining to hazardous waste handling, storage, transportation and disposal, discharge of stormwater and dewatering water, and worker health and safety are complied with during construction of the proposed IWRSS NWC. That all relevant federal, state and local laws pertaining to storage of hazardous substances are complied with, with respect to the ongoing use and maintenance of the fuel tank for the proposed emergency generator.
Socioeconomics and Environmental Justice	Negligible impacts	None
Cumulative Impacts	Transportation – minor Other resources - negligible	None

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LIST OF ACRONYMS AND ABBREVIATIONS

ADEM	Alabama Department of Environmental Management
ADT	average daily traffic
APE	Area of Potential Effects
AHC	Alabama Historical Commission
ASASF	Alabama State Archaeological Site File
CAA	Clean Air Act of 1970
CBMPP	Construction Best Management Practices Plan
CEQ	Council on Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
CFR	Code of Federal Regulations
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
CWA	Clean Water Act of 1972
dB	decibels
EA	Environmental Assessment
EHS	Environmental Health and Safety
EO	Executive Order
ESA	Endangered Species Act of 1973
FEMA	Federal Emergency Management Agency
FPPA	Farmland Protection Policy Act of 1981
g	acceleration of an object falling due to gravity
GCR	General Conformity Rule
GHG	greenhouse gas
HL	Hydrology Laboratory
HSEB	Hydrologic Software Engineering Branch
HSMB	Hydrologic Science and Modeling Branch
IT	information technology
IWRSS	Integrated Water Resources Science and Services
kW	kilowatt
LEED	Leadership in Energy and Environmental Design
LOS	level of service
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NHPA	National Historic Preservation Act of 1966
NOAA	National Oceanic and Atmospheric Administration
NRHP	National Register of Historic Places
NPDES	National Pollutant Discharge Elimination System
NWC	National Water Center

NWS	National Weather Service
OC	operations center
OHD	Office of Hydrologic Development
OSHA	Occupational Health and Safety Administration
Phase I ESA	Phase I Environmental Site Assessment
$PM_{2.5}$	particulate matter (less than 2.5 micrometers in diameter)
PM_{10}	particulate matter (less than 10 micrometers in diameter)
PSD	Prevention of Significant Deterioration
RCRA	Resource Conservation and Recovery Act of 1976
REC	Recognized Environmental Condition
RFC	River Forecast Centers
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SPCC	Spill Prevention, Control and Countermeasure
TMDL	Total Maximum Daily Load
TPY	tons per year
UA	University of Alabama
UPS	Uninterruptible Power Supply
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USEPA	U.S. Environmental Protection Agency
USGS	U.S. Geological Survey
VMC	Visual Modification Classes

1 INTRODUCTION

Virtually every area of the United States experiences critical water problems, such as too much or too little water, poor quality water, unmet demand, aging water infrastructure, or uncertainties posed by future climate change. Together, these issues pose what is commonly recognized to be one of the nation's most critical resource threats in the twenty-first century. Water issues could profoundly affect our economy, domestic policies, and our regulatory framework for resource planning and disaster response.

To address the growing water challenges and guide critical decisions, the National Oceanic and Atmospheric Administration's (NOAA's) National Weather Service (NWS) is leading an interagency consortium called Integrated Water Resources Science and Services (IWRSS). The goal of the NWS and its core partners in the IWRSS, the U.S. Geological Survey (USGS) and the U.S. Army Corps of Engineers (USACE), is for IWRSS to develop and deliver new and improved hydrological and water resource information for the use of stakeholders and decision-makers. Because no agency has all the capabilities and resources needed to address complex water issues, an IWRSS facility would provide the consistent multiagency collaboration and synergy needed to facilitate a national strategy and response to water resource issues.

The IWRSS strategy is based on three pillars:

- The first pillar is technical, involving the establishment of a common operating framework as a single, definitive source of information for state and local water managers. The common framework would enable key systems to be interoperable, with synchronized data exchange and consistent spatial visualization tools.
- The second pillar involves cooperation and interaction between federal agencies and academia to identify and implement advanced water science and technology. A wealth of relevant scientific research is conducted at academic institutions in support of water resource information needs, and the federal government can provide a platform to move these scientific advances into operational production.
- The third pillar involves the human dimension. Specifically, IWRSS would investigate, develop, and establish the information, social science concepts, stakeholder interactions, and tools needed to make a difference in water resource decision-making.

To implement the IWRSS strategy, the formation of a national water services and support facility, or national water center, is proposed to provide a platform for the integration of research and technology and to serve as a proving ground to test new capabilities before delivery to regional and national operations. NOAA would implement an IWRSS National Water Center (NWC) to integrate services and service delivery through more effective communications,

improved river and flood forecasts and mapping, and new "summit-to-sea" water resource forecast information. An NWC facility dedicated to support such an integrated system would foster better communication and provide the common operating framework to mitigate the potential for major floods, droughts, and impaired water resources to have substantial impacts on life, property, and economic activity.

In 2009, the U.S. Congress approved a Fiscal Year 2010 Appropriations Bill (authored by Senator Richard Shelby of Alabama) with a line item authorizing funding of $14 million to establish a Cooperative Institute and Research Center for Southeast Weather and Hydrology. The authorization provides funding to NOAA for a proposed federal IWRSS NWC facility at the University of Alabama (UA or University) campus in Tuscaloosa, Alabama. NOAA, which is part of the U.S. Department of Commerce, is the lead federal agency for implementing the proposed action to establish an IWRSS NWC (which would serve as the Cooperative Institute and Research Center for Southeast Weather and Hydrology, as defined in the bill). The NWS and its Office of Hydrologic Development (OHD) has initiated planning for a proposed IWRSS NWC at UA with Dr. Joseph Benson, UA Vice President for Research, and Mr. Timothy Leopard, UA Director of Facilities.

As the federal lead agency subject to the National Environmental Policy Act of 1969 (NEPA), NOAA has prepared this Environmental Assessment (EA) for its proposed action to construct and operate an IWRSS NWC. In addition to the No Action Alternative, the EA analyzes the Preferred Site Alternative (or subject site) on the UA campus in Tuscaloosa. This EA is prepared in accordance with the NEPA, the Council on Environmental Quality (CEQ) Regulations at 40 CFR 1500-1508, and NOAA Administrative Order 216-6, *Environmental Review Procedures for Implementing the NEPA.*

2 PURPOSE AND NEED

The purpose of the IWRSS NWC facility is to provide the nation with a seamless suite of consistent information for water resources monitoring and forecasting. This consistency would be achieved by improving the overall quality of the information and providing new information products and services to further support the needs of water resource stakeholders. The stakeholders include federal, state and local entities, including UA, for which the facility would benefit both public and university research priorities on University property.

The need for an IWRSS NWC arises from an unmet capacity, cited by federal, state and local water resource managers and decision-makers, to obtain more refined and integrated information that will enhance their ability to reliably respond to immediate and long-term planning uncertainties, such as natural disasters, climate change, and increasing demand on limited water resources. One example of this need is the record-breaking rain and flood event that occurred across the Cumberland and Tennessee Valleys from May 1–3, 2010. Twenty-six people lost their lives (eleven in the Nashville area alone). The damage estimates associated with this event are nearly $2 billion. The flooding disaster, particularly in Nashville, was the result of many unfortunate circumstances, including unprecedented 2-day rainfall amounts, changing river levels, and lack of public awareness of the potential impacts of the forecast river levels.

At this time, no single facility is available to address the program requirements identified for an IWRSS NWC (Gould Evans Associates *et al*., 2010). In response, NOAA is providing leadership for an IWRSS consortium. The overarching IWRSS goals and functionality include dedicated data processing capacity, interpersonal collaboration, and briefings and warnings using an integrated, multi-agency data set. The IWRSS consortium would be supported by an operations and service center, or National Water Center, which would be developed to improve coordination and communication for potential flooding situations and to deliver enhanced flood services. An evaluation of program needs that are required to support the envisioned IWRSS NWC indicates a staffing requirement of nearly 200 and a facility of at least approximately 58,000 gross square feet. The established program will enable the IWRSS to meet its objective of improved water resources information from which to predict, plan for, and address water-related needs and vulnerabilities.

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3 PROPOSED ACTION

The proposed action would provide a single facility for housing components of the NWS and its OHD, and establish capabilities to synthesize information technology across the IWRSS consortium. As the leader in weather, hydrologic, and climate forecasts and warnings for the United States, the NWS and its OHD play a key role in acquiring and synthesizing water resource data. In addition to coordination with IWRSS partners, they rely on 13 River Forecast Centers (RFCs) for hydrologic expertise and the development and use of hydrologic, hydraulic, and hydrometeorological models. NWS Weather Forecast Offices in 122 communities work closely with the RFCs and coordinate with local emergency and water managers to disseminate forecasts and warnings to the local areas they serve. The National Center for Environmental Prediction, also within the NWS, provides meteorological forecast data and guidance.

The OHD enhances NWS products by conducting hydrologic research, developing hydrologic techniques, managing hydrologic development within NWS field offices, and providing advanced hydrologic products to meet needs identified by NWS customers. The following OHD managers, groups, and related systems, with technology data inputs by other partners, would be key occupants and contributors to the proposed IWRSS NWC (NOAA, 2010):

- Advanced Hydrologic Prediction Service: This group provides new information and products as they become available from new science and technology. This service improves flood warnings and water resource forecasts to meet diverse and changing customer needs.
- Planning, Programming, and Coordination: This group leads the planning, acquisition, tracking, and resource analyses for NOAA and NWS hydrology programs.
- Hydrology Laboratory (HL): This group conducts studies, investigations, training, and analysis, all of which lead to the application of new scientific and computer technologies for hydrologic forecasting and related water resource problems.
- Hydrologic Software Engineering Branch (HSEB): This group prepares implementation-level requirements; implements tests, documents, and controls; and maintains applications and database software for the use of field offices to conduct the hydrologic services program. HSEB establishes the processes used within the HL for software and database engineering and is responsible for quality assurance of software developed in the HL. The HSEB maintains the workstation and desktop software development and office automation environment of the HL and the OHD. The HSEB coordinates development of applications at the RFCs.

- Hydrologic Science and Modeling Branch (HSMB): This group applies the sciences of hydrology, hydrometeorology, and hydraulics to NWS systems. It works with other components of the HL to apply these sciences to application software and data products developed within the HL and as a consultant to other NWS organizations. The HSMB works with research and development organizations in the government, private, and academic sectors to advance and secure the science necessary for the conduct of the hydrologic services program. HSMB applies its scientific expertise to training material developed cooperatively with the Office of Services and Office of Science and Technology.
- RFC Development Manager: This position is responsible for managing science and software development among the RFCs to ensure the efficient and economical use of NWS resources.
- Community Hydrologic Prediction System: This system enables NOAA's research and development enterprise and operational service delivery infrastructure to be integrated and leveraged with other federal water agency activities, academia, and the private sector to form the backbone of a national water information system.

To accommodate the various components of the IWRSS NWC, the NWS has initiated a facility programming effort to identify the space requirements for staff, equipment, information technology (IT), communication and coordination facilities, and associated parking and design requirements. As a result of the programming effort that NWS, OHD, and UA planners and staff have conducted, a proposed facility has been identified to support 196 individuals with approximately 58,000 gross square feet. On-site services, adjacency of facilities, and IT requirements have been estimated, as have the requirements for additional parking, utilities, and service loading access.

4 ALTERNATIVES

4.1 PREFERRED SITE ALTERNATIVE

The Preferred Site Alternative for the proposed action is on Hackberry Lane, northeast of Shelby Hall on the UA campus in Tuscaloosa, Alabama (see Figure 1). Under this alternative the proposed IWRSS NWC (facility) would be constructed on a 3.7-acre parcel (see Figures 2, 3-A and 3-B) that is currently occupied by the UA Environmental Health and Safety (EHS) building (see Figures 3-C and 3-D). The subject site is available for lease to NOAA and would require site preparation activities, including utility abandonment or relocation, and demolition of existing structures by UA. The proposed facility design and facility construction, as proposed by NOAA, would be consistent with UA Master Plan design and Leadership in Energy and Environmental Design (LEED) silver design certification standards and guidelines. NOAA would own and operate the proposed facility. Data processing to support IWRSS operations would be augmented by the use of computers and equipment in existing facilities at Gordon Palmer Hall located approximately 2,200 feet south of the preferred IWRSS site. No physical construction or demolition is proposed at Gordon Palmer Hall. The facility will house IWRSS-compatible computer process equipment within existing spaces currently suited for such equipment.

The proposed IWRSS NWC structure would be a two-story, 58,000 gross square foot building with a partial basement containing an operations center (OC). A conceptual drawing which shows the footprint of the NWC structure and a general site layout is shown on Figure 4, and additional renderings of the proposed NWC structure are given in **Appendix A**, along with an updated site plan. The building footprint on the site would be approximately 24,000 square feet, with a 10,000-square-foot basement area below grade. Parking for the proposed facility would be accommodated by a combination of 40 paved, on-site stalls to the east of the NWC building and to the south of the existing chiller units, and approximately 140 off-site parking stalls on the UA campus. The off-site parking is planned by UA on an undeveloped, graded parcel across the Bryce Hospital access road to the northeast, opposite the adjacent chiller units (refer to Figure 1). UA is seeking funding to construct a parking structure on this property; otherwise, surface parking could be installed on the southern portions of that same location to accommodate the IWRSS NWC off-site parking requirement.

Vehicle access to the Preferred Site Alternative is proposed from the east and north (see Figure 4). The northern access is from the Bryce Hospital access road, which is currently under UA control. The eastern access would traverse the former Bryce Hospital property. UA recently acquired the former Bryce Hospital property; however, UA possession of the property will not occur until May 2013. Site access would include a drop off area on Hackberry Lane for vehicles and busses.

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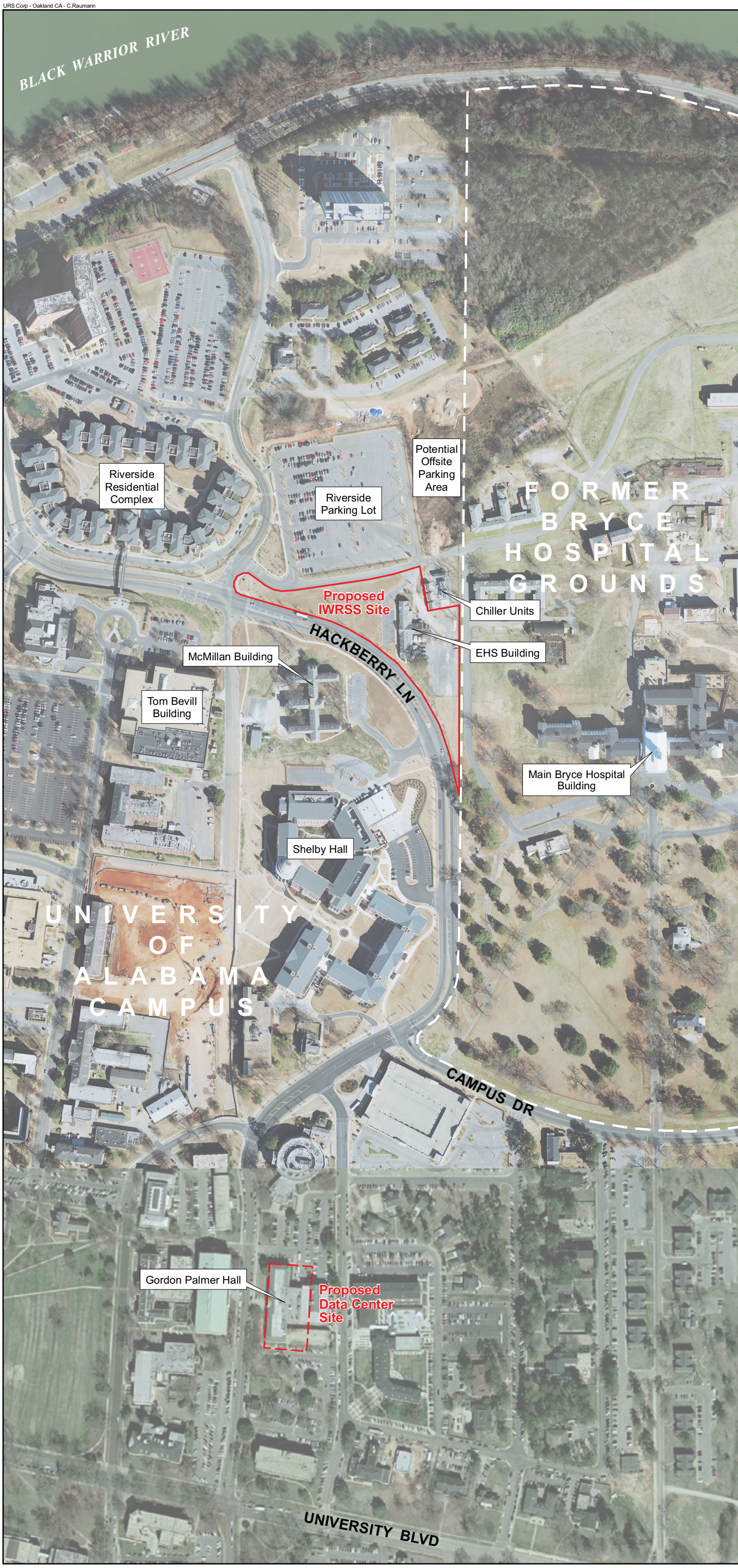

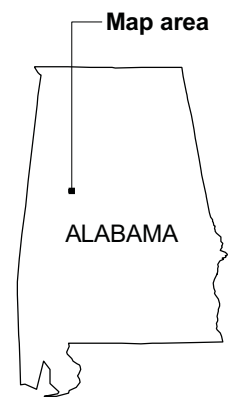

LEGEND

- Proposed IWRSS Site
- Proposed Data Center Site

N

0 200 400
Scale in Feet

BASE MAP SOURCES:
Aerial photographs provided by
The University of Alabama (2010)
and Esri (2009)
Inset map provided by Esri (2010)

INTEGRATED WATER RESOURCES SCIENCE AND SERVICES NATIONAL WATER CENTER

Preferred Site Alternative
Vicinity Map

DATE: 1/7/2011	FIGURE: 1
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LEGEND

Proposed IWRSS Site

INTEGRATED WATER RESOURCES SCIENCE AND SERVICES NATIONAL WATER CENTER

Preferred Site Alternative Oblique View

DATE: 1/7/2011	FIGURE: 2
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Figure 3-A. View of preferred site, looking east from northwest corner. Date taken: 9/21/2010

Figure 3-B. View of preferred site, looking north from southeast corner. Date taken: 11/5/2010

INTEGRATED WATER RESOURCES SCIENCE AND SERVICES NATIONAL WATER CENTER	Site Photographs	DATE: 1/7/2011	FIGURE: 3
		DRAWN BY: CGR	CHECKED BY: BPJ
		URS	JOB NUMBER: 28645201

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Figure 3-C. Front (western) façade of existing Environmental Health and Safety Building. Date taken: 9/21/2010

Figure 3-D. Rear (eastern) façade of existing Environmental Health and Safety Building. Date taken: 9/21/2010

INTEGRATED WATER RESOURCES SCIENCE AND SERVICES NATIONAL WATER CENTER	Site Photographs	DATE: 1/7/2011	FIGURE: 3
		DRAWN BY: CGR	CHECKED BY: BPJ
		URS	JOB NUMBER: 28645201

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Figure 3-E. View of chiller units, looking north from northeast corner of site. Date taken: 9/21/2010

Figure 3-F. View of main Bryce Hospital building, looking east from eastern boundary of site. Date taken: 9/21/2010

INTEGRATED WATER RESOURCES SCIENCE AND SERVICES NATIONAL WATER CENTER	Site Photographs	DATE: 1/7/2011	FIGURE: 3
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		URS	JOB NUMBER: 28645201

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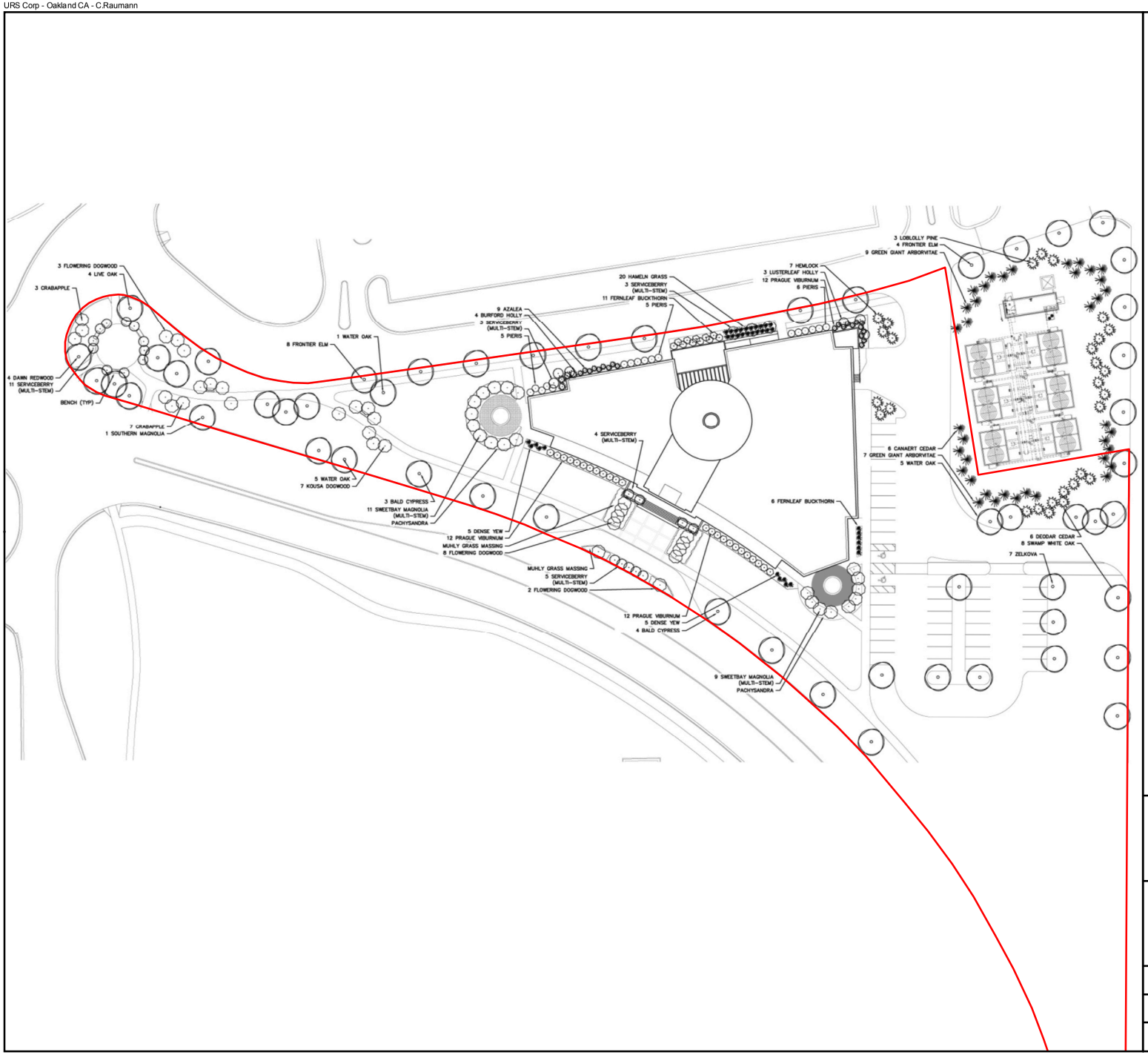

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Scale in Feet

SOURCE:
Gibbens Drake Scott Inc., Gould Evans Associates, TranSystems, 2011. Design Development Review for the National Water Center on the Campus of the University of Alabama, April 26, 2011.

INTEGRATED WATER RESOURCES SCIENCE AND SERVICES NATIONAL WATER CENTER

Proposed IWRSS NWC
Site Plan –
Preferred Site Alternative

DATE: 5/23/2011	FIGURE: 4
DRAWN BY: CGR	CHECKED BY: BPJ
URS	JOB NUMBER: 28645201

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Site restoration, including site leveling and utility relocation and upgrades, would be negotiated as part of the Memorandum of Agreement between NOAA and UA. The existing UA structure would be demolished to accommodate the proposed NOAA building, and the EHS functions currently undertaken within the building would be relocated elsewhere. It is currently unknown where such functions would be relocated to, however it assumed for the purposes of this assessment that such functions would be relocated to another location somewhere within the UA campus.

Immediately adjacent to the site are a series of chiller units with cooling towers that serve other nearby structures (see Figures 2 and 3-E). The chiller units would not be disturbed during site preparation or construction. A 15-foot-high architectural screen wall faced with masonry veneer would be constructed around three sides of the chiller units to visually block these structures and reduce the level of noise reaching the proposed facilities.

On-site de-construction or demolition of the EHS building would be followed by grading to remove or reroute utility infrastructure and excavate approximately 58 cubic yards for the below-grade OC facility. The aboveground and buried utility infrastructure rights-of-way that cross the proposed site include overhead power, buried fiber optic cable, telephone cable, sanitary sewer, water, gas, and storm water drainage. Utility infrastructure components likely to be relocated include overhead power lines, a 24-inch and a 16-inch water main, a gas main, and a fiber optic cable. Several smaller water, storm sewer, and sanitary sewer lines may also need to be relocated. Utilities required for the proposed facility are readily available on-site or from adjoining developments. The existing and planned re-routing of utility infrastructure is depicted on Figure 5. A 1,000-kilowatt (kW) emergency engine generator and uninterruptible power supply (UPS) switch gear would be provided to ensure continued operations at the facility should a failure of the public power supply occur. The fuel for the generator would either be diesel or natural gas, with an external fuel tank capacity sufficient for 2 days of operation at 100 percent load. Critical areas of the facility would be protected by the UPS, which would include 300-kilovolt-amperes, 480-volt, 3-phase input and 120/208-volt, 3-phase, 4-watt output.

The removal of the EHS building would occur in summer 2011; the construction of the proposed IWRSS NWC is anticipated to begin in February 2012, and continue over an 18-month construction period (Gould Evans Associates *et al.*, 2010). Graders, backhoes, loaders, haul trucks, and related construction vehicles and supplies would operate within the project area and establish a small staging area at the western portion of the parcel.

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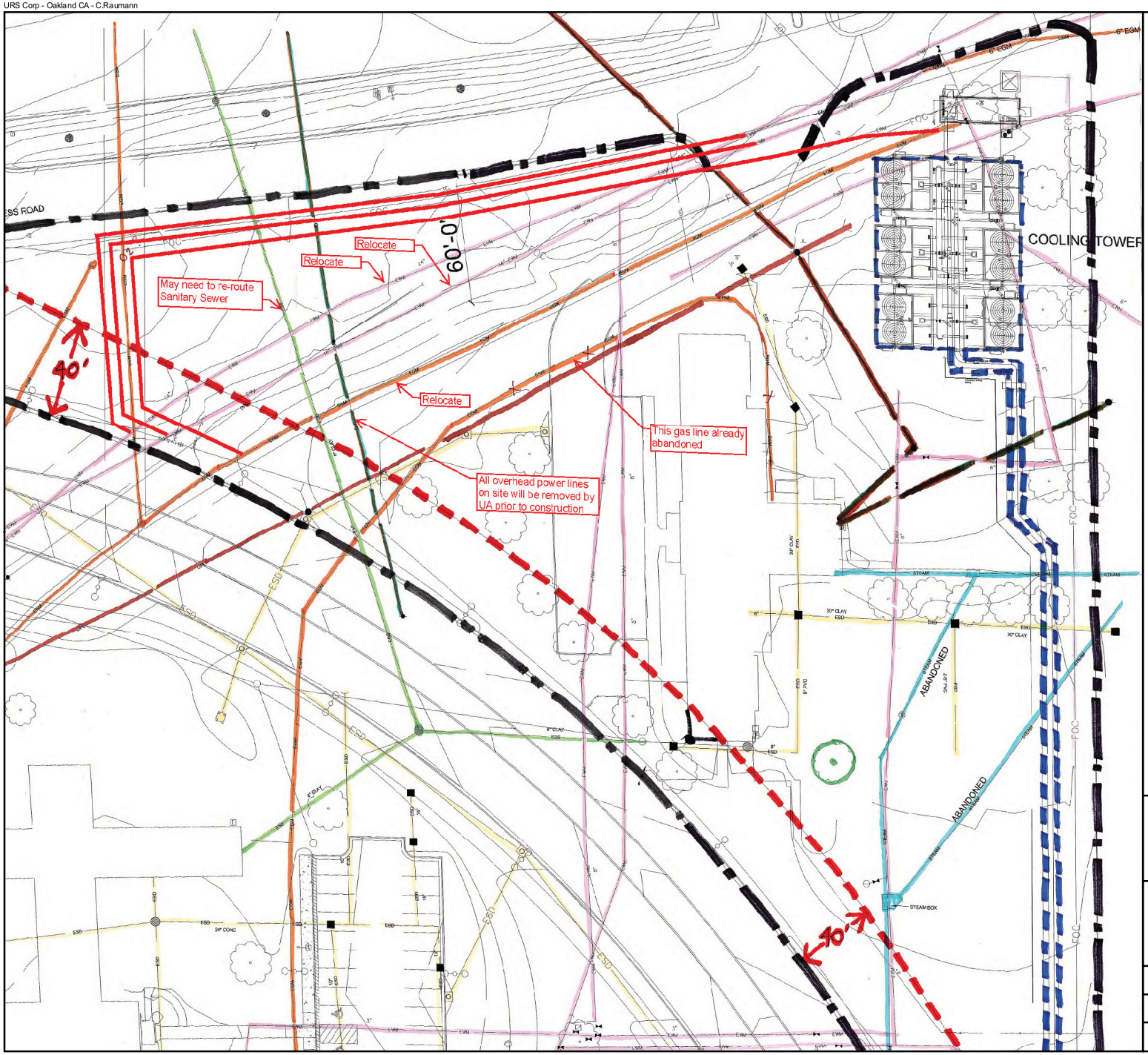

LEGEND

- STEAM — STEAM LINE
- EWM — WATER
- ESS — SAN. SEWER
- ESD — STORM DRAIN
- OPL — POWER LINE
- EGM — GAS
- FOC — FIBER OPTIC CABLE
- 40' SETBACK
- COOLING TOWER
- PROPOSED IWRSS SITE BOUNDARY

N

0 50 100

Scale in Feet

MAP SOURCE:
Gould Evans Associates (2009)

INTEGRATED WATER RESOURCES SCIENCE AND SERVICES NATIONAL WATER CENTER

Existing Utilities and Proposed Alterations

DATE: 1/7/2011	FIGURE: 5
DRAWN BY: CGR	CHECKED BY: BPJ
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4.2 NO ACTION ALTERNATIVE

The No Action Alternative assumes that the proposed NOAA action to construct and operate an IWRSS NWC would not occur and that existing operations at the preferred or alternative sites considered would continue or be available for alternative uses planned by others. Under this scenario, the Preferred Site Alternative would not be available to NOAA and the UA may continue operation of its EHS building at that location. Or, at the discretion of University planners, demolition of the EHS building may or may not occur under the No Action Alternative. Existing overhead power lines would be re-routed under the No Action Alternative; however, underground utilities are expected to remain for the foreseeable future. Under this scenario, use of the former Bryce Hospital property to accommodate access to the subject site would not be required in advance of May 2013, when the University formally acquires control of that adjacent property. Existing environmental conditions would remain unchanged; however, funding authorized by Congress would remain unspent for this purpose and establishment of an IWRSS NWC by NOAA would be delayed indefinitely. The use of the existing disparate methods for water resource data coordination and forecasting nationally would be unchanged.

4.3 ALTERNATIVES CONSIDERED AND REJECTED

Except for a No Action Alternative, no other feasible alternatives to the proposed action and the preferred site were identified by NOAA. A purely virtual configuration or IT framework for effective coordination among the interagency consortium would not meet the full suite of IWRSS goals and functionality, including a dedicated data processing capacity, interpersonal collaboration, and briefings and warnings using an integrated, multi-agency data set.

The NWS has been authorized funding to establish a physical facility at the UA campus in Tuscaloosa, Alabama. Initially three locations within the campus were presented by UA planners to the NWS. These locations are shown on Figure 6. The anticipated IWRSS program required facilities for approximately 200 staff and 58,000 gross square feet, exclusive of vehicle circulation and landscaping. Because of the severe limitations in site size and access at locations B and C identified in Figure 6, these locations were deemed inadequate for the purpose and need for the proposed action and excluded from further consideration by NOAA, The preferred site (Location A on Figure 6) was carried forward for further consideration and examined in this EA.

For this reason, the analysis in this EA focuses on the Preferred Site Alternative and the No Action Alternative.

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URS Corp - Oakland CA - C.Raumann

LEGEND

Preferred Site Alternative

Sites Considered and Rejected

N

0 400 800

Scale in Feet

MAP SOURCE:
Locations from Gibbens Drake Scott Inc., personal communication (2010)
Aerial photograph provided by Esri (2009)

INTEGRATED WATER RESOURCES SCIENCE AND SERVICES NATIONAL WATER CENTER

Sites Considered

DATE: 1/7/2011	FIGURE: 6
DRAWN BY: CGR	CHECKED BY: BPJ
URS	JOB NUMBER: 28645201

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5 AFFECTED ENVIRONMENT

The Preferred Site Alternative for the proposed IWRSS NWC is in Tuscaloosa, Alabama on the UA campus. Situated 60 miles southwest of Birmingham, Tuscaloosa is the county seat of Tuscaloosa County. With a 2009 population of 93,215, Tuscaloosa is the fifth-largest city in Alabama (Juggle.com, 2011). Tuscaloosa is 66.7 square miles, of which 10.5 square miles is the Black Warrior River and Lake Tuscaloosa.

UA is the oldest and largest public university in the state. As of the fall of 2010, the University enrollment was 30,232 students. The UA campus is anchored by its central quad, which is a large green space containing one of the most recognizable landmarks on campus: the Denny Chimes. The early growth of the campus core largely followed a classical composition oriented by a north-south axis configuration and later establishing a secondary cross axis (east and west). The campus has gone through at least four historically substantive building periods, with the classical campus organization considered during all of these periods (UA, 2007). The architectural typology has evolved; it ranges from Classical, Neo-classical, and Victorian to other largely traditional forms of architecture. However, the most typical typology is the Classical order, with symmetrical and proportional structures featuring brick masonry, rhythmic-punched openings, entablatures, columns, and colonnades throughout the campus. Open spaces, buildings, and circulation elements within the campus address natural systems to optimize the energy performance of buildings, to ensure safety and environmental quality, and to retain a natural setting.

Details regarding the geophysical, jurisdictional, and cultural setting potentially affected by the proposed action are further described in Section 6, *Environmental Assessment*.

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6 ENVIRONMENTAL ASSESSMENT

This section discusses the regulatory framework for impact analysis, the existing environment conditions relevant to each resource topic, and evaluates the anticipated environmental effects to those resources, including recommended impact mitigation measures for the Preferred Site Alternative and the No Action Alternative. Additional background data and other materials are provided in **Appendix B**. Substantive public and agency comments are provided in **Appendix C**.

6.1 LAND USE

This section describes federal, state, and local land use statutes and policies for the study area (or the UA campus). Key among these policies are the federal Public Buildings Amendments of 1988 (Public Law 100-678), and the UA Campus Master Plan (UA, 2007) which incorporates state and local planning considerations. The application of these policies and plans—and the proposed project's consistency with them—is considered when assessing the intensity and duration any potential project-related environmental impacts to land use planning under NEPA.

The Public Buildings Amendments of 1988 identify the responsibilities of federal agencies in complying with non-federal zoning regulations. This law requires federal agencies to consider local zoning and development requirements, provide local officials with plans to review for up to 30 days, and permit normal inspections by building officials during construction. The local government cannot bring any actions or fines against the federal agency for non-compliance. NOAA would adhere to the provisions of the Public Building Amendments of 1988.

The University's Campus Master Plan provides a long-term, campus-wide vision. The Master Plan is fluid and evolving, as its purpose is conceptual in nature (Behm, 2010). The Master Plan identifies a campus vision consisting of five goals: preserving the campus core and landmark structures, regenerating the vitality of the campus, integrating new construction through incremental infill, adapting buildings and facilities to accommodate innovation and expansion, and planning for future campus expansions. Specific aspects of these goals are discussed relative to the proposed action and the Preferred Site Alternative.

6.1.1 Existing Environment

6.1.1.1 Preferred Site Alternative

The proposed project would be constructed on land owned and occupied by UA. According to the City of Tuscaloosa's Zoning Map, the University is designated as Institutional Districts (I), which allows uses and structures that are major public and private nonprofit institutions serving the public, such as universities, colleges, hospitals, parks, fairgrounds, and large state, federal, and municipal facilities (City of Tuscaloosa, 2010e).

The University's Master Plan loosely identifies five functional organizations or planning clusters for the campus. These functional organizations are: academic and administrative support, campus housing, athletics and recreation, support functions, and community interface. The subject site and the University's EHS building are beyond the northeastern periphery of the academic and support cluster and outside the campus housing cluster. Academic and administrative support establishes the core of the campus and is intended for learning and selected supporting services. Campus housing surrounds the campus core and primarily supports student residences and student life. The subject site resides within an intervening area defined broadly as open space, a campus land use priority established in the early 1900s for enhancing and extending the learning experience and connecting disparate elements of the campus. The EHS building and the subject parcel were acquired for use by the University before the creation of open space definition and tend to connect more to the academic or support functions along Hackberry Lane rather than the campus housing function to the northwest.

A map accompanying the University Master Plan identifies existing and proposed buildings and future expansion of the University, including planned structures, pedestrian spaces, open space, transit-only streets, and athletic fields (see **Appendix B-1**). The map shows that the Preferred Site Alternative contains the UA EHS building and does not indicate any change to that structure or its land parcel (UA, 2007).

The subject site is outside the early north-south axial campus design initiated by State Architect William Nichols in 1829 and the complementary cross-axis and quad complex core constructed after the Civil War. The architecture of the University consists of the Neo-classical, Victorian, classical, and traditional forms of architecture. Subsequent major development is associated with the Greater University Plan in the early 1900s and Million Dollar Plan (near the Wood Hills Quad); this subsequent development focused on the original central north-south axis and central lawn and introduced the open-space concept (UA, 2007).

From the core area and quad, alignment of the campus is an outward sphere of development that bridges outlying academic, administrative, residential, athletics and support campus functions and related architecture realms. University growth has resulted in the use of properties outside of the original campus in areas such as the subject site, formerly a part of the adjacent Bryce Hospital compound. The Preferred Site Alternative is north of the University's core area and quad at the northern periphery of academic campus development. It currently abuts the eastern edge of the campus boundary with the former Bryce Hospital property.

Land uses surrounding the subject site include the parking areas to the north for campus residents, University academic and administrative buildings to the west and south, and the former Bryce Hospital property to the east (see Figures 1 and 2). According to the Campus

Master Plan, future development is anticipated to the north to support campus residents, including a prospective parking structure and additional housing. Also, the University is expected to receive ownership of the former Bryce Hospital property, with the right to use or further develop roads, parcels, and structures adjacent to the subject site. University access to and use of the adjacent Bryce Hospital property are expected to occur in 2013. The adjacent property associated with the former Bryce Hospital is currently inaccessible to University traffic. Portions of Bryce Hospital are included in an Environmental Covenant with the University, which transferred the property rights of approximately 45 acres from the Hospital to the University (UA, 2010a). The Environmental Covenant land is northeast of the proposed project location and is not adjacent to the project location.

6.1.1.2 No Action Alternative

The existing environment with respect to land use is described in the preceding section.

6.1.2 Environmental Consequences

6.1.2.1 Preferred Site Alternative

The proposed project would result in a federal facility on University property that would benefit both public and university research priorities. It would not conflict with the City of Tuscaloosa Zoning Policy pertaining to an Institutional District at this location. The UA Master Plan does not designate a specific land use or organization function for the subject site. The proposed action would be generally consistent with the University's Master Plan, since replacement of the existing structure with the construction of the proposed IWRSS NWC would not alter the land use identified within the University Master Plan or change the overall land use or architectural character and function of the campus and adjoining area. The proposed project would not divide, isolate, or be inconsistent with existing or planned campus land uses.

The proposed action at the Preferred Site Alternative would require approximately 140 off-site parking spaces to adequately serve the IWRSS NWC program. Existing surface parking is present to the north of and adjacent to the preferred site; this parking is reserved for campus residential and other limited uses. To serve the proposed IWRSS NWC, an additional parking area is proposed by the University to the northeast between the existing campus residential parking lot and the former Bryce Hospital property (see Figures 1 and 2). This parking would be provided as surface parking, unless as a separate action, the University elects to construct a parking structure as contemplated in the Campus Master Plan (see Section 12, *Transportation*). This action would be consistent with the Master Plan.

Adequate off-site parking for the proposed IWRSS NWC facility would be provided on adjacent University property (Randall, personal communication, November 2010; Leopard, personal

communication, September 2010). No land use conflicts with federal, state, or local plans, policies, or regulations are anticipated to result from implementation of the proposed action at the Preferred Site Alternative.

6.1.2.2 No Action Alternative

Under the No Action Alternative, the proposed action would not be implemented; no new IWRSS facility would be established. The Preferred Site Alternative would either continue to be used by the University's Office of Environmental Health and Safety or be planned for other currently unforeseeable uses. No land use impacts would result under the No Action Alternative.

6.1.3 Mitigation Measures

6.1.3.1 Preferred Site Alternative

No mitigation measures are recommended.

6.1.3.2 No Action Alternative

No mitigation measures are recommended.

6.2 GEOLOGICAL RESOURCES

To examine the effects of the proposed action on geological resources (and the effects of these resources on the proposed action), this analysis considers the Surface Mining and Reclamation Act (Public Resources Code, Division 2, Chapter 9, Section 2710 et seq.), the Historic Sites Act of 1935, and geologic conditions or subsurface mineral rights that may affect or be affected by the proposed action. The Surface Mining and Reclamation Act was enacted to address the need for a continuing supply of mineral resources and to prevent or minimize the adverse impacts of surface mining to public health, property, and the environment. The Historic Sites Act of 1935 establishes a national registry of natural landmarks and protects "outstanding examples of major geological features."

Project-related impacts associated with geological resources may include hazards such as landslides, erosion, fault rupture, seismic shaking, liquefaction, sinkholes and subsidence, and effects to mineral resources or protected geological features. Geologically hazardous areas pose a threat to the health and safety of citizens when incompatible development is sited in areas of significant hazard. Some geological hazards can be reduced or mitigated by engineering, design or modified construction practices, but other geological hazards are best avoided. Geological hazards considered include the following:

Landslide: Landslide areas are prone to landslides, soil failure, and/or subsidence that can result in movement of fill, soil, rock, or other geologic strata.

Erosion: Erosion areas are areas where soils may experience severe to very severe erosion due to construction activity. Susceptibility to erosion is generally a function of soil type, topography, wave or tidal action, occurrence of groundwater seepage or surface runoff, and the built environment.

Seismic: Seismic areas are subject to severe risk of earthquake damage as a result of ground shaking, ground rupture, or soil liquefaction. Earthquakes are driven by geological processes that produce stresses in the earth's crust (plate tectonics). Seismic hazards can include the following:

- Strong shaking at the ground surface, particularly in areas of soft, unconsolidated soils, such as artificial fills, in river valleys or along shorelines of bays and lakes. Ground shaking can occur far from the earthquake source. To characterize ground-motion amplifying effects, the International Code Council adopted the six site classes in the National Earthquake Hazard Reduction Program in the Uniform Building Code;
- Ground rupture is a visible breaking and displacement of the Earth's surface along the trace of the fault, which may be on the order of several feet in the case of major earthquakes. Ground rupture only occurs along an active fault trace;
- Liquefaction is a phenomenon in which strong earthquake-generated ground shaking causes soil to rapidly lose its strength and temporarily behave like liquid or quicksand.

Sinkhole and Subsidence: These areas are subject to risk of sinkhole collapse or diminished structural integrity due to dissolution of underlying bedrock or underground drainage. Bedrock consisting of limestone or other geologic material (e.g., sandstones with carbonate matrix) is prone to development of dissolution cavities and cave networks. Sinkholes and subsidence hazards result from both natural and man-made (induced) processes.

6.2.1 Existing Environment

6.2.1.1 Preferred Site Alternative

The geologic conditions in the vicinity of the Preferred Site Alternative are characterized by alluvial terrace deposits of Quaternary age at the surface, overlying Cretaceous-aged deposits of the Coker Formation in the Tuscaloosa Group. Sedimentary outcrop rocks range in age from Cretaceous to Quaternary. The Coker Formation in Tuscaloosa County is characterized by light- and vari-colored, irregularly bedded sand, clay, and gravel. Coarser sand beds and gravel beds are predominant in the lower portion of the formation, and the upper part of the formation mainly consists of clay and sandy clay, with some lenses of glauconitic and micaceous sand. The Coker Formation layers are typically less than 100 feet thick in the vicinity of UA (Raymond, et al., 1988).

Soils at the Preferred Site Alternative are predominantly Bama-Urban land complex, a well-drained soil with slopes of 2 to 6 percent. The most westerly portion of the site contains Smithdale fine sandy loam. This area of Smithdale fine sandy loam constitutes less that 5 percent of the site area and is a location where no earth-moving activity is planned. More detailed information is presented in the *Custom Soil Resource Report of Tuscaloosa County, Alabama*, prepared for the proposed IWRSS NWC on December 22, 2010 (see **Appendix B-2**).

Alluvial deposits near the Black Warrior River are typically as thick as 80 feet, and well data in the vicinity of the Preferred Site Alternative show thicknesses of between 50 and 83 feet. The sand and gravel beds in the Coker Formation are some of the most productive aquifers in Tuscaloosa County. Typical yields from groundwater wells in Quaternary alluvial deposits in Tuscaloosa County are from 5 to 25 gallons per minute, though potential yields from this aquifer are much higher (more than 100 gallons per minute) in properly screened wells (Paulson et al., 1962). Recharge to the Coker Formation is generally good in Tuscaloosa County, particularly in areas where relatively flat-lying terrace sand and gravel overlies the formation (Paulson et al., 1962), as is the case in the vicinity of the Preferred Site Alternative.

No "outstanding examples of major geological features" were found near the Preferred Site Alternative during a search of the National Register of Historic Places (National Park Service, 2010a).

Alabama is considered to be a state with a moderate earthquake risk (FEMA, 2010). Three main zones of frequent earthquake activity affect the state of Alabama: the New Madrid Seismic Zone, the Southern Appalachian Seismic Zone (also called the Eastern Tennessee Seismic Zone), and the South Carolina Seismic Zone (Geological Survey of Alabama, 2010). The closest of these zones is approximately 160 miles from Tuscaloosa. The probability of an earthquake of 5.0 magnitude or greater occurring within 31 miles of Tuscaloosa within the next 50 years is 2.12 percent, and the last recorded earthquake of 4.5 magnitude or greater was in 1986 (Homefacts, 2010). The USGS has estimated that horizontal ground shaking has a 1 in 50 (2 percent) chance of exceeding 8 percent to 16 percent of *g* (where *g* is the acceleration of an object falling due to gravity) in a 50-year period (USGS, 2007), which is considered a moderate to low hazard according to FEMA.

Tuscaloosa County contains mineral-producing areas for construction sand and gravel, industrial sand, crushed stone, and sulfur (oil) (USGS, 2009). Sand and gravel deposits are present within the area of the UA campus; however, no existing mineral resource recovery operations occur on or near the Preferred Site Alternative (Beg et al., 1978). Such operations are also unlikely to be developed in the future, due to the location of the UA campus.

6.2.1.2 No Action Alternative

The existing environment with respect to geological resources is described in the preceding section.

6.2.2 Environmental Consequences

6.2.2.1 Preferred Site Alternative

The site is gently sloping and in an urbanized environment where the landslide and erosion hazards are considered relatively low; however, the Preferred Site Alternative may be susceptible to erosion when disturbed by construction with finished grades greater than 15 percent.

Geological evidence suggests a moderate to low seismic risk for the Preferred Site Alternative. Assuming that the proposed structures meet current building standards, the impact of seismic hazards on the proposed action is considered to be minor.

Neither the Coker Formation nor the overlying Quaternary alluvial deposits contain high levels of carbonate materials and are therefore not subject to dissolution and subsequent sinkhole formation or subsidence (Raymond, et al., 1988). Subsidence and sinkhole hazards will have no impact on the proposed action.

Due to the lack of unique geological features or substantial mineral deposits in the vicinity of the Preferred Site Alternative, the proposed action would have no impact on these resources.

Adverse impacts to significant geologic conditions would not result from the construction or operation of the proposed IWRSS NWC. Excavation to depths where groundwater may be affected by the presence of environmentally recognized conditions is considered in Section 6.15, *Hazardous Materials*.

6.2.2.2 No Action Alternative

Under the No Action Alternative, the proposed action would not occur and existing geological and mineral resources and potential effects from the threat of landslide, erosion, seismic, or subsidence hazards would remain unchanged. There would therefore be no impact on geological resources.

6.2.3 Mitigation Measures

6.2.3.1 Preferred Site Alternative

No mitigation measures are recommended.

6.2.3.2 No Action Alternative

No mitigation measures are recommended.

6.3 AIR QUALITY

To examine the air quality effects of the proposed action, this analysis considers emissions regulated under the Clean Air Act of 1970 (CAA), which seeks to protect human health and the environment from air pollution in the ambient air. The CAA at U.S. Code Title 42, Chapter 85, Sections 7401 - 7431 establishes federal air quality standards for stationary and mobile sources, sources of hazardous air pollutants, and the emissions causing acid rain. The CAA establishes a comprehensive permit system for all major sources of air pollution and addresses protection of the ozone layer. It authorizes the U.S. Environmental Protection Agency (USEPA) to establish National Ambient Air Quality Standards (NAAQS) for pollutants, known as "criteria pollutants," that are considered harmful to the environment and health. The NAAQS include standards for the following criteria pollutants: carbon monoxide, lead, nitrogen dioxide, ozone, sulfur dioxide, particulate matter less than 10 micrometers in diameter (PM_{10}), and particulate matter less than 2.5 micrometers in diameter ($PM_{2.5}$).

Under the CAA, each state has the responsibility to ensure air quality within an air basin through a State Implementation Plan (SIP). The SIP describes proposed measures for achieving and maintaining air quality standards and enforcement of the NAAQS for criteria pollutants. Areas where the national primary and secondary ambient air quality levels for a pollutant exceed the state and/or federal standards for that pollutant are considered to be non-attainment areas for that pollutant. Non-attainment areas may be classified as basic, serious, severe, or extreme non-attainment areas for a given criteria pollutant. Areas that have achieved attainment may be designated as "maintenance areas," which are subject to maintenance plans showing how the area will continue to meet federal and state air quality standards. The CAA requires that non-attainment and maintenance areas (with respect to the NAAQS) prepare individual SIPs. Federal actions must demonstrate conformity to any SIP.

6.3.1 Existing Environment

6.3.1.1 Preferred Site Alternative

The Alabama Department of Environmental Management (ADEM) Air Division administers the state Air Pollution Control Program pursuant to the Alabama Environmental Management Act, Ala. Code §§ 22-22A-1 to 22-22A-16 and the Alabama Air Pollution Control Act, Ala. Code §§ 22-28-1 to 22-28-23. The Air Division also administers the delegable provisions of the CAA that regulate air emissions from stationary and mobile sources. The rules for ADEM's Air Pollution Control Program are found in Division 3 of the ADEM Administrative Code. Division 3 regulations include emission standards and control requirements on both a pollutant-specific basis and process/equipment/industry-specific basis. Division 3 also sets forth the permitting requirements for air emission sources.

At ADEM Administrative Code Revised 335-3-1-.03, Ambient Air Quality Standards, the primary and secondary NAAQS—and the accompanying appendices set forth in 40 Code of Federal Regulations (CFR) 50—have been incorporated by the ADEM Air Division and apply throughout Alabama. The USEPA has established, and Alabama has adopted, NAAQS for the criteria pollutants listed in Table 1 (USEPA, 2010b). Tuscaloosa County is currently in attainment for the federal air quality standards for all criteria pollutants (USEPA, 2010c).

Table 1: National and State Ambient Air Quality Standards

Pollutant	Primary Standards		Secondary Standards	
	Level	Averaging Time	Level	Averaging Time
Carbon monoxide (CO)	9 ppm (10 mg/m^3)	8-hour [1]	None	
	35 ppm (40 mg/m^3)	1-hour [1]		
Lead	0.15 µg/m^3 [2]	Rolling 3-month average	Same as primary standard	
	1.5 µg/m^3	Quarterly average	Same as primary standard	
Nitrogen dioxide (NO_2)	53 ppb [3]	Annual (arithmetic average)	Same as primary standard	
	100 ppb	1-hour [4]	None	
Particulate matter (PM_{10})	150 µg/m^3	24-hour [5]	Same as primary standard	
Particulate matter ($PM_{2.5}$)	15.0 µg/m^3	Annual [6] (arithmetic average)	Same as primary standard	
	35 µg/m^3	24-hour [7]	Same as primary standard	
Ozone (O_3)	0.075 ppm (2008 std)	8-hour [8]	Same as primary standard	
	0.08 ppm (1997 std)	8-hour [9]	Same as primary standard	
	0.12 ppm	1-hour [10]	Same as primary standard	
Sulfur dioxide (SO_2)	0.03 ppm	Annual (arithmetic average)	0.5 ppm	3-hour [1]
	0.14 ppm	24-hour [1]		
	75 ppb [11]	1-hour	None	

ppb = parts per billion
ppm = parts per million
µg/m^3 = micrograms per cubic meter
mg/m^3 = milligrams per cubic meter
std = standard

[1] Not to be exceeded more than once per year.
[2] Final rule signed October 15, 2008.
[3] The official level of the annual nitrogen dioxide standard is 0.053 ppm (equal to 53 ppb), which is shown here for the purpose of clearer comparison to the 1-hour standard.
[4] To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 100 ppb (effective January 22, 2010).
[5] Not to be exceeded more than once per year on average over 3 years.
[6] To attain this standard, the 3-year average of the weighted annual mean PM2.5 concentrations from single or multiple community-oriented monitors must not exceed 15.0 µg/m3.

Table 1: National and State Ambient Air Quality Standards

Pollutant	Primary Standards		Secondary Standards	
	Level	Averaging Time	Level	Averaging Time

[7] 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 µg/m3 (effective December 17, 2006).
[8] 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 0.075 ppm. (effective May 27, 2008)
[9] (a) 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.
(b) The 1997 standard—and the implementation rules for that standard—will remain in place for implementation purposes as USEPA undertakes rulemaking to address the transition from the 1997 ozone standard to the 2008 ozone standard.
(c) USEPA is in the process of reconsidering these standards (set in March 2008).
[10] (a) USEPA revoked the 1-hour ozone standard in all areas, although some areas have continuing obligations under that standard ("anti-backsliding").
(b) The standard is attained when the expected number of days per calendar year with maximum hourly average concentrations above 0.12 ppm is $\leq$ 1.
[11] Final rule signed June 2, 2010. To attain this standard, the 3-year average of the 99th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 75 ppb.

Source: USEPA, 2010b, http://epa.gov/air/criteria.html

The USEPA promulgated a General Conformity Rule (GCR) (Section 110 of the CAA and Title 40 CFR Part 51.853) that requires responsible federal agencies to make a determination of conformity with the SIP for a major undertaking. Each federal action within a non-attainment or maintenance area must be reviewed to determine whether it (1) qualifies for an exemption listed in the GCR; (2) results in emissions that are below GCR *de minimis* emissions thresholds; or (3) would produce emissions above the GCR *de minimis* thresholds applicable to the specific area, requiring a detailed air quality conformity analysis.

Since Tuscaloosa County is in attainment for all the criteria air pollutants, there are no applicable GCR *de minimis* thresholds for the proposed project. GCR *de minimis* thresholds are only applicable for nonattainment or maintenance areas.

Carbon monoxide, hydrocarbons, particulate matter, sulfur dioxide and oxides of nitrogen emissions are associated with vehicle emissions. Traffic in 2007 is estimated to be nearly 12,000 vehicle trips per day for this portion of Hackberry Lane. The traffic contribution from existing activities at the Preferred Site Alternative is estimated to be 200 trips per day, primarily generated by staff at the EHS building.

The primary risks from fugitive dust particles relate to human health and nuisance values. Fugitive dust can contribute to respiratory health problems and create an inhospitable working environment. Deposition of dust on surfaces can be a nuisance to those living or working downwind. In winter, prevailing winds are from the northwest and in the summer they are from the southwest (Gould Evans Associates *et al.*, 2010). Each of these downwind directions is towards the unoccupied former Bryce Hospital property.

On December 7, 2009, the Final Endangerment and Cause or Contribute Findings for Greenhouse Gases under Section 202(a) of the CAA was signed. The endangerment finding states that current and projected concentrations of the six key well-mixed GHGs in the atmosphere—carbon dioxide (CO_2), methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride—threaten the public health and welfare of current and future generations. Furthermore, it states that the combined emissions of these well-mixed GHGs from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution which threatens public health and welfare (USEPA, 2010d). The EPA has moved forward under the endangerment finding by developing vehicle emission standards under the CAA. The EPA and the Department of Transportation's National Highway Traffic Safety Administration have issued a joint proposal to establish a national program consisting of new emission standards for light-duty vehicles, model year 2012 through 2016, that will reduce GHG emissions and improve fuel economy. This proposal marks the first GHG standards proposed by the EPA under the CAA as a result of the endangerment and cause or contribute findings.

On February 18, 2010, the CEQ released draft guidance on the consideration of GHG in federally proposed actions. The draft guidelines include a presumptive threshold of 25,000 metric tons of carbon dioxide equivalent (CO_2e) emissions from a proposed action to trigger a quantitative analysis. However, the document does not provide guidance on when to determine GHG emissions are "significant' for NEPA purposes, but rather poses the question to the public (CEQ, 2010).

6.3.1.2 No Action Alternative

The existing environment with respect to air quality is described in the preceding section.

6.3.2 Environmental Consequences

6.3.2.1 Preferred Site Alternative

Construction at the Preferred Site Alternative would take place over 18 months, beginning in October 2011. This alternative would result in temporary air emissions due to the operation of construction vehicles and equipment engines and fugitive dust from earth-moving activity. Grading and excavation would occur for approximately 8 weeks within the 3.7-acre footprint. Because the project site is relatively flat, the grading requirements would be minor except for the excavation needed to install the subsurface OC and the removal or realignment of buried utility infrastructure. The project area would be landscaped after construction.

The proposed action would include precautions to eliminate the potential for fugitive dust and fugitive emissions to occur. These precautions would include the use of water or chemicals to control the dust resulting from the demolition of existing buildings or structures, construction

operations, the grading of roads, or the clearing of land. These precautions would also include adequate containment methods so that the discharge of visible fugitive dust emissions would not extend beyond the lot line of the property on which the emissions originate. Given the limited extent and duration of these activities, minimal dust emissions would result due to grading activities. Impacts to air quality during the construction phase of the IWRSS project would be minor and temporary. Construction emissions for the worst case construction year (2012) have been estimated in Table 2 below. The construction emissions are relatively small, and even if the project area were subject to *de minimis* thresholds, the thresholds would not be exceeded[1].

Long-term impacts would be associated with commuter traffic and deliveries to the facility, emissions from building space heating systems, and monthly stationary source emissions from the periodic testing and infrequent operation of the emergency generator and UPS. The proposed action would generate an estimated 784 vehicle trips per day and would displace an estimate of approximately 200 vehicle trips per day occurring at the existing UA EHS facility, resulting in a net change of 584 vehicle trips per day. This represents less than 5 percent of the estimated vehicle trips per day, based on 2007 traffic count data, and a corresponding increased contribution to vehicle air emissions.

A 1,000-kW emergency generator would be installed and fueled by either diesel fuel or natural gas, with an external belly fuel tank capacity for 2 days of operations at 100 percent load. The UPS would include 300-kilovolt-amperes, 480-volt, 3-phase input and 120/208-volt, 3-phase, 4-watt output. It would operate for approximately 2 hours each month for testing, and for longer periods during rare events in which power provided to the proposed IWRSS NWC by the local public utility service is disrupted. The sums of the operational emissions are presented below in Table 2. The operational emissions are not substantial and even if the project area were subject to *de minimis* thresholds, the thresholds would not be exceeded.

It is possible to estimate a project's incremental contribution of CO_2, a GHG, into the atmosphere. However, it is typically not possible to determine whether or how an individual project's relatively small incremental contribution might translate into physical effects on the environment. Given the complex interactions between global and regional atmospheric systems, it is impossible to discern whether the presence or absence of CO_2 emitted by the proposed project would result in any altered conditions. Should federal or state significance criteria for GHG to be applied to the proposed action, the significance of the project CO_2 emissions would

[1] Based on the assumption that the *de minimis* threshold would be 100 tons per year for NOx, VOC, CO, PM_{10}, $PM_{2.5}$ and SO_2 if the county was considered maintenance for these pollutants.

likely be minor relative to GHG thresholds implemented under pending federal or state policies. Although GHG emission quantification for the proposed project is not required under NEPA (project emissions would be less than 25,000 metric tons CO_2e), the GHG emissions are presented in Table 2.

Table 2: Construction and Operational Emissions for Proposed Project

Pollutant	Worst Case Construction Period (2012)		Operational Period (2013)	
Carbon monoxide (CO)	1.72	tons/year	39.48	tons/year
Nitrogen oxides (NOx)	4.55	tons/year	2.54	tons/year
Particulate Matter (PM_{10})	9.19	tons/year	0.14	tons/year
Particulate Matter ($PM_{2.5}$)	9.19	tons/year	0.09	tons/year
Sulfur oxides (SOx)	0.29	tons/year	0.07	tons/year
Volatile Organic Compounds (VOC)	0.14	tons/year	1.95	tons/year
Carbon Dioxide (CO_2)	612.70	metric tons/year	1,367.27	metric tons/year

Project construction CO_2 emissions are equivalent to CO_2 emissions from approximately 120 passenger vehicles, and project operational emissions are equivalent to CO_2 emissions from approximately 265 passenger vehicles. Additionally, the *Inventory of Alabama Greenhouse Gas Emissions and Sinks: 1990* states that CO_2 statewide emissions were 29.8 million metric tons carbon dioxide equivalent (CO_2e) in 1990 (USEPA, 1990). Project construction and operational GHG emissions would be less than 0.01% of the 1990 state GHG inventory, and therefore would be negligible.

The building would include computers; however, no hazardous chemicals would be used that would require the installation of indoor fume hoods or emission control technologies. Air emission impacts from the anticipated sources associated with the project would be minor. An ADEM permit for a minor source may be required, based on the final design criteria.

6.3.2.2 No Action Alternative

Under the No Action Alternative, the proposed action would not occur and ambient air quality conditions would remain unchanged.

6.3.3 Mitigation Measures

6.3.3.1 Preferred Site Alternative

The following mitigation measures are recommended with respect to the air quality effects associated with the Preferred Site Alternative:

- During clearing, grading, earth moving, excavation, or transportation of cut-and-fill material, water trucks or sprinkler systems will be used to prevent fugitive dust from leaving the site.
- During construction, water trucks or sprinkler systems will be used to keep all affected areas of vehicle movement damp enough to prevent dust from leaving the site. At a minimum, these activities will include wetting down such areas in the late morning, after work is completed for the day, and whenever wind speeds exceed 15 miles per hour.
- Soil stockpiled for more than 2 days will be covered, kept moist, or treated with soil binders to prevent dust generation.

6.3.3.2 No Action Alternative

No mitigation measures are recommended.

6.4 WATER RESOURCES

To examine the effects of the proposed action on water resources and features, this analysis considers Sections 401 and 404 of the Clean Water Act (CWA) and related pollution standards at ADEM Administrative Code Revised Chapter 335-6-10 and their best management practices. Section 401 of the CWA authorizes the USEPA to promulgate water quality certification authority to the ADEM for projects requiring a National Pollutant Discharge Elimination System (NPDES) permit due to the discharge of any pollutant into waters of the United States. Section 404 of the CWA provides for USACE regulatory review and permit authority for the dredge or fill of material within waters of the United States.

The Clean Water Act and federal regulations require construction site operators to obtain a NPDES permit for regulated land disturbances and associated discharges of stormwater runoff to State waters such as the Black Warrior River. New USEPA regulations were effective February 1, 2010. In response, the ADEM will replace its "permit-by-rule" system with a general NPDES permit developed and administered under ADEM Administrative Code Revised Chapter 335-6-6-.23. The proposed action is expected to be implemented under the proposed General Permit program under which NOAA shall comply with applicable provisions described in Chapter 335-6-6, and other applicable provisions of ADEM Administrative Code Division 335-6, and the Alabama Water Pollution Control Act.

The effects of the proposed action on water resources were considered based on anticipated professional practices and applicable regulatory standards. Depending on the duration and intensity of the effect, the following effects may be considered significant:

- Substantial alteration of existing drainage patterns
- Substantial increase in surface water runoff
- Creation of off-site drainage or flooding hazards
- Degradation of water quality in excess of federal or state regulatory criteria

An impact is considered to be a long-term impact if it could persist beyond the construction period. Any potential impacts not explicitly described in this assessment are considered to be negligible.

6.4.1 Existing Environment

6.4.1.1 Preferred Site Alternative

No man-made water impoundments or natural water features are present within the area of the Preferred Site Alternative. Storm water surface flow across the subject site is generally to the north-northwest, toward the Black Warrior River, which is approximately 1,700 feet north of the site. A campus storm water collection and drainage system directs captured flows to the Black Warrior River. Three storm drains are immediately south, east, and north of the EHS building and one is in the curb on the west side of the EHS building parking lot. No natural water courses are present on or near the Preferred Site Alternative. As previously indicated in Section 6.2, *Geological Resources*, sand and gravel beds in the Cretaceous-age beds constitute some of the most productive aquifers in Tuscaloosa County, with potential yields of several hundred gallons per minute. The water table is approximately 10 to 20 feet below ground surface (TTL, 2010).

6.4.1.2 No Action Alternative

The existing environment with respect to water resources is described in the preceding section.

6.4.2 Environmental Consequences

6.4.2.1 Preferred Site Alternative

The potential effects of the proposed action on water resource and surface or groundwater processes include:

- sediment entrainment by surface water flows into drainage curbs and culverts during construction, and
- accelerated runoff over impervious surfaces after construction.

Exposure to groundwater during excavation may result in the need for dewatering or other measures for effective construction of subsurface structures and conduits. Also, periodic transfer

of fuel to the emergency generator fuel storage and secondary containment vessels presents the potential for accidental releases to the storm water drainage system.

Although excavation is required to prepare the site, the volume of excavation for the 10,000 square foot OC and underground utilities is not substantial. The proposed action would involve construction activities that include the installation of drainage filters or silt fences to reduce or eliminate the amount of siltation occurring off-site, including the storm drainage system. Neither the short-term nor the long-term storm water runoff caused by impervious surfaces is expected to substantially change from existing conditions. Also, the project's LEED Silver goal will include measures to limit surface runoff and allow for on-site infiltration. The project would require an NPDES permit for grading within the 3.7-acre project boundary. Provided that standard conditions for the NPDES General Permit approval are followed, neither short-term nor long-term runoff would impair water quality on or off the project area, including the campus-wide water quality of storm water discharge to the Black Warrior River. The standard conditions for NPDES General Permit approval by the ADEM are provided in Section 6.4.3.1 below.

The proposed action would disturb on- and off-site areas of less than 10 acres, including adjacent off-site parking and grading associated with access to adjacent utility services and roadways. It is assumed that NOAA will apply for and receive a NPDES permit from the ADEM, including adherence to its provisions. These provisions would include stormwater pollution prevention requirements such as erosion and sediment controls, soil stabilization, pollution prevention measures, including spills and leaks from equipment, generators and fuel storage units, and preparation of a Construction Best Management Practices Plan in accordance with 40 CFR Part 112 and ADEM Administrative Code Revised at Chapter 335-6-6-.12(r). These practices are presented in the most recent edition of *Alabama Handbook For Erosion Control, Sediment Control, And Stormwater Management On Constructions Sites And Urban Areas, Alabama Soil and Water Conservation Committee* (ASWCC).

Groundwater may be encountered during excavation and should be considered during facility design and construction management. Should geotechnical investigations indicate that groundwater would be encountered during construction, standard construction practices would be required and could include removal through dewatering before excavation or containment per an ADEM-accepted NPDES Spill Prevention, Control and Countermeasures (SPCC) Plan.

For servicing the emergency generator and its fuel source, fuel transfers would be consistent with NPDES requirements and safe practices established within the NPDES SPCC Plan Secondary containment may be required against the low probability of a spill or release. Groundwater may be affected by off-site contamination. If the groundwater is contaminated, exposure to construction workers or off-site release of groundwater may have the potential for adverse

effects to human health (see Section 6.15, *Hazardous Materials* for additional discussion of this issue).

Assuming best management practices are employed for the prevention of pollutant discharge to the environment; anticipated project-related effects to water resources at the Preferred Site Alternative are expected to be negligible.

6.4.2.2 No Action Alternative

Under the No Action Alternative, the proposed action would not occur and water quality conditions, existing stormwater drainages and off-site water resources would remain unchanged.

6.4.3 Mitigation Measures

6.4.3.1 Preferred Site Alternative

The proposed action would involve the implementation of best management practices, such as silt fences, for the prevention of sediment release during excavation and construction and the release of fuels from equipment during construction or during IWRSS NWC operations. Specifically, secondary containment structures may be used to contain spills related to equipment or refueling operations.

Controls anticipated under a NPDES General Permit would mitigate potential impacts to water resources and include:

- Control the discharge of stormwater volume and velocity within the site to minimize soil erosion;
- Control stormwater discharges, including both peak flow rates and total stormwater volume, to minimize erosion at outlets and to minimize downstream channel and streambank erosion;
- Minimize the amount of soil exposed during construction activity through the use of project phasing or other appropriate techniques;
- Minimize the disturbance of steep slopes;
- Minimize sediment discharges from the site;
- Minimize the generation of dust and off-site tracking of sediment from vehicles;
- Stabilize all construction entrances and exits;
- Where applicable, install storm drain inlet protection measures to further prevent sediment discharges;

- Provide and maintain natural buffers around surface waters, direct stormwater to vegetated areas to increase sediment removal and maximize stormwater infiltration, unless infeasible;
- Minimize soil compaction and, unless infeasible, preserve topsoil;
- Implement measures to achieve the pollutant reductions consistent with applicable Total Maximum Daily Loads (TMDLs), accessed at: http://adem.alabama.gov/programs/water/approvedTMDLs.htm;
- Stabilize disturbed areas immediately whenever any clearing, grading, excavating or other earth disturbing activities have permanently ceased on any portion of the site, or temporarily ceased on any portion of the site and will not resume for a period exceeding 13 calendar days;
- Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, concrete washout, and other wash waters. Wash waters must be treated in a sediment basin or alternative control that provides equivalent or better treatment prior to discharge;
- Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste and other materials present on the site to precipitation and to stormwater;
- Minimize the discharge of pollutants from any spills and leaks from, including but not limited to, vehicles; mechanical equipment; chemical storage; and refueling activities;
- Prepare, implement, and maintain a SPCC Plan for all on-site fuel or pollutant storage tanks during construction; and for ongoing operation if total aboveground fuel storage capacity equals or exceeds 1,320 gallons.

6.4.3.2 No Action Alternative

No mitigation measures are recommended.

6.5 RECREATIONAL RESOURCES

No federal land subject to review of recreational resources under the National Park Service Organic Act (16 U.S.C. Sections 1–4) for administering areas of national significance or under the Wilderness Act (16 U.S.C. Sections 1131–1136) for federally designated "wilderness areas" are applicable to the proposed action. Consistency with recreational and athletic priorities established under the University Master Plan was considered.

6.5.1 Existing Environment

6.5.1.1 Preferred Site Alternative

Multiple sports and recreation centers and complexes are present on the UA campus. The University's 19 varsity sports teams, which are known as the Crimson Tide, participate in the National Collegiate Athletic Association's Division 1 as a member of the Southeastern Conference's Western Division (UA, 2010b, http://www.rolltide.com/ [accessed December 21, 2010]). Prominent varsity sports include football, basketball, baseball, softball, and gymnastics. The Bryant-Denny Stadium, formerly known as the Denny Stadium, is home to the Crimson Tide football team. During home football games, the 101,871-seat Bryant-Denny Stadium is typically sold out. The basketball stadium is at Coleman Coliseum, which also includes the Sewell-Thomas Stadium, Sam Bailey Track & Field Stadium, the Hank Crisp Indoor Facility, the Mal M. Moore Athletic Facility, and the surrounding football buildings and practice fields (UA, 2010c, http://ua.edu/athletics.html [accessed December 21, 2010]).

Organized recreational opportunities are provided by the University's Division of Student Affairs, University Recreation. University Recreation offers membership to University students, faculty, staff members, alumni, and retired faculty/staff, as well as to the surrounding community (UA, 2010d, http://urec.ua.edu/ [accessed December 21, 2010]). Recreational fields, tennis courts, and recreation centers are available for the general student population in addition to the Student Recreation Center and Aquatic Center. The Student Recreation Center on-site amenities include a gymnasium, racquetball courts, an indoor pool, a weight room, exercise machines, group exercise studios, and locker rooms (UA, 2010e, http://urec.ua.edu/urecFacilities.cfm [accessed December 21, 2010]).

The University Open Space System includes formal and informal landscaped spaces for quads, lawns, plazas, courtyards, recreational parks, athletic fields, streetscapes and paths, and natural areas (UA, 2007). The portion of the University campus at and near to the Preferred Site Alternative is identified as a part of the Open Space System, a landscaped area established between academic structures and roadways. No organized recreational facilities are on or in the immediate vicinity of the Preferred Site Alternative, and the site currently offers few opportunities for substantive recreation resources. Opportunities for recreation nearby include existing or planned pathways or bikeways. Key open space recreational opportunities such as the outdoor amphitheater, the Crescent, Capstone Promenade, the Academic Walk of Champions, and frequently traversed open space courtyards and grassy areas are not on or in the vicinity of the Preferred Site Alternative.

The Bryant-Denny Stadium is on Paul W. Bryant Drive and Wallace Wade Avenue, and Coleman Coliseum is on Paul W. Bryant Drive and Coliseum Drive. Both of these facilities are

south of the Preferred Site Alternative; they may be accessed via Hackberry Lane, which was recently rerouted to its current location adjacent to the Preferred Site Alternative.

6.5.1.2 No Action Alternative

The existing environment with respect to recreational resources is described in the preceding section.

6.5.2 Environmental Consequences

6.5.2.1 Preferred Site Alternative

The proposed action at the Preferred Site Alternative would neither displace nor interfere with existing or planned organized or informal recreational or sports opportunities at the University or organized recreational opportunities at campus fields, buildings, or sports stadiums. Thus, no short-term or long-term project effects would occur to recreational opportunities.

6.5.2.2 No Action Alternative

Under the No Action Alternative, the proposed action would not be implemented; no new IWRSS NWC facility would be established. The proposed project site would either continue to be used by the University Office of Environmental Health and Safety or be available for other uses, and existing recreational resources would remain unchanged. No significant recreational resource impacts would result under the No Action Alternative.

6.5.3 Mitigation Measures

6.5.3.1 Preferred Site Alternative

No mitigation measures are recommended.

6.5.3.2 No Action Alternative

No mitigation measures are recommended.

6.6 CULTURAL RESOURCES

To examine the effects of the proposed action on archaeological resources and historic properties, this analysis reviews cultural resources and considers coordination under Section 106 of the National Historic Preservation Act of 1966 (NHPA), as amended. Section 106 requires federal agencies to consider the effects of their actions on properties in or eligible for inclusion in the National Register of Historic Places (NRHP). Compliance requires consultation with the State Historic Preservation Officer (SHPO) within the Alabama Historical Commission (AHC) and, as necessary, the Advisory Council on Historic Preservation, if there is a potential adverse effect to historic properties. If adverse effects on historic, archaeological, or cultural properties

are identified, then agencies must attempt to avoid, minimize, or mitigate the impacts to these resources.

Depending on the potential for resources to be present, the AHC may request that the specific guidelines outlined in the Alabama Historical Commission Administrative Code regarding the intensity of survey and testing for cultural resources be followed at the subject property.

6.6.1 Existing Environment

6.6.1.1 Preferred Site Alternative

A literature search was conducted to collect information related to the history of use at the Preferred Site Alternative and surrounding areas. The search included queries to the Alabama State Archaeological Site File (ASASF) (UA Office of Archaeological Research, 2010), the NRHP (National Park Service, 2010a), and Sanborn Fire Insurance maps (EDR, 2010). Also, Doug Behm, Director of University Lands and Real Estate Services, was consulted regarding use of the Preferred Site Alternative and surrounding areas (Behm, 2010).

As recommended in the AHC publication, *Alabama Guidelines: Preparing Report for Historic Architectural Resource Under Section 106 of the NHPA of 1966, as Amended*, the first step in determining if a federal undertaking will have an effect on properties listed in or eligible for the NRHP is defining the Area of Potential Effects (APE) (Alabama Historical Commission, 2009). The APE is defined as "the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The APE is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking" (36 CFR 800.16[d]).

All aspects of the proposed action were considered in establishing both a direct and indirect, or secondary, APE. The direct and indirect APEs were established based on anticipated earthwork and construction activity as well as the type and height of architectural elements proposed (see Figure 7). A 6.5-acre direct APE for proposed physical activities was established and includes the 3.7-acre IWRSS project site, and adjacent or connected areas, and corridors in which construction-period staging, temporary project use, or other ground disturbance for utilities is anticipated. Adjacent areas potentially affected include a temporary staging and parking area to the northeast, portions of a limited-access roadway on Bryce Hospital property immediately east of the project site, and the trenching of utility corridors extending immediately off of the project site. Because the proposed structure would be a two-story building, an indirect APE to account for any dominant visual influence would extend approximately 1/8-mile (660 feet) beyond the approximate footprint of the proposed structure.

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LEGEND

- Area of Potential Effects
- Indirect Area of Potential Effects

Existing Structures

- Chillers for Shelby Hall
- Environmental Health and Safety Building
- Study Area Boundary

N

0 100 200 400

Scale in Feet

MAP SOURCE:
Aerial photograph provided by
The University of Alabama (2010)

INTEGRATED WATER RESOURCES SCIENCE AND SERVICES NATIONAL WATER CENTER

Area of Potential Effects - Preferred Site Alternative

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According to information in the ASASF, the Preferred Site Alternative lies within the western portion of the former Bryce Hospital Complex (or Bryce Hospital District), an area that UA researchers evaluated in 1997 and recorded as Site 1TU808 (see Figure 8). Site 1TU808 encompasses the original 19th century core of Bryce Hospital, the adjacent grounds, and the old hospital cemetery to the east of the main hospital buildings. These original hospital boundaries are described as the Black Warrior River to the north, Campus Drive to the south, with an access road running from Campus Drive to the river comprising the eastern boundary, and UA campus to the west as far as the former route of Hackberry Lane. Site 1TU808 includes three separate cultural resource loci identified as historic structural remnants dating to the late 19th/early 20th centuries (Rooney, 1997). While these loci are not listed on the NRHP, it has been recommended to SHPO by Rooney that this area not be disturbed. One loci evaluated, Loci #2, may overlap with the extreme northwestern corner of the Preferred Site Alternative.

The Preferred Site Alternative lies within the original boundary of the Bryce Hospital Complex, and the existing structure (EHS building) was used at the time as the men's tuberculosis ward. This building is describes as a one-story brick, T-shaped building with a cross gable roof, ventilators with gables, central entry vestibule with fluted pilasters, segmental pediment, flanking fixed 12-pane sash windows, recessed double door, façade with 20 6/6 pane sash windows, and concrete foundation (Ford, 1997). The structure and the land upon which it is located are now on property owned by the University.

Prior cultural resource surveys of structures at the former Alabama Insane Hospital, later named Bryce Hospital in honor of its first superintendent, document various phases of development of the original grounds (Ford, 1997). Bryce Hospital was constructed in 1853 and was a model of 19th century mental hospital Kirkbride design for the "moral treatment" philosophy that included well-lit buildings and landscaping for farming and exercise.

The NRHP lists the main Bryce Hospital building (building #77000216) as the "Alabama Insane Hospital," with a period of significance from 1850 to 1974 and areas of significance including architecture and social history. This listing is based on the main building's association with the moral treatment phase of hospital development and its linear Kirkbride plan layout for a target population of 250 patients. Subsequent expansion in response to overcrowding and advancements in treatment philosophy altered the Kirkbride design model, though the main four-story structure is a relatively intact example of this design.

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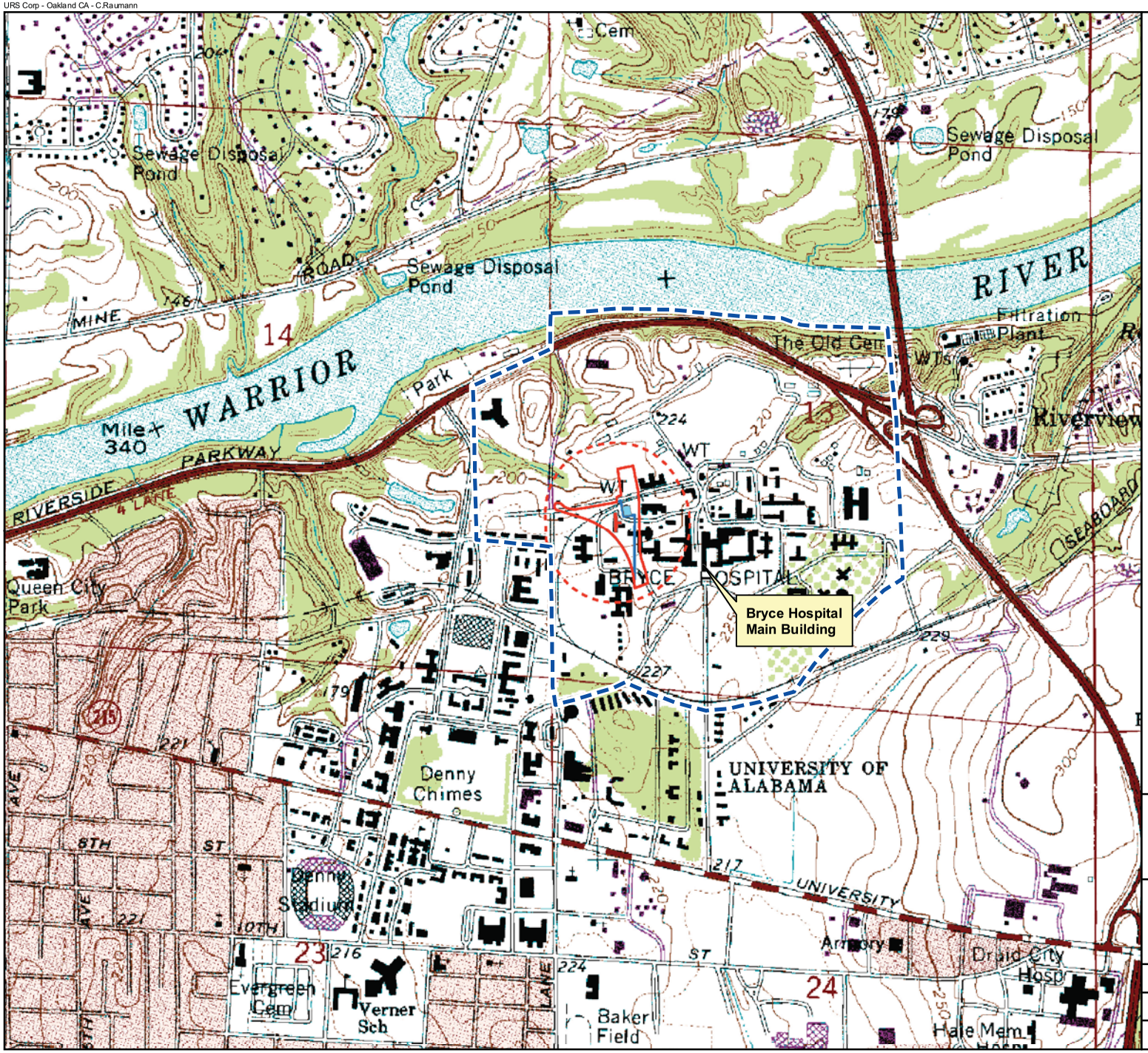

LEGEND

- Area of Potential Effects
- Indirect Area of Potential Effects
- Alabama State Site File 1TU808 Boundary

Existing Structures

- Chillers for Shelby Hall
- Environmental Health and Safety Building
- Study Area Boundary

N

0 500 1,000 2,000

Scale in Feet

DATA SOURCE:
Rooney, C.A., 1997, *A Cultural Resources Reconnaissance Survey of Approximately 38 Acres West of Bryce Hospital, In Tuscaloosa, Tuscaloosa County, Alabama*, Office of Archaeological Services, University of Alabama Museums

USGS 7.5-minute series, Tuscaloosa, AL quadrangle

INTEGRATED WATER RESOURCES SCIENCE AND SERVICES NATIONAL WATER CENTER

Area of Potential Effects and Alabama State Site File 1TU808 Boundary

DATE: 1/7/2011	FIGURE: 8
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The main building exemplifies the Kirkbride asylum design, featuring a central block, which houses administrative functions, and a series of three wings set back from each other to house patients. The central domed building and its expansive front grounds are over 840 feet east to southeast. Various connected wings of the main building spread to the east and west. The most westerly building wings were removed, and the remaining westerly wings are approximately 500 feet southeast of the proposed IWRSS NWC structure (see Figure 3-F).

The NRHP also lists the Gorgas-Manly Historic District, site #71000108, which consists of eight Gothic Revival structures on 120 acres south of Campus Boulevard East on the UA campus (National Park Service, 2010b). The period of significance for this district extends from 1825 to 1899, and the areas of significance include architecture and education. The University of Alabama Historic District, site #02001068, was added to the NRHP in 2002. This district includes 1,000 acres, with 49 buildings with a period of significance from 1800 to 1974 (National Park Service, 2010b). The Preferred Site Alternative lies within an area of the UA campus that has been recently developed near the northeastern campus boundary and is over 3000 feet from either The University of Alabama Historic District or the Gorgas-Manly Historic District.

A records search indicated that one prehistoric site (1TU678) lies within the Bryce Hospital Complex; the site is approximately ½-mile northeast of the Preferred Site Alternative. Eight other prehistoric sites lie within a 1-mile radius of the Preferred Site Alternative: 1TU1 and 1TU492 on the south bank of the Black Warrior River; 1TU112, 1TU114, 1TU116, and 1TU928, all on the north bank of the Black Warrior River; and 1TU676 and TU677, both to the east of the Bryce Hospital Complex (UA Office of Archaeological Research, 2010).

Sanborn Fire Insurance Maps from 1923, 1950, and 1967 were reviewed for structures within and in the vicinity of the subject site. The building currently occupied as the EHS building was constructed in 1946 to 1947, according to the 1950 Sanborn map. This map has the building labeled as “Men’s T. B. Wards.” The 1967 Sanborn map shows a steel water tower near the northeast corner of the subject property. The water tower is present in an aerial photo from 2006, but in an aerial photo dated 2009 the tower is no longer visible. A series of chiller units serving Shelby Hall now occupy the footprint of the former water tower.

From on-site observations and a review of maps of utility corridors and other infrastructure, the Preferred Site Alternative and the direct APE lie within an area previously disturbed by trenching and grading for utilities, roadways, and building foundations.

6.6.1.2 No Action Alternative

The existing environment with respect to cultural resources is described in the preceding section.

6.6.2 Environmental Consequences

6.6.2.1 Preferred Site Alternative

On September 21, 2010, URS personnel walked the Preferred Site Alternative and adjacent areas, including the 6.5-acre direct APE for the proposed IWRSS NWC. The Preferred Site Alternative lies within an area previously disturbed by trenching and grading for utilities, roadways, and building foundations. Given the extent of prior disturbance and findings from prior surveys within the former Bryce Hospital, it is unlikely that previously undiscovered prehistoric material would be found within the direct APE. Given its lack of association with the Kirkbride plan elements of the main building at Bryce Hospital, the existing UA EHS building is not likely eligible for the NRHP under National Register criteria. Structures currently listed in the NRHP are outside the indirect APE; these structures include the main Bryce Hospital building and structures within the Gorgas-Manly Historic District and The University of Alabama Historic District. While one of three loci evaluated by Rooney in 1997 for remnant historic structures, Loci #2, may overlap with the extreme western corner of the Preferred Site Alternative, the proposed action to re-route utilities and excavate for foundations would not occur within this study area. In addition, the evaluated resource has not been placed by the Alabama Historical Commission on the NRHP.

Prehistoric site (1TU678) is within the former Bryce Hospital Complex and is approximately ½-mile northeast of the Preferred Site Alternative. This feature is not within the project's direct (or indirect) APE and would not be affected. Similarly, eight prehistoric sites (1TU1, 1TU492, 1TU112, 1TU114, 1TU116, 1TU928, 1TU676, and TU677) are either along the Black Warrior River or east of the Bryce Hospital Complex, are outside of the APE, and would not be affected. The AHC concurs that the proposed action would not have an adverse effect upon archaeological resources (see Appendix C).

The proposed IWRSS NWC structure would replace the existing EHS building, a 63-year-old building that has been adapted for University use(see Figures 3-C and 3-D). On July 1, 2011, the AHC determined that this building is eligible to the NRHP. Based on the National Register criteria (36 CFR 63) and the criteria of adverse effect, (36 CFR 800.5), the AHC has also determined that the proposed action would have an adverse effect on this resource, as the action would cause physical destruction and removal of a historic property (see Appendix C). AHC has recommended specific impact mitigation measures that would resolve adverse effects to historic properties. These measures are outlined in the above referenced AHC correspondence and primarily consists of photographic documentation of existing Bryce Hospital Complex (or Bryce Hospital District) structures keyed to a map providing the physical location and year (or period) of construction. Based on completion of this mitigation measure, the AHC agrees that the

proposed action would not have an adverse effect under Section 106 of the NHPA. Provided the specified mitigation measures are achieved prior to demolition of the EHS building, the proposed NOAA action would not have a significant adverse effect under NEPA.

The proposed IWRSS NWC structure would be consistent with the architectural typology of the campus and a well-established development pattern consisting of a Classical order, with symmetrical and proportional brick masonry structures with rhythmic punched openings, entablatures, columns or colonnades. Overall, the proposed design of the National Water Center within the Bryce Hospital Complex Historic District would match the visual narrative and context of the area's historic period features, and would not diminish their significance or create a false sense of history. The design of the new building is expected to be consistent to the *Secretary of Interior's Standards for Rehabilitation*, particularly the guidelines for district settings, retaining the characteristics which define the district, and would have a similar massing, size, and scale to other properties nearby. The University's industrial chiller units are beyond the northeast corner of the Preferred Site Alternative. Other than the EHS building and the Bryce Hospital main building, the nearest potential or known historic resource is the former Bryce Hospital main building, particularly its central main block and tower, which are approximately 840 feet to the east-southeast, and its connected two-story wings to the east and west. The nearest portion of its attached brick wings is approximately 500 feet from the proposed IWRSS NWC structure. The main building's distinctive domed central block is outside the indirect APE, and the visual effects of the proposed two-story structure to the westerly wing of the main hospital building would be negligible. The AHC finds there to be no adverse effect to other listed or eligible structures, including the Bryce Hospital main building (see Appendix C).

6.6.2.2 No Action Alternative

Under the No Action Alternative, the proposed action would not be implemented, and therefore no potential impacts would result to cultural resources in the area.

6.6.3 Mitigation Measures

6.6.3.1 Preferred Site Alternative

The following mitigation measures recommended for the Preferred Site Alternative to reduce adverse effects to cultural resources to less than significant.

- Create of an accurate and to-scale map on acid-free archival bond paper for the entire Bryce NRHP district as depicted in AHC Site 1TU808.
- Cite locations of approximately 20 remaining buildings within the district and associated with Bryce Hospital. A recent aerial photograph will be used as a base map for spatial accuracy and location relative to existing features.

- Indicate the date or era of construction, i.e. the original hospital in the 1850s through the final construction period of the 1940s – 1950s. It is understood that the precise date of construction for smaller structures at Bryce Hospital are not well documented and may not be readily available for inclusion in this effort.
- Prepare one (1) archival quality black and white photograph of each remaining buildings' front elevation and key to the map. When possible, multiple buildings may be captured on the same photograph to assist depiction of the historic district's spatial relationships, historic context, and visual narrative.
- Prepare one (1) archival quality photograph of the front elevation of the Men's Tuberculosis Building along with two (2) archival quality photographs representing the interior of the Men's Tuberculosis Building (aka EHS building).
- Ensure photographs are large-format, 8" x 10", and are accompanied by contact-style prints produced from scanned TIFF images of the negatives. Copies of the negatives will not be required.
- Submit up to three (3) printed copies (one unbound) of the map and photographs, as described above, on 8 1/2 x 11 inch pages and deliver to the AHC.

Should archaeological resources be encountered during the construction phase of the proposed IWRSS NWC, work in the area of the affected resource would be suspended and the AHC consulted.

6.6.3.2 No Action Alternative

No mitigation measures are recommended.

6.7 FLORA AND FAUNA

To examine the effects of the proposed action on biological resources, this analysis considers the federal Endangered Species Act (ESA) (16 U.S. Code 1536), which provides for the conservation of endangered and threatened species of fish, wildlife, and plants. Federal agencies must ensure that proposed actions do not jeopardize the continued existence of any endangered or threatened species or cause the destruction or adverse modification of their habitat. If listed species or designated critical habitat are present and could be affected by the proposed action, the federal agency shall consult with the U.S. Fish and Wildlife Service (or the National Marine Fisheries Service) and prepare a biological assessment to analyze the potential effects of the project on listed species and critical habitat before a determination of effect is made.

6.7.1 Existing Environment

6.7.1.1 Preferred Site Alternative

Table 3 is a summary of federally listed species in Tuscaloosa County. The table is used to assess the potential for project-related impacts and the need for further coordination under the ESA.

Table 3: Federally Listed Threatened, Endangered, and Candidate Species

Class	Scientific Name	Common Name	Federal Status
Amphibia	*Necturus alabamensis*	Black Warrior waterdog	C
Aves	*Picoides borealis*	Red cockaded woodpecker	E
	Mycteria americana	Wood stork	E
	Haliaeetus leucocephalus	Bald eagle	BGEPA
Bivalvia	*Pleurobema decisum*	Southern clubshell mussel	E
	Pleurobema furvum	Dark pigtoe mussel	E
	Pleurobema perovatum	Ovate clubshell mussel	E
	Medionidus acutissimus	Alabama moccasinshell mussel	T
	Potamilus inflatus	Inflated heelsplitter mussel	T
	Hamiota (=Lampsilis) altilis	Fine lined pocketbook mussel	T
	Hamiota (=Lampsilis) perovalis	Orange nacre mucket mussel	T
Insecta	*Neonympha mitchellii mitchellii*	Mitchell's satyr butterfly	E
Monocots	*Platanthera integrilabia*	White fringeless orchid	C
Reptilia	*Sternotherus depressus*	Flattened musk turtle	T

E - Endangered T - Threatened C - Candidate Species BGEPA - Bald & Golden Eagle Protection Act
Source: USFWS, 2010a

The Preferred Site Alternative consists of property developed with structures, parking areas, and landscaped areas (grass lawn and sparse ornamental trees). No terrestrial or aquatic habitats exist on or near the subject site that would support transient or prolonged use by the species identified in Table 3 or non-game species protected under 2010-2011 Alabama Regulations at Section 220-2-.92 for non-game fish, and fur-bearing animals, including amphibian, reptile, bird, and mammal species.

6.7.1.2 No Action Alternative

The existing environment with respect to flora and fauna is described in the preceding section.

6.7.2 Environmental Consequences

6.7.2.1 Preferred Site Alternative

The potential for the project to affect protected species and their habitat has been considered. This section analyzes potential occurrences and existing habitat for protected flora and fauna, migratory birds, and raptors. Due to the urbanized conditions and lack of critical habitat at and near the Preferred Site Alternative, no direct or cumulative impacts to habitat are anticipated. The project would not displace habitat suitable to support protected species and does not involve

tall structures with hard-to-see elements or lighting that may attract or present a hazard to raptors or migratory birds. No nesting habitat would be disturbed or removed during construction; therefore, no short-term or long-term impacts to migratory birds would occur. Further information in support of this analysis is contained in **Appendix B-3**.

The subject site is unlikely to support non-game species protected under Alabama Regulations Section 220-2-.92 for non-game, fish and fur-bearing animals, including amphibian, reptile, bird, and mammal species.

6.7.2.2 No Action Alternative

Under the No Action Alternative, the proposed action would not occur, and no demolition, alteration, or construction activities would be undertaken. No impacts to protected flora and fauna would occur under the No Action Alternative.

6.7.3 Mitigation Measures

6.7.3.1 Preferred Site Alternative

No mitigation measures are recommended.

6.7.3.2 No Action Alternative

No mitigation measures are recommended.

6.8 WETLANDS

To examine the effects of the proposed project on wetlands resources, this analysis considers whether actions would occur in jurisdictional wetlands regulated under Section 404 of the CWA and Executive Order (EO) 11990, Protection of Wetlands. These regulations and policies require federal agencies to avoid to the extent possible long- and short-term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever a practicable alternative is available. A jurisdictional wetland is one that meets three criteria: (1) a seasonal water table at or near the surface, (2) the presence of hydric soils, and (3) the presence of hydrophytic vegetation.

6.8.1 Existing Environment

6.8.1.1 Preferred Site Alternative

Soils on or near the subject site are identified as the Bama-Urban land complex with 2 to 6 percent slope. This soil type consists predominantly of well-drained, fine sandy loam and sandy clay loam. It is not on the NRCS list of hydric soils (NRCS, 2010a). The water table is approximately 10 to 20 feet below ground surface (TTL, 2010). No hydrophytic vegetation was observed during a site inspection conducted in September 2010.

A review of the U.S. Fish and Wildlife Service National Wetland Inventory data (USFWS, 2010b) indicates that there are no previously identified wetlands for this region present at the Preferred Site Alternative; however, two ponds are approximately 900 feet west and 1,800 feet southwest of the subject property, respectively.

6.8.1.2 No Action Alternative

The existing environment with respect to wetlands is described in the preceding section.

6.8.2 Environmental Consequences

6.8.2.1 Preferred Site Alternative

No jurisdictional wetlands are present within or adjacent to the subject site. The proposed action associated with the Preferred Site Alternative would not result in dredge or fill activity within jurisdictional wetlands.

6.8.2.2 No Action Alternative

Under the No Action Alternative, the proposed action would not occur, and no demolition, alteration, or construction activities would be undertaken. No impact to jurisdictional wetlands would result from the No Action Alternative.

6.8.3 Mitigation Measures

6.8.3.1 Preferred Site Alternative

No mitigation measures are recommended.

6.8.3.2 No Action Alternative

No mitigation measures are recommended.

6.9 FLOODPLAINS

To examine the effects of the proposed project on floodplain resources, this analysis considers whether actions would occur within the 1 percent chance flood elevation as determined by the Federal Emergency Management Agency (FEMA) and depicted on its Flood Insurance Rate Maps.

Executive Order 11988 requires federal agencies to avoid to the extent possible the long- and short-term adverse impacts associated with the occupancy and modification of flood plains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative. In accomplishing this objective, "each agency shall provide leadership and shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health,

and welfare, and to restore and preserve the natural and beneficial values served by flood plains in carrying out its responsibilities" for the following actions:

- acquiring, managing, and disposing of federal lands and facilities;
- providing federally-undertaken, financed, or assisted construction and improvements;
- conducting federal activities and programs affecting land use, including but not limited to water and related land resources planning, regulation, and licensing activities.

6.9.1 Existing Environment

6.9.1.1 Preferred Site Alternative

FEMA Flood Insurance Rate Map #01125C0508F includes the Tuscaloosa, Alabama, area and the subject site (see **Appendix B-4**). Actions within the Preferred Site Alternative, including the associated data center at Gordon Palmer Hall, are within "Zone X." This zone is defined as "areas determined to be outside the 0.2 percent annual chance floodplain." The proposed action would occur at an elevation outside of the area of the 1 percent chance flood (aka 100-year floodplain).

6.9.1.2 No Action Alternative

The existing environment with respect to floodplains is described in the preceding section.

6.9.2 Environmental Consequences

6.9.2.1 Preferred Site Alternative

The proposed action at the Preferred Site Alternative is outside of the area for the 0.2 percent annual chance flood; therefore, it is consistent with EO 11988. No effect to areas within the 1 percent chance flood elevation would occur under this alternative.

6.9.2.2 No Action Alternative

Under the No Action Alternative, the proposed action would not occur, and no demolition, alteration, or construction activities would be undertaken. The No Action Alternative would therefore have no impact on floodplains or flooding.

6.9.3 Mitigation Measures

6.9.3.1 Preferred Site Alternative

No mitigation measures are recommended.

6.9.3.2 No Action Alternative

No mitigation measures are recommended.

6.10 AGRICULTURAL RESOURCES

To examine the effects of the proposed project on agricultural resources, this analysis considers whether proposed actions would be subject to the Farmland Protection Policy Act (FPPA) and similar state or local farmland protection goals. The FPPA sets forth federal policies to prevent the unnecessary and irreversible conversion of farmland to nonagricultural uses. For the purpose of FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance. Prime farmland, as defined by the U.S. Department of Agriculture (USDA), is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forest land, or other land, but it is not urban or built-up land or water areas. Regulations at 7 CFR 658.2(a) exclude land from definition of farmland as those lands already in urban use or committed to urban development or water storage.

6.10.1 Existing Environment

6.10.1.1 Preferred Site Alternative

The Preferred Site Alternative includes property in an urbanized area within the UA campus and City of Tuscaloosa, Alabama. No agricultural uses or resources are on or surround the site. The soil type at the Preferred Site Alternative is National Map Unit Symbol 331540 "Bama-Urban Land Complex, 2 to 6 percent slopes" and is not included in the list of soils suitable for prime farmland designation in Tuscaloosa County (NRCS, 2010b).

Neither FPPA resources nor including prime or unique farmland or farmland of statewide importance, are present on or within areas potentially affected under the Preferred Site Alternative.

6.10.1.2 No Action Alternative

The existing environment with respect to agricultural resources is described in the preceding section.

6.10.2 Environmental Consequences

6.10.2.1 Preferred Site Alternative

No agricultural resources, as defined by the USDA or state or local jurisdictions, are at or in proximity to the subject site. The proposed action would have no impact on agricultural resources.

6.10.2.2 No Action Alternative

Under the No Action Alternative, the proposed action would not occur, and no demolition, alteration, or construction activities would be undertaken within prime or unique farmland or farmland of statewide importance. Therefore, no impact would occur to agricultural resources.

6.10.3 Mitigation Measures

6.10.3.1 Preferred Site Alternative

No mitigation measures are recommended.

6.10.3.2 No Action Alternative

No mitigation measures are recommended.

6.11 NOISE

The USEPA has historically coordinated federal noise control activities through its Office of Noise Abatement and Control. In 1981, the USEPA phased out the office's funding as part of a federal policy to transfer the primary responsibility for regulating noise to state and local governments. However, Congress did not rescind the federal Noise Control Act of 1972 and the Quiet Communities Act of 1978, and these laws remain in effect today.

Chapter 10.8, Article II of the City of Tuscaloosa Code of Ordinances regulates noise in residential districts within the corporate limits of the city. However, construction activity or equipment operating between the hours of 6 a.m. and 9 p.m. is not subject to the provisions of Article II (City, 2010e).

6.11.1 Existing Environment

6.11.1.1 Preferred Site Alternative

The Preferred Site Alternative is within the UA campus and contains a building used by the UA Office of EHS. No significant noise-generating activities currently occur on the site. Immediately adjacent to the northeast corner of the site is an area containing five pairs of industrial-sized chiller units, which are associated with the heating and air-conditioning system for Shelby Hall to the south of the subject site (see Figure 3-E). Sources of ambient noise levels at the subject site include the chiller units (which produce a low-frequency, constant noise) and automobiles (both on-site and on adjacent roads and parking lots). It is estimated that each of the ten industrial chiller cooling towers typically generates 65 to 85 decibels (dB) at a distance of 50 feet (Stanford, 2003).

Adjacent land uses include the Riverside Parking Lot to the north, the former Bryce Hospital to the east (currently unoccupied), Shelby Hall (containing teaching and research laboratories,

lecture halls, and offices) to the south, the McMillan building (containing the University of Alabama Press and the National Alumni Association's Crimson Calling Center) to the southwest, and the Riverside Residential Complex to the northwest. Sensitive noise receptors in the vicinity of the site include Riverside Residential Complex, the nearest dwellings of which are approximately 150 feet northwest of the northwestern corner of the site.

The Riverside Residential Complex is not within a "residential district" in terms of the City of Tuscaloosa Code of Ordinances, as the proposed site and adjacent areas of the UA campus are zoned "Institutional District."

6.11.1.2 No Action Alternative

The existing environment with respect to noise is described in the preceding section.

6.11.2 Environmental Consequences

6.11.2.1 Preferred Site Alternative

The proposed action at the Preferred Site Alternative would result in temporary negligible noise effects during construction. However, ongoing impacts from the operation of the proposed IWRSS NWC would likely have a minor positive effect with respect to noise since a proposed wall would diminish sound from the industrial chillers in the direction of the UA campus.

During construction, equipment and machinery such as backhoes, diggers, haul trucks, and graders, would be used to demolish existing structures and prepare the site for construction of the proposed IWRSS NWC. This equipment is likely to increase ambient noise levels at the site temporarily during construction. Construction noise fluctuates depending on site activities, but can range from 75 to 100 dB at close range.

The noise provisions of the City of Tuscaloosa Code of Ordinances are not relevant at this site given the lack of a nearby "residential districts" and the fact that daytime construction noise is exempt. However, the ordinance provides a guideline as to acceptable noise levels for residential properties for this portion of the campus and its nearest student residential dwellings. Overall, the noise impacts during construction would be negligible.

After construction, operation of the proposed IWRSS NWC would generate relatively minor levels of noise. The majority of staff and other building users would drive personal vehicles to work and either park on-site or in the off-site parking area to the north of the site. These vehicles would be equipped with functional exhaust mufflers and be operated on-site for short periods only (i.e., just enough time to get in and out of the parking lot). Noise impacts due to such vehicle movements would not be significant, because the vehicles associated with the existing EHS building currently create similar noise levels.

Operations at the site would require occasional, limited monthly testing of a diesel- or natural-gas-powered backup generator and infrequent use of the 1000-kW unit to provide electricity during power outages. The generator would be installed, maintained, and operated in accordance with manufacturer specifications. The generator also would be equipped with an exhaust muffler and be situated within an enclosure, further attenuating noise levels. Noise impacts to adjacent properties caused by the occasional testing and maintenance of the emergency generator are exempt from state and local regulations and would not be significant.

The proposed action at the Preferred Site Alternative includes construction of a 15-foot-high wall faced with masonry veneer and situated around three sides of the chiller units immediately to the northeast. This screen wall would reduce the level of noise reaching receptors within the subject site. Generally, a sound wall would attenuate the noise generated by the chiller units by 15 dB (Paige, n.d.), thus reducing noise perceived at the proposed IWRSS NWC building to between 50 and 70 dB. In addition, depending on the type of material used, the proposed IWRSS NWC building would further attenuate noise generated by the chiller units.

Because of the screens that would be built around the chillers, the proposed IWRSS NWC would have a minor long-term positive effect with respect to exposure to noise at the subject site.

6.11.2.2 No Action Alternative

Under the No Action Alternative, the proposed action would not occur and no new noise sources or structures for noise attenuation near occupied structures would occur. Existing ambient noise levels would persist. Therefore there would be no impact on ambient noise from the No Action Alternative.

6.11.3 Mitigation Measures

6.11.3.1 Preferred Site Alternative

To adhere to local noise regulations, the use of large construction equipment and earth-moving activity would be limited to the hours of 6 a.m. to 9 p.m. daily. No long-term mitigation measures are recommended.

6.11.3.2 No Action Alternative

No mitigation measures are recommended.

6.12 TRANSPORTATION

To examine the effects of the proposed project on the transportation network in the community, a qualitative analysis is used to assess whether the proposed action has the potential to result in a significant impact, and whether a quantitative analysis and prospective improvements to the transportation infrastructure may be necessary. The approach applied involves the use of trip

generation data, essentially the number of inbound and outbound vehicle trips expected to be generated due to the proposed action during an average day and during peak hour traffic. The expected worst-case trip generation is compared to accepted thresholds to determine whether a more comprehensive traffic analysis is needed.

Level of service (LOS) is a qualitative measurement used to describe traffic conditions on a transportation route. LOS is based on the number of vehicles using the roadway compared to the maximum number of vehicles the route/intersection was designed to accommodate. LOS is expressed qualitatively using letters from A through F. LOS A represents free-flowing conditions, and LOS F represents gridlock (Transportation Research Board, 2000). Within Alabama, LOS D or better is considered an acceptable level for state highways/intersections in urban areas (Jacobs Carter Burgess, 2008). Given the known or estimated LOS levels for major arterial roads and intersections and a lack of published traffic count and LOS data at adjacent affected minor arterial road segments and intersections, a quantitative analysis may be appropriate if changes in the project create the potential for a significant impact.

6.12.1 Existing Environment

6.12.1.1 Preferred Site Alternative

The Preferred Site Alternative is on Hackberry Lane, north of Campus Drive East and south of Old Hackberry Lane. Hackberry Lane is designated as a Collector Street/Minor Arterial by the City of Tuscaloosa (2011, http://74.11.32.198/Tuscaloosa_GIS/ [accessed January 2011]). The LOS designation for this minor arterial have either not been prepared or made publicly available. This segment of Hackberry Lane was established in the last 3 years and has increased vehicle capacity by installing one vehicle and one bicycle lane in each direction, with an island median dividing the roadway (see Figure 2). The annual average daily traffic (ADT) on University Boulevard near Hackberry Lane in 2009 was 23,180 (ALDOT, 2011). Tuscaloosa County data compiled by the West Alabama Regional Commission shows the annual ADT along Hackberry Lane, north of University Boulevard, as 11,826 in 2007 (WARC, 2008).

At present, the EHS building houses approximately 20 full- and part-time staff. Multiple vehicle trips are made to and from the site during the day, due to the quantity and range of functions performed by the EHS staff throughout the UA campus.

6.12.1.2 No Action Alternative

The existing environment with respect to transportation is described in the preceding section.

6.12.2 Environmental Consequences

6.12.2.1 Preferred Site Alternative

The scope of the proposed development action would require minimal use of equipment for deconstruction, grading, excavation and hauling, and such equipment would be kept within an on-site staging area during the construction period. The number of construction workers would be less than 20 for any one construction phase, and typically less than 10 individuals. This would represent effectively no change to existing traffic trips generated at the Preferred Site Alternative due the existing EHS building operations.

Operation of the proposed IWRSS NWC would increase the ADT in the vicinity of the site by approximately 784 trips, assuming that 100 percent of building occupants (196 persons) each use private vehicles and make one added trip during the day (e.g., on lunch break). This level is considered a worst-case scenario, given the expected phasing of IWRSS staff growth over the initial five years of operation and the presence of campus carpool opportunities, quality public transportation services, and bicycle infrastructure in the area. Also, the proposed IWRSS NWC will operate 24 hours per day, so the timing of peak traffic accessing the site will be spread over several shifts throughout the day, rather than concentrated in only the morning and afternoon peak traffic periods.

The additional 784 trips along Hackberry Lane could be accommodated given its improved configuration, with wide bicycle lanes and an island median, and that traffic will be generated by working shifts spread over a 24-hour work day. The proposed bus/vehicle passenger drop-off lane on Hackberry Avenue would tend to lessen the overall number if individual trips and reduce impacts associated with project-related traffic. Finally, the LEED goals of the project will further reduce project related traffic demand by encouraging the use of carpooling, bicycle access, and public transportation.

Except during special campus events, Hackberry Lane and the nearest intersection at Old Hackberry Lane are expected to function at or above LOS D. Traffic generated by the proposed IWRSS NWC would not result in a lower LOS level and a subsequent failure of vehicle operations on this segment of Hackberry Lane.

During major events at Bryant-Denny Stadium portions of Hackberry Lane south of the Preferred Site Alternative are temporarily closed to vehicle traffic (e.g., on days of home football games), an alternative access route for IWRSS NWC staff would be established by campus police and emergency response organizations. This alternative would need to provide unfettered site access for the IWRSS NWC staff who would be required to occupy the NWC OC during a water resource event elsewhere that is being monitored and analyzed for public safety purposes.

The proposed project would limit on-site parking to 40 spaces and require up to 140 spaces of off-site parking. Existing campus parking privileges nearby are authorized by permit and are typically dedicated to specific campus users, such as campus residents or University staff. The Campus Master Plan includes planning for future parking structures in the area immediately north of the subject property. Whether provided as surface parking or as part of a future parking structure, the vacant land parcel identified in the Campus Master Plan for this purpose is expected to be adequate for the off-site parking required for staff and visitors associated with the proposed IWRSS NWC and other campus-related users contemplated under the campus growth plan.

As such, it is considered that the proposed IWRSS NWC would have a minor effect with respect to transportation.

6.12.2.2 No Action Alternative

Under the No Action Alternative, existing traffic volume and LOS would be unchanged at the UA campus. The University would be expected to plan property management and re-development at the former Bryce Hospital grounds, including opening the entry to that property from the UA campus. Under the Campus Master Plan, the addition of a parking structure and other long-range plans would occur in the foreseeable future. Therefore there would be no impact on existing transportation conditions from the No Action Alternative.

6.12.3 Mitigation Measures

6.12.3.1 Preferred Site Alternative

An alternative access route for IWRSS NWC staff would be established with campus police and emergency response organizations.

6.12.3.2 No Action Alternative

No mitigation measures are recommended.

6.13 UTILITIES AND SOLID WASTE

The anticipated use of utility resources and infrastructure is evaluated for effects associated with utility access and capacity of services. Effects that would require substantially new infrastructure or acquisition of natural, non-renewable resources to support the proposed action are identified. EO 12185, Conservation of Petroleum and Natural Gas (44 Federal Register Section 75093) encourages additional conservation of petroleum and natural gas by recipients of federal financial assistance.

6.13.1 Existing Environment

6.13.1.1 Preferred Site Alternative

The City of Tuscaloosa (City) provides water, wastewater, solid waste, fire, and environmental services throughout the city, including the subject property on the University campus (City of Tuscaloosa, 2010a, http://www.ci.tuscaloosa.al.us [accessed December 2010a]). Existing utilities at or near the subject site include fiber optic, telephone, storm sewer, sanitary sewer, water, gas, and overhead power distribution lines, as shown on Figure 5. An existing 8-inch sanitary sewer pipeline connects to the existing EHS building (Gould Evans Associates *et al*., 2010). Several existing water mains traverse the project site and connect two larger (16- and 24-inch) water pipelines. The pipelines that transect the project site are 8 inches in diameter and connect to a 16-inch pipeline. Aboveground power lines travel across the project site and continue toward the University campus. Also, existing gas lines are present underground. An abandoned gas line connects to the existing EHS building. In addition, an existing 6-inch gas line along the north of the project site (Gould Evans Associates *et al*., 2010), parallels the large existing water main.

The City Water Works and Sewer Department operates the Hilliard Fletcher Wastewater Treatment Plant, at 4010 Kauloosa Avenue, approximately 4.5 miles to the south of the University and northwest of the Interstate 359 and Interstate 20 interchange. The facility supports an average daily flow of 30 million gallons per day.

The City Water District services the city, including the subject site on the UA campus. Two water treatment plants near Tuscaloosa Lake, the Ed Love Water Treatment Plant and the Jerry Plott Water Treatment Plant, meet water demand within the City. The Water Works Distribution Center on Kaulton Road delivers over 10 billion gallons per year. Existing water use within the EHS building is considered negligible and assumed to be zero for the purpose of this analysis.

Solid Waste generated by the University campus is collected by the City's Environmental Services Department and transported to the Black Warrior Solid Waste Facility (Facility) for disposal. The Facility, which is operated by the Black Warrior Solid Waste Disposal Authority, is at 3301 Landfill Drive in Coker, Alabama, which is approximately 10 miles west of the University. The Facility is categorized as a nonhazardous disposal site. It was opened in 1977, and the closure year is set for 2046 (USEPA, 2010a). The facility has used approximately 6 million cubic yards of its total of 20 million cubic yards of capacity.

The City Police Department serves the entire City and supports the University Police Department, which serves the campus. The University Police Department has three divisions: patrol, administration, and support. There are nine lieutenants and sergeants and 25 to 30 patrol officers in the University Police Department, with one K-9 division acting on behalf of Region 3

Response Team for Homeland Security (UA, 2010f, http://police.ua.edu/divisions.html [accessed December 2010]).

The University is within the service area of the Tuscaloosa Fire and Rescue Service (Fire Service). The Fire Service has 12 stations; Station 2 is on campus at 322 Paul W. Bryant Drive (City of Tuscaloosa, 2010c, http://www.ci.tuscaloosa.al.us/index.aspx?nid=24 [accessed December 2010]). This fire station is approximately 1 mile to the south of the subject site. The project is in an area with an Insurance Services Office (ISO) Class rating of 3 for fire-fighting capacity (City of Tuscaloosa, 2010d, http://www.ci.tuscaloosa.al.us/FAQ.aspx?TID=12 [accessed December 2010]).

Electricity and natural gas are provided to the City and University by private companies. Alabama Power, a subsidiary of Southern Company, provides the City and the University with electricity (City of Tuscaloosa, 2010b, http://www.ci.tuscaloosa.al.us/index.aspx?nid=99 [accessed December 2010]). Alagasco, an Energen Company, provides natural gas to the University and the City (City of Tuscaloosa, 2010b).

6.13.1.2 No Action Alternative

The existing environment with respect to utilities is described in the preceding section.

6.13.2 Environmental Consequences

6.13.2.1 Preferred Site Alternative

The proposed project would not increase University-affiliated student, faculty, or staff populations on the campus. The IWRSS NWC occupancy that is anticipated under the proposed action would increase over a 5-year period and eventually total 197 individuals. Under the proposed action, utility infrastructure such as the overhead power lines, two large (24- and 16-inch diameter) water mains, a 6-inch gas main, a fiber optic cable, and water, storm water, and sanitary sewer distribution lines would be relocated (Gould Evans Associates *et al*., 2010).

The wastewater that would be generated by the proposed project would be domestic sewage. Sanitary sewer waste lines would connect to the existing campus sanitary sewer main. Wastewater from the lavatory, shower, and some floor drains may be piped independently for the collection of gray water. Therefore, the project would not exceed the established wastewater treatment requirements.

Potable water would be delivered to the proposed building from the existing and relocated service lines on and adjacent to the project site. Potable water would be used for the restrooms, sinks, mop basins, drinking fountains, showers, hose bibs, wall and roof hydrants, ice machines, coffee machines, emergency fixtures, and makeup water supplies in the new building. The water

use estimated for the first 5 years of operation of the proposed IWRSS NWC building would be approximately 1,807.14 gallons per day (Kling, 2010).

After 5 years, the proposed IWRSS NWC facility would be fully staffed, requiring approximately 3,569.59 gallons per day of total water. The use of a gray water system would reduce conventional potable water consumption. Approximately 35.46 percent of produced wastewater (1265.63 gallons per day) would be diverted to the gray water system, resulting in approximately 2,303.96 gallons per day of wastewater being discharged to the sanitary sewer. Rainwater and storm water would be collected by primary and secondary roof drainage systems and piped to a long storage tank to combine with the gray water system, which would increase the volume of gray water utilized (to a maximum of 2289.96 gallons per day), and thereby reduce the amount of potable water required (Kling, 2010).

Infrastructure required to process the wastewater generated by the project and meet increases in potable water service demand would be readily available from the existing capacity provided by the City.

Solid waste produced by the proposed project through construction or operations would be accommodated at the Black Warrior Solid Waste Facility given the volume of its unused total capacity and remaining years of service.

It is considered that the proposed IWRSS NWC would have a minor effect with respect to utilities and solid waste.

6.13.2.2 No Action Alternative

Under the No Action Alternative, the proposed action would not be implemented; no new IWRSS NWC would be established. The proposed project site would either continue to be used by the University Office of Health and Safety or be available for other uses. Existing underground utility services would remain, although the University intends to remove or re-route the overhead power lines on the subject site. No significant utilities and solid waste impacts would result under the No Action Alternative.

6.13.3 Mitigation Measures

6.13.3.1 Preferred Site Alternative

No mitigation measures are recommended.

6.13.3.2 No Action Alternative

No mitigation measures are recommended.

6.14 VISUAL AND AESTHETIC RESOURCES

Neither NEPA nor any federal agency provides specific impact criteria or standards for determining the significance of visual/aesthetic resources impacts. However, of the ten issues listed in NEPA as being important to consider, three appear relevant to visual resource impact assessment: the unique character of the affected resource, the potential for controversy, and the potential to violate laws and regulations. A framework for analysis of visual effects on federal lands was developed by the Bureau of Land Management in 1978 and USDA (National Forest Service) in 1974. These frameworks are applicable to large federal landholdings and actions evaluated under an environmental impact statement. However, concepts from these methodologies can be applied to provide a basis for assessing effects within an EA for lesser federal actions proposed on non-federal land parcels. The concepts include actions to:

- Identify those views potentially affected and for which the public may express concern
- Describe the existing visual conditions and potentially affected critically sensitive views
- Estimate the intensity of possible adverse visual impacts on those views
- Evaluate the significance of the possible impacts
- Mitigate, as needed, using measures to lessen the impact to a level that is less than significant.

This analysis considers the visual resources and condition of potentially affected views. These resources may include landforms, vegetation, water surfaces, and cultural modifications (physical changes caused by human activities) that give the landscape a visually aesthetic quality. This impression is referred to as "visual character," a point of reference to assess whether a given project would appear compatible with the setting or would contrast unfavorably with them. Potentially significant visual impacts are those that:

- Cause a perceptibly substantial reduction of visual quality, including the degree of public sensitivity, the intensity of the impacts, and the duration of the impact.
- Be inconsistent with specific laws, ordinances, regulations or standards pursuant to general planning policies or objectives for the protection of the quality of aesthetics and visual resources.

In this case, a level of impact beyond negligible may occur to important landscapes with moderate or high visual sensitivity. This sensitivity is assumed to exist where landscapes, particular views, or the visual characteristics of certain features are protected through policies, goals, objectives, and design controls in public planning documents or where critical views are subject to sensitive public interest and concern.

6.14.1 Existing Environment

6.14.1.1 Preferred Site Alternative

Visual resources have a social setting, which includes public expectations, values, awareness, and concern regarding visual quality. This social setting is addressed as "visual sensitivity," and is key to assessing how important a visual impact may be and whether or not it represents a significant impact. The visual condition and degree of visual sensitivity is expressed as one of the following four levels:

- **High Sensitivity:** A great potential for the public to react strongly to a threat to visual quality. Concern is expected to be great because the affected views are rare, unique, or special to the locale. A small modification would be visually distracting and represent a substantial reduction in visual quality.
- **Moderate Sensitivity:** A substantial potential for the public to express concern. Affected views are secondary in importance or are similar to others commonly available to the public. Noticeably adverse changes would probably be tolerated if the essential character of the views remains dominant.
- **Low Sensitivity:** A small minority of the public may have a concern. Only the greatest intensity of adverse change would have the potential to result in public concern regarding a reduction in visual quality.
- **No Sensitivity:** There is no sensitivity where the potentially affected views are not "public" (not accessible to the general public) or because there are no indications that the affected views are valued by the public.

The anticipated level of visual sensitivity is considered to be low to moderate. The subject site is part of a broader campus setting in which the Campus Master Plan seeks to keep key historic, architectural, and landform elements consistent at the campus core and in outlying land uses used for education and administration, campus residences, support services, and parking and open space goals. Likewise, the subject site (see Figures 3-A and 3-B) and its existing structure (see Figures 3-C and 3-D) are associated with the adjacent Bryce Hospital property, which has developed over the last 180 years. These policies and visual conditions represent an area of potential interest to the public and land use planners.

These events have established the area's visual character. *Visual Character* is the physical features inherent to the potentially affected area and reflects how the landscape was formed, how it functions, and how it is structured. Development actions that have been previously established or made part of future planning decisions include architectural design and scale, development density, and land use functions that are congruent with the landform, campus functions, and its

unique history. *Congruence* or *intactness* is the degree to which past actions have noticeably and unfavorably changed landscape features, their patterns of distributions, or the conditions under which they are viewed. Unfavorable changes would appear incongruent with the inherent character of the area. The setting is reasonably intact given the adherence to planning guidelines established for the campus over many decades. Likewise, the setting consists of a unity of landscape features that distinguishes it as an intact campus setting and a remnant part of the adjacent Bryce Hospital compound. *Coherence* or *unity* is the current internal consistency and harmony of landscape features that has resulted from past actions. A landscape may be "intact," yet past actions may have resulted in there being little to no discernible pattern, composition, and/or harmony.

6.14.1.2 No Action Alternative

The existing environment with respect to visual and aesthetic resources is described in the preceding section.

6.14.2 Environmental Consequences

6.14.2.1 Preferred Site Alternative

The proposed action at the Preferred Site Alternative would replace, but not seek to replicate, an existing single-story brick façade structure with a two-story structure of similar scale and exterior architectural composition. Affected public views are from transportation corridors and portions of campus structures that are primarily from the south, west, and north and within the immediate area. These views become distinct at approximately 660 feet, given the relatively level terrain and prior development pattern. Public views are not afforded from the former Bryce Hospital property to the east given the exclusionary fencing and vacant condition of property and open spaces on that large adjacent property. Panoramic views from taller structures or public viewpoints are not available within this area.

Visual conditions, such as the four Visual Modification Classes (VMCs) expressed in the Bureau of Land Management guidelines, are similarly considered. The highest quality landscapes (i.e., those in class VMC 1) are those in which all features and their distribution, as well as sources of lighting, appear to be characteristic of the established setting, and past actions have not introduced incongruous changes or altered viewing conditions, and such actions have not adversely affected the coherence (scale, pattern, organization, composition) of the landscape and its lighting.

Visual conditions that are classified as VMC 2 occur where adverse changes in the landscape and/or lighting are noticeable but subordinate to the features characteristic of the area; these

changes may attract some attention, but they do not compete for it with other features in the field of view; historically available scenic views may have become partly blocked or less accessible.

The proposed action would occur within visual conditions described as VMC 2. The scale and design of the proposed IWRSS NWC would be congruent with the existing landscape and development pattern. It is anticipated that the external architectural design and associated means of site ingress and egress would be consistent with the Campus Master Plan for this location and anticipated land use planning decisions to be developed by the University for the former Bryce Hospital property.

The proposed action at the Preferred Site Alternative would not cause a substantial degradation of existing visual character or quality of the site and its surroundings. The action includes elements that would be congruent with campus and regional landform and development. No adverse change to the coherence of the established pattern of landscape would result.

In addition, the proposed action at the Preferred Site Alternative would not result in visual impacts that would be inconsistent with applicable rules and regulations, specifically the UA Campus Master Plan. Architectural elements that are typical for portions of the campus or are accepted deviations for areas outside of the Quad or core areas, are expected to be acceptable.

6.14.2.2 No Action Alternative

Under the No Action Alternative, the existing visual elements, such as the EHS building and the adjacent chiller units, would remain; however, the University would remove the overhead power lines currently traversing the Preferred Site Alternative. The existing EHS structure would likely remain for the foreseeable future. Therefore there would be no impact on existing visual resources.

6.14.3 Mitigation Measures

6.14.3.1 Preferred Site Alternative

No mitigation measures are recommended.

6.14.3.2 No Action Alternative

No mitigation measures are recommended.

6.15 HAZARDOUS MATERIALS

Hazardous materials and hazardous wastes are regulated by many state and federal laws. These include not only specific statutes governing hazardous waste, but also a variety of laws regulating air and water quality, human health and land use. The primary federal laws regulating hazardous wastes/materials are the Resource Conservation and Recovery Act of 1976 (RCRA)

and the Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA). The purpose of CERCLA, often referred to as Superfund, is to clean up contaminated sites so that public health and welfare are not compromised. RCRA provides for "cradle to grave" regulation of hazardous wastes. Other federal laws include:

- Community Environmental Response Facilitation Act
- Clean Water Act (CWA)
- Clean Air Act (CAA)
- Safe Drinking Water Act
- Occupational Safety and Health Act (OSHA)
- Atomic Energy Act
- Toxic Substances Control Act
- Federal Insecticide, Fungicide, and Rodenticide Act

In addition to the acts listed above, EO 12088, Federal Compliance with Pollution Control, mandates that necessary actions be taken to prevent and control environmental pollution when federal activities or federal facilities are involved.

Hazardous waste in Alabama is regulated primarily under the authority of RCRA by the ADEM. Other Alabama laws that affect hazardous waste include Division 14 of the ADEM Administrative Code and Section 22 of the Code of Alabama 1975.

This analysis considers project-related effects on identified Recognized Environmental Conditions (RECs - e.g., effects on contaminated soil, groundwater or sediments), as well as the potential for release of additional hazardous materials during construction, operation and maintenance activities under the proposed action.

6.15.1 Existing Environment

6.15.1.1 Preferred Site Alternative

The Preferred Site Alternative is currently used by the University's EHS department. The existing building on the site (the EHS building) is currently used as a collection and temporary storage area for hazardous materials (including radioactive waste), and associated offices and laboratories for EHS staff. Several portable buildings are also present on the subject site; some of which are used for storage of various materials, others are used as workshops. Groundwater elevation at the site is believed to range between 10-20 feet below ground surface (TTL, 2010), and flows in a general northerly direction toward the Black Warrior River, although the movement is multi-directional, with local west-northwestward components (PELA, 2010).

A Phase I Environmental Site Assessment (Phase I ESA) was completed for the Preferred Site Alternative in November 2010 by URS Corporation (URS, 2010). Phase I ESAs are generally performed in conformance with the scope of limitations of the American Society of Testing Materials Practice E1527-05 for the purpose of identifying RECs. The Phase I ESA is intended to satisfy one of the requirements to qualify for the innocent landowner, contiguous property owner or bona fide prospective purchaser limitations on liability under CERCLA.

The findings of the Phase I ESA included the following REC for the site:

- Possible groundwater contamination at the preferred alternative IWRSS site, related to a former leaking underground storage tank and laundry operations on the adjacent Bryce Hospital property, now owned by UA.

In addition, the following minor environmental issues were also noted at the site:

- The EHS building is currently used to store radioactive wastes and radioactive sources, and has done so for several years. The University's EHS Director affirms that no spills or leaks of such materials have been reported from monthly monitoring efforts within the EHS building.
- Discussions with the University's EHS Director (Mr. Hal Barrett) have indicated that there are no formal closure/decommissioning requirements by the State of Alabama in relation to the hazardous waste and radioactive waste storage facilities within the EHS building. However, Mr. Barrett indicated that following removal of all hazardous and radioactive waste from the building, swipes would be taken and analyzed, to confirm that surfaces within the building are not contaminated.
- Fluorescent lights stored within one of the portable buildings outside the EHS Building may contain mercury.
- Although an asbestos and/or lead-based paint survey was not conducted as part of this Phase I ESA, the age of the buildings onsite makes it possible that some materials contain asbestos and/or lead-based paint.

The Phase I ESA contained the following recommendations:

- That a Phase II Environmental Site Investigation be performed at the proposed IWRSS NWC site, to confirm the existence and extent of volatile organic compound and chlorinated hydrocarbon contamination of groundwater (if any).
- That NOAA review and consider the results of sample swipes on surfaces within the EHS building taken by UA immediately following decommissioning of the EHS building and prior to its deconstruction or demolition.

- That all hazardous materials, chemicals and containers, and fluorescent lights stored within the EHS building and portable buildings should be disposed of appropriately and in accordance with applicable regulations.
- That an asbestos and lead-based paint survey should be conducted to ascertain the content of the building materials through the collection and laboratory analysis of samples, if building demolition is proposed.

6.15.1.2 No-Action Alternative

The existing environment with respect to hazardous materials is described in the preceding section.

6.15.2 Environmental Consequences

6.15.2.1 Preferred Site Alternative

The Preferred Site Alternative includes demolition and/or removal of the existing structures on the site, including the EHS building and associated portable buildings. Underground utilities on the site will be relocated, and significant earthworks will be undertaken to facilitate construction of the proposed IWRSS NWS. The design of the proposed IWRSS NWC includes a partial basement, therefore dewatering during construction may be necessary.

Demolition of the EHS building and removal of the portable buildings currently on-site could have potentially significant impacts on worker health and safety and environmental quality, if appropriate regulations, precautions and processes are not followed with respect to closure and decommission of the existing building and its contents. Such regulations may include (but are not limited to) the following, and should be specified for the proposed action within a hazardous materials storage, closure and management plan prepared by the entity responsible for closure and demolition of the EHS building and removal of portable buildings currently on-site:

- Title 29 CFR 1910 and 1926
- Title 40 CFR 260-268
- Alabama Environmental Management Act (Alabama Code Title 22 Chapter 22A)
- Alabama Hazardous Wastes Management and Minimization Act (Alabama Code Title 22 Chapter 30)
- Alabama Hazardous Substance Cleanup Fund Act (Alabama Code Title 22 Chapter 30A).

Discussions with UA's EHS Director, Mr. Hal Barrett, indicated that there are no formal State requirements or protocols relating to decommissioning of the hazardous waste and radiological waste storage areas within the EHS building. However, Mr. Barrett indicated that following

removal of EHS materials and operations from the site, swipe samples would be taken from all surfaces within the building and tested to ensure that no contamination is present.

Machinery and vehicles used during demolition and construction activities, such as graders, backhoes, loaders and haul trucks, will use diesel and other fuel. This could have potentially significant impacts on environmental quality if best management practices with respect to spill prevention and protection, as required by a NPDES permit, are not utilized.

A Phase II Environmental Site Investigation at the site is recommended in the Phase I ESA to further evaluate potential on-site contamination, including contamination of soil and groundwater. Such an investigation could further define the presence of potential hazardous contamination at the site. It is assumed that any such investigation (and subsequent remediation, if necessary) would comply with all applicable local, state, and federal regulations, with regards to worker and public health and safety, waste management and treatment, excavation, transportation, and disposal of hazardous materials; and may require notification of applicable regulatory agencies.

If soil or groundwater at the site is contaminated, construction activities could result in exposure to contaminants by construction workers if appropriate regulations, precautions and processes, such as required by OSHA in Title 29 CFR 1910 and Title 29 CFR 1926, are not followed. Such exposure could therefore have potentially significant impacts on worker health and safety.

If groundwater at the site is contaminated, construction activities could result in mobilization of the contaminants through disposal of dewatering water, if appropriate regulations, precautions and processes, such as required by the NPDES permit system, are not followed. Such exposure could therefore have potentially significant impacts on water quality and the environment. Conditions and requirements applicable to all NPDES permits from the ADEM Water Quality Program are found at Alabama Administrative Code Revised 335-6-6-.12. Provisions implementing these requirements would be incorporated into a NPDES permit required for the proposed action (see Section 6.4, *Water Resources*), and would include releases subject to Section 307(a) of the Federal Water Pollution Control Act (known as the Clean Water Act or CWA) for toxic pollutants. Any toxic pollutant listed under CWA are subject to Water Pollution Prevention and Control measures using best available technology economically achievable for the proposed action, per CWA Title 33, Chapter 26. The NPDES permit application required for the proposed action at the Preferred Site Alternative would identify releases of toxic substances and their control or elimination within its SPCC plan. Adhering to the provisions of the NPDES permit and the SPCC approved by the ADEM would reduce the potential for a significant impact to occur due to the discharge of pollutants such as sediments and toxic substances on or away from the subject site.

If soil at the site is contaminated, construction activities could result in mobilization of the contaminants through disposal of excavated material, if appropriate regulations, precautions and processes are not followed. Such regulations may include (but are not limited to) the following:

- Resource Conservation and Recovery Act (RCRA), Subtitle C and D
- Alabama Environmental Management Act (Alabama Code Title 22 Chapter 22A)
- Alabama Hazardous Wastes Management and Minimization Act (Alabama Code Title 22 Chapter 30)
- Alabama Hazardous Substance Cleanup Fund Act (Alabama Code Title 22 Chapter 30A).

On-going operation of the proposed IWRSS NWC is anticipated to have less than significant impacts with respect to hazardous materials. While the proposed IWRSS NWC will have an emergency generator that is fueled by diesel/natural gas, adherence to relevant regulations regarding fuel tank construction and maintenance should adequately mitigate the risk of spills or leaks. Federal Regulation 40 CFR 112 applies to facilities that store petroleum and its derivatives. Facilities having an aggregate aboveground storage capacity in excess of 1,320 gallons are required to prepare and implement an SPCC Plan that complies with the regulation.

6.15.2.2 No-Action Alternative

The No Action Alternative would not involve construction, demolition, earthwork or other activities that could impact conditions that would cause the release of known or suspected hazardous materials or be affected by hazardous materials.

6.15.3 Mitigation Measures

6.15.3.1 Preferred Site Alternative

The following mitigation measures are recommended in relation to hazardous materials for the Preferred Site Alternative:

- That NOAA ensure that the lease agreement with the university includes conditions requiring that the existing building on site be closed and demolished in accordance with all applicable federal, State and local laws pertaining to hazardous materials handling, storage, transportation and disposal, including (but not limited to) relevant laws pertaining to asbestos and lead-based paint, and that test results for swipes taken from surfaces within the EHS building following decommissioning are provided to NOAA for review.
- That NOAA investigates the presence of contamination in groundwater at the site, prior to commencing site disturbing activities, in accordance with the recommendations of the

Phase I ESA drafted for the Preferred Site Alternative in November 2010 and finalized in January 2011.

- That all relevant federal, state and local laws pertaining to hazardous waste handling, storage, transportation and disposal, discharge of stormwater and dewatering water, and worker health and safety are complied with during construction of the proposed IWRSS NWC.
- That all relevant federal, state and local laws pertaining to storage of hazardous substances are complied with, with respect to the ongoing use and maintenance of the fuel tank for the proposed emergency generator.

6.15.3.2 No-Action Alternative

No mitigation measures are recommended.

6.16 SOCIOECONOMICS AND ENVIRONMENTAL JUSTICE

Executive Order 12898, known as the Federal Environmental Justice Policy, requires federal agencies to address, to the greatest extent practicable and permitted by law, the potential for disproportionately high adverse human health and environmental impacts to occur on minority and low-income populations due to their programs, policies, and activities.

Effects associated with environmental justice require that a significant adverse impact not be predominately borne by a minority population and/or a low-income population and that the impact not be appreciably more severe or greater in magnitude than would be suffered by the non-minority population and/or non-low-income population. This evaluation considers federal, regional, and campus area population and economic data to assess affected populations and the potential for disproportionately high adverse effects to occur to minority or low-income populations.

6.16.1 Existing Environment

6.16.1.1 Preferred Site Alternative

Table 4 summarizes the change in population for the United States, the State of Alabama, the city and county of Tuscaloosa, and U.S. Census Tract 112 between 1990 and 2009. The County has undergone a population increase of 22.3 percent over the past two decades. In 1990, the population of the County was 150,522, and in 2009 the County's population was 184,035. The City has experienced an increase in growth as well; the City population has increased from 77,759 in 1990 to an estimated 93,141 in 2009, a 19.8 percent increase. The County and City's population growth increased approximately 20 percent from 1990 to 2009.

Table 4: Population Change by Geographic Area

Geographic Area	1990	2000 (% Change 1990-2000)	2009 (% Change 2000-2009)	1990–2009 Percent Change
US Census Tract 112 (UA, Bryce Hospital)	Unavailable	1,948	Unavailable	Unavailable
City of Tuscaloosa	77,759	77,906 (0.2)	93,141 (19.6)	19.8
County of Tuscaloosa	150,522	164,875 (9.5)	184,035 (11.6)	22.3
State of Alabama	4,040,522	4,447,100 (10.1)	4,708,708 (5.9)	16.5
United States	248,709,873	281,421,906 (13.2)	307,006,556 (9.1)	23.4

Sources: U.S. Census Bureau, 1990, 2000, 2009

U.S. Census Tract 112 comprises UA and Bryce Hospital. According to the 2000 U.S. Census, the total population within Tract 112 was 1,948 (U.S. Census Bureau, 2000). U.S. Census data in 1990 and 2010 for Tract 112 is unavailable and therefore not incorporated into this analysis.

Table 5 summarizes the change in the University population between 1990 and 2009. The University has seen a growth of 45 percent in the past 20 years, from 19,794 to 28,699 enrolled students. Although the University experienced a drop in attendance between 1990 and 2000, the student body increased substantially between 2000 and 2009, by 48.9 percent, for a 2009 student body of 28,699.

Table 5: Population Change at The University of Alabama

Geographic Area	1990	2000 (% Change 1990–2000)	2009 (% Change 2000–2009)	1990–2009 Percent Change
University (student population)	19,794	19,277 (-2.6)	28,699 (48.9)	45.0

Source: UA, 2010f

Table 6 summarizes the existing racial profile of the state, County, City of Tuscaloosa, and U.S. Census Tract 112. The racial profile of Alabama in 2009 was 69.97 percent White, 26.1 percent Black or African American, and 3.19 percent Other. The racial profile of the County was 66.2 percent White, 31.2 percent Black or African American, and 2.6 percent Other in 2009. The racial profile of the City in 2009 was 50.8 percent White, 46.2 percent Black or African American, and 3.1 percent Other (U.S. Census Bureau, 2009). According to the 2000 U.S. Census, the racial breakdown within Census Tract 112 was 53.6 percent White, 44.5 percent Black or African American, 1.79 percent Other (U.S. Census Bureau, 2000).

Table 6: Racial Profile by Geographic Area

Race	U.S. Census 2000 Tract 112	Tuscaloosa City	Tuscaloosa County	Alabama
White	53.6%	50.8%	66.2%	69.97%
Black or African American	44.5%	46.2%	31.2%	26.1%
Other*	1.79%	3.1%	2.6%	3.19%

*Other is defined as American Indian and Alaska Native, Asian, native Hawaiian and other Pacific Islander, some other race, two or more races, Hispanic, or Latino origin.
Note: All data are for 2009, except for the U.S. Census 2000 Tract 112 data, which is from 2000.

Sources: U.S. Census Bureau, 2000, 2009

Table 7 summarizes the existing racial profile of the University in 2009. The University's student body racial makeup consists of 81.5 percent White, 11.7 percent Black or African American, 3.9 percent Other, and 2.9 percent International. The University has established international student exchange programs that increase the percentage of international students in its student body demographics.

Table 7: 2009 Racial Profile of The University of Alabama

Race	Percent of University Population
White	81.48
Black/African American	11.74
Other*	3.94
International	2.85

*Other is defined as: American Indian and Alaska Native, Asian, native Hawaiian and other Pacific Islander, some other race, two or more races, Hispanic, or Latino origin.

Source: UA, 2010f

Table 8 summarizes the various socioeconomic factors for the United States, the State of Alabama, the County, the City, and U.S. Census Tract 112. In 2009, the mean household income for the County was $55,537, and the mean household income for the City was $52,255. In 2000, 21.4 percent of household incomes in the City were less than $10,000, 17.4 percent of households had incomes of $10,000 to $19,999, 52.9 percent of households had incomes of $20,000 to $99,999, and 8.2 percent of households had incomes of over $100,000. In the same year, Census Tract 112 showed that 44.7 percent of households had incomes of less than $10,000, 24.3 percent of households had incomes of $10,000 to $14,999, 11.3 percent of households had incomes of $15,000 to $19,999, 18.4 percent of households had incomes of $20,000 to 99,999, and 1.2 percent of households had incomes above $100,000.

Table 8: Mean Household Income, Poverty Status, Labor Force, and Unemployment by Geographic Area

Geographic Area	Mean Household Income	Poverty Status	Labor Force	Unemployment
U.S. Census 2000 Tract 112	$16,304	48.9%	42.1%	4.75%
Tuscaloosa City	$52,255	28.3%	52.0%	7.1%
Tuscaloosa County	$55,537	20.3%	58.1%	7.4%
Alabama	$55,543	17.5%	60.9%	11.1%
United States	$68,914	14.3%	65.3%	9.9%

Note: All data are for 2009, except for the U.S. Census 2000 Tract 112 data, which are from 2000.

Sources: U.S. Census Bureau, 2000, 2009

The poverty rate for individuals in the County was 20.3 percent, and the City poverty rate for individuals was 28.3 percent. The County's labor force in 2009 was approximately 58.1 percent of the population, with 7.4 percent of the population unemployed. The City's labor force in 2009 was approximately 52 percent of the population, with 7.1 percent unemployed. According to 2000 Census data for Census Tract 112 (which only covers the University and Bryce Hospital), the mean household income was $16,304, and the mean household income for the City was $44,917.

6.16.1.2 No Action Alternative

The existing environment with respect to socioeconomics and environmental justice is described in the preceding section.

6.16.2 Environmental Consequences

6.16.2.1 Preferred Site Alternative

The percentage minority population for Census Tract 112 (46.29 percent) is slightly lower than that of the City (49.3 percent) and somewhat higher than that of the County (33.8 percent). The rate of unemployment in Census Tract 112 is 4.75 percent, which is less than that of the City (7.1 percent) and the County (7.4 percent). The mean household income in Census Tract 112 is $16,304, which is below the City's mean household income of $52,255 and the County's mean household income of $55,537. The percentage living in poverty in Census Tract 112 (48.9 percent) is more than the percentage living in poverty in the City (28.3 percent) and the County as a whole (20.3 percent) (U.S. Census Bureau, 2009; U.S. Census Bureau, 2000). The reason for the high percentage of low-income persons is due to the large college-aged student population living in Census Tract 112.

Under the proposed action, the University would continue to implement programs to encourage enrollment of minority groups and recruit underrepresented and minority students for its undergraduate and graduate programs. The overall enrollment of minority students is

18.53 percent. The campus would not be interpreted as a low-income population for the purposes of EO 12898.

The proposed action would not result in a reduction of available residential units or the displacement of residents within the project vicinity. Therefore, no effect to the housing market would occur. The proposed action would not add to the student, faculty, or staff population at the University. The NOAA staff would transfer from existing facilities outside the region, and the proposed action is expected to result in some housing relocations. The economic effect of federal employee transfers from other geographic locations is not expected to substantially alter existing socioeconomic conditions or local commerce. The project would be served by existing utility service providers. Expansion of existing utility and infrastructure systems would not be necessary; however, abandonment or re-routing of both main and distribution service lines for various utility services would be required (see Section 6.13, *Utilities and Solid Waste*).

Overall, the University has a lower percentage of minorities than the City and County. The City's higher rate of unemployment and percentage of people living in poverty and its lower mean household income relative to the County are due to the large student population within the City. The proposed project would provide additional educational opportunities to students. Negligible adverse environmental or human health effects are expected to result from the proposed project, and no disproportionately high, adverse environmental effects would impact low-income or minority communities. Negligible socioeconomic effects would result due to implementation of the proposed project.

6.16.2.2 No Action Alternative

Under the No Action Alternative, the proposed action would not be implemented; no new IWRSS NWC facility would be established. The existing economic and demographic conditions and trends for the campus and adjacent areas would persist. The minor economic stimulus and related effects of adding NOAA and perhaps other federal employees to the regional residential population and campus workforce that were previously in areas outside of Tuscaloosa County would not occur. No significant socioeconomic or environmental justice impacts would result under the No Action Alternative.

6.16.3 Mitigation Measures

6.16.3.1 Preferred Site Alternative

No mitigation measures are recommended.

6.16.3.2 No Action Alternative

No mitigation measures are recommended.

6.17 CUMULATIVE IMPACTS

In addition to the effects of a proposed action on the environment, NEPA guidelines at 40 C.F.R. 1508.8 require the lead agency to consider the cumulative impacts in their determination. A cumulative impact is *"The impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."* Thus, even if a proposed action will not itself have significant impacts on the environment, if combined with other similar insignificant action, they cumulatively may have significant impacts.

This evaluation of cumulative effects considers the environmental setting described for each resource or topic analyzed individually under the Preferred Site Alternative. The proposed action is evaluated in light of past, present and reasonably foreseeable actions identified from available planning documents and provided by agencies and land owners.

6.17.1 Existing Environment

6.17.1.1 Preferred Site Alternative

The existing environment considered for this analysis is described in the Existing Environment subsections provided for each of the resources and topics analyzed individually. Past and present actions include use of the existing UA EHS building and UA actions in adjacent areas, such as removal of a water tank, installation of chiller units and re-routing of Hackberry Lane. Foreseeable actions include prospective plans or projects in the UA Campus Master Plan and the Tuscaloosa Area Metropolitan Planning Organization Area Transportation Improvement Plan (Tuscaloosa Area Metropolitan Planning Organization, 2010).

Land use planning associated with UA acquisition of the former Bryce Hospital has not been formally defined and is unavailable for the purposes of considering foreseeable actions.

6.17.1.2 No Action Alternative

The existing environment with respect to cumulative impacts is described in the preceding section.

6.17.2 Environmental Consequences

6.17.2.1 Preferred Site Alternative

Past, present and foreseeable actions that would potentially combine with the Preferred Site Alternative are primarily associated with roadway, circulation and parking capacity projects. Past actions include re-routing a portion of Hackberry Lane to an alignment adjacent to the subject

site and UA acquisition of property and roadways within the former Bryce Hospital. Other than the relocation of EHS operations to an undetermined location on the UA campus, foreseeable actions include the prospective development of a UA parking structure north of the Preferred Site Alternative and the nearest on-campus road surface improvements to the south on University Avenue and near Hackberry Lane.

Based on available planning documents, each of the remaining resources topics analyzed individually would not be substantively affected by the Preferred Site Alternative and recommended mitigation measures in combination with past, present and foreseeable future projects. The resource topic for which potential cumulative effects are expected to potentially be greater than negligible is transportation. Therefore, the analysis of cumulative effects focuses on transportation.

Cumulative Transportation Effects: Recent and projected transportation-related development projects were evaluated based on the Project Listing presented in the Tuscaloosa Area Metropolitan Planning Organization Transportation Improvement Program (Tuscaloosa Area Metropolitan Planning Organization, 2010). The recent transportation projects and those anticipated in that document for 2011 do not include substantial new roadways or roadway maintenance projects within routes and locales directly affected by the Preferred Site Alternative. The re-routing of Hackberry Lane in 2008 to its existing location adjacent to the subject site provides enhanced vehicle and bicycle circulation and capacity, which is a minor positive effect.

No specific plan exists for future use of the adjacent Bryce Hospital property; however, the University will need to arrange for authorization to use existing access roads within the former Bryce Hospital property to implement the Preferred Site Alternative. Assuming access is authorized and existing exclusion fences are repositioned, roadways within Bryce Hospital would be adequate for establishing site access. No other substantive transportation improvements would be required within the former Bryce Hospital property and any other future development is not foreseen at this time.

The Campus Master Plan functional organization generally designates areas to the south and west of the subject site to be used for academic facilities and areas to the north, including an undefined parking structure north of the IWRSS NWC Preferred Site Alternative, for residential functions and vehicle parking. This future action to install a parking structure would be in response to anticipated campus parking demand and potentially have a secondary effect of replacing a proposed surface parking lot to provide off-site parking for an IWRSS NWC. The transportation improvements associated with the recent re-routing Hackberry Lane and other elements of the Master Plan would support the anticipated traffic volume generated by UA parking areas contemplated north of the Preferred Site Alternative. Cumulative effects of added

traffic and parking capacity are expected to result in a minor effect to transportation infrastructure and circulation capacity.

6.17.2.2 No Action Alternative

Under the No Action Alternative, the proposed action would not occur and past, present and foreseeable future actions would remain unchanged. Based on the planning information available, cumulative effects under the No Action Alternative would not be significant.

6.17.3 Mitigation

6.17.3.1 Preferred Site Alternative

No mitigation measures are recommended.

6.17.3.2 No Action Alternative

No mitigation measures are recommended.

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7 SUMMARY OF ANTICIPATED IMPACTS AND SUGGESTED MITIGATION

No anticipated environmental impacts were identified in relation to the No Action Alternative. Table 9 summarizes the anticipated environmental impacts by environmental resource identified for the Preferred Site Alternative, and summarizes suggested mitigation measures. These mitigation measures are recommended, but would not be required to support a finding of no significant impact.

Table 9: Summary of Anticipated Environmental Impacts and Suggested Mitigation IWRSS NWC Preferred Site Alternative

Resource	Anticipated Impacts	Suggested Mitigation
Land Use	Negligible impacts	None
Geological Resources	Seismic impacts – low Other geological resources – no impacts	None
Air Quality	Construction – minor Ongoing operation - minor	During clearing, grading, earth moving, excavation, or transportation of cut or fill material, water trucks or sprinkler systems are to be used to prevent fugitive dust from leaving the site. During construction, water trucks or sprinkler systems shall be used to keep all affected areas of vehicle movement damp enough to prevent dust from leaving the site. At a minimum, this would include wetting down such areas in the later morning, after work is completed for the day, and whenever wind speed exceeds 15 miles per hour. Soil stockpiled for more than two days shall be covered, kept moist, or treated with soil binders to prevent dust generation.
Water Resources	Negligible impacts	The proposed action would include implementation of best management practices, such as silt fences, for the prevention of sediment release during excavation and construction, and the release of fuels from construction equipment or during IWRSS NWC operations. Specifically, secondary containment structures may be used to contain spills related to equipment or refueling operations. Specific measures minimally required for the National Pollutant Discharge Elimination System permit are recommended (see Section 6.4.3)
Recreational Resources	No impacts	None
Cultural Resources	Adverse impact	The following mitigation measures are recommended for the Preferred Site Alternative to reduce adverse effects to less than significant.

Table 9: Summary of Anticipated Environmental Impacts and Suggested Mitigation IWRSS NWC Preferred Site Alternative

Resource	Anticipated Impacts	Suggested Mitigation
		• Create of an accurate and to-scale map on acid-free archival bond paper for the entire Bryce NRHP district as depicted in AHC Site 1TU808 • Cite locations of approximately 20 remaining buildings within the district and associated with Bryce Hospital. A recent aerial photograph will be used as a base map for spatial accuracy and location relative to existing features. • Indicate the date or era of construction, i.e. the original hospital in the 1850s through the final construction period of the 1940s – 1950s. It is understood that the precise date of construction for smaller structures at Bryce Hospital are not well documented and may not be readily available for inclusion in this effort. • Prepare one (1) archival quality black and white photograph of each remaining buildings' front elevation and key to the map. When possible, multiple buildings may be captured on the same photograph to assist depiction of the historic district's spatial relationships, historic context, and visual narrative. • Prepare one (1) archival quality photograph of the front elevation of the Men's Tuberculosis Building along with two (2) archival quality photographs representing the interior of the Men's Tuberculosis Building (aka EHS building). • Ensure photographs are large-format, 8" x 10", and are accompanied by contact-style prints produced from scanned TIFF images of the negatives. Copies of the negatives will not be required. • Submit up to three (3) printed copies (one unbound) of the map and photographs, as described herein, on 8 1/2 x 11 inch pages and deliver to the AHC.
Flora and Fauna	No impacts	None
Wetlands	No impacts	None
Floodplains	No impacts	None
Agricultural Resources	No impacts	None
Noise	Construction – negligible impacts Ongoing operation – minor positive impact	Limit the use of large construction equipment and earthmoving activity to the hours of 6 a.m. to 9 p.m. daily.
Transportation	Construction – no impacts	An alternative access route for IWRSS NWC staff should be established with campus police and

Table 9: Summary of Anticipated Environmental Impacts and Suggested Mitigation IWRSS NWC Preferred Site Alternative

Resource	Anticipated Impacts	Suggested Mitigation
	Ongoing operation – minor	emergency response organizations.
Utilities and Solid Waste	Minor	None
Visual and Aesthetic Resources	Negligible impacts	None
Hazardous Materials	Construction – potentially significant Ongoing operation – less than significant	That NOAA ensure that the lease agreement with the university includes conditions requiring that the existing building on site be closed and demolished in accordance with all applicable federal, State and local laws pertaining to hazardous materials handling, storage, transportation and disposal, including (but not limited to) relevant laws pertaining to asbestos and lead-based paint, and that test results for swipes taken from surfaces within the EHS building following decommissioning are provided to NOAA for review. That NOAA investigates the presence of contamination in groundwater at the site, prior to commencing site disturbing activities, in accordance with the recommendations of the Phase I ESA drafted for the Preferred Site Alternative in November 2010 and finalized in January 2011. That all relevant federal, state and local laws pertaining to hazardous waste handling, storage, transportation and disposal, discharge of stormwater and dewatering water, and worker health and safety are complied with during construction of the proposed IWRSS NWC. That all relevant federal, state and local laws pertaining to storage of hazardous substances are complied with, with respect to the ongoing use and maintenance of the fuel tank for the proposed emergency generator.
Socioeconomics and Environmental Justice	Negligible impacts	None
Cumulative Impacts	Transportation – minor Other resources – negligible	None

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8 PUBLIC OUTREACH

Public involvement is essential to implementing NEPA and is a part of NOAA's outreach policy found at Section 5.02, Scoping and Public Involvement, within NOAA Administrative Order 216.6: *Procedures for Implementing the National Environmental Policy Act*. Per Section 5.02b.1, public involvement is encouraged in the review of EAs, which may not otherwise get adequate public input. The policy states that to the extent possible, environmental assessments should be published or made available in conjunction with proposed rules and plans subject to public review and comment. NOAA program managers are also encouraged to use state "single points of contact" established by the federal Office of Management and Budget per under E.O. 12372: *Intergovernmental review of Federal Programs*. Currently, the state of Alabama does not have a state single point of contact or state clearinghouse to facilitate broad review of federal programs.

The Draft EA was made available for public review and comment for a 30-day period starting February 2, 2011 and ending March 5, 2011. Public notice regarding the availability of the Draft EA was published in *The Tuscaloosa News* on February 2, 3 and 4, 2011 and in *The Crimson White* (University newspaper) on February 4, 5, 7 and 9, 2011. Copies of the Draft EA were available for viewing during the comment period at the Tuscaloosa Public Library (main branch) and the Amelia Gayle Gorgas Library (on the UA campus). Electronic or hard copies of the Draft EA were also available on request from URS Corporation.

No public comments on the Draft EA were received during the public review and comment period. **Appendix C** contains copies of agency correspondence received regarding the project. The Final EA has been revised to reflect substantive comments, including recommended mitigation measures provided by the AHC regarding adverse effects associated with the demolition of the UA's EHS building.

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9 LIST OF PREPARERS

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10 LIST OF AGENCIES AND PERSONS CONTACTED

The following individuals were contacted in relation to this EA:

- Douglas D. Behm, University Geologist, Director University Lands/Real Estate Services, December 2010.
- Greg Rhinehart, Alabama Historical Commission, December 2010.
- Hal Barrett, Director, University Office of Environmental Health and Safety, January 2011.
- Gene Ford, Architectural Historian, University of Alabama Anthropology Department, January 2011.

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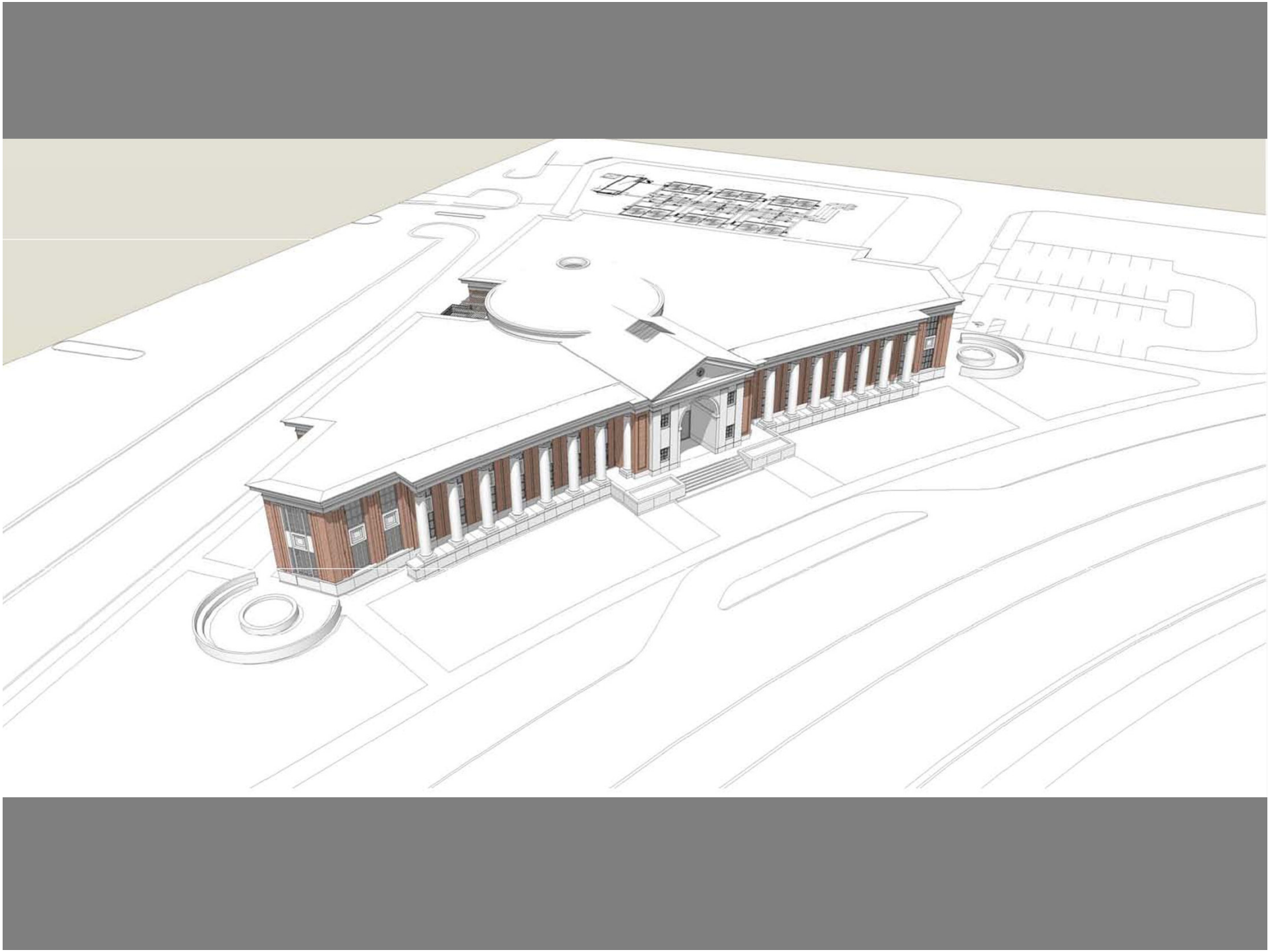
Appendix A: Renderings

Hackberry Lane View 1

Design Development *April 26, 2011*

Source: Gibbens Drake Scott Inc., Gould Evans Associates, TranSystems, 2011. Design Development Review for the National Water Center on the Campus of the University of Alabama, April 26, 2011.



Source: Gibbens Drake Scott Inc., Gould Evans Associates, TranSystems, 2011. Design Development Review for the National Water Center on the Campus of the University of Alabama, April 26, 2011.

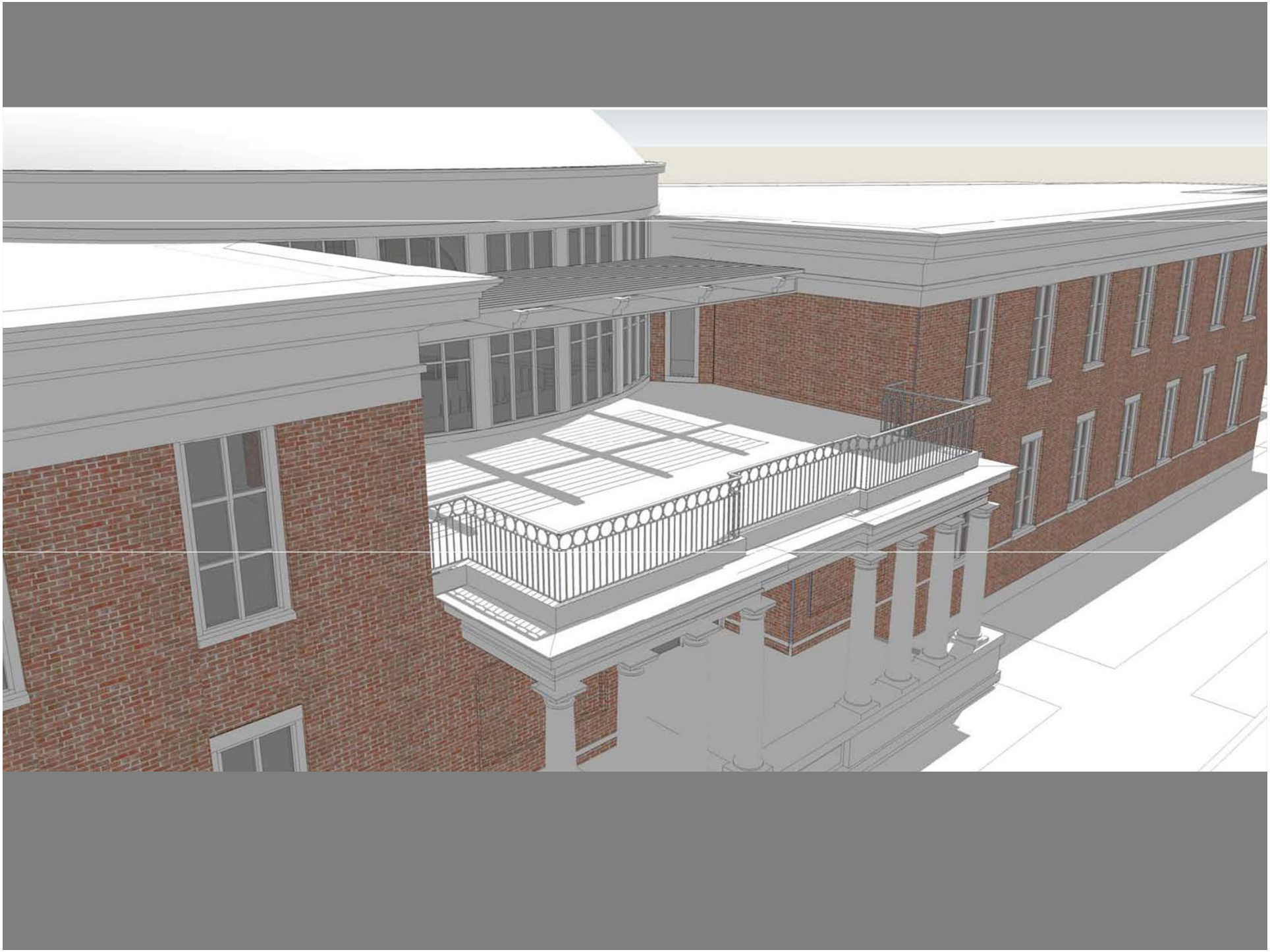
Source: Gibbens Drake Scott Inc., Gould Evans Associates, TranSystems, 2011. Design Development Review for the National Water Center on the Campus of the University of Alabama, April 26, 2011.

Source: Gibbens Drake Scott Inc., Gould Evans Associates, TranSystems, 2011. Design Development Review for the National Water Center on the Campus of the University of Alabama, April 26, 2011.

Bryce View 2

Design Development *April 26, 2011*

Source: Gibbens Drake Scott Inc., Gould Evans Associates, TranSystems, 2011. Design Development Review for the National Water Center on the Campus of the University of Alabama, April 26, 2011.



Source: Gibbens Drake Scott Inc., Gould Evans Associates, TranSystems, 2011. Design Development Review for the National Water Center on the Campus of the University of Alabama, April 26, 2011.

Appendix B: Background Data and Materials

July 2011

Appendix B-1: University of Alabama Campus Master Plan Map

UNIVERSITY OF ALABAMA

TUSCALOOSA, ALABAMA

MASTER PLAN

LEGEND

- OPEN SPACE
- ATHLETIC FIELDS
- EXISTING OFF CAMPUS BUILDINGS
- EXISTING UNIVERSITY OF ALABAMA BUILDINGS
- FUTURE UNIVERSITY OF ALABAMA BUILDING LOCATIONS
- SIDEWALKS / PEDESTRIAN SPACES
- TRANSIT ONLY STREETS

0 400' 800' 1600'

APRIL 10th, 2007

KPS GROUP

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Appendix B-2: Custom Soil Resource Report of Tuscaloosa County, Alabama

July 2011

URS

United States Department of Agriculture

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Tuscaloosa County, Alabama

IWRSS National Water Center

December 22, 2010

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Soil Data Mart Web site or the NRCS Web Soil Survey. The Soil Data Mart is the data storage site for the official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means

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How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

- Soil Map Units

Special Point Features

- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other

Special Line Features

- Gully
- Short Steep Slope
- Other

Political Features

- Cities

Water Features

- Oceans
- Streams and Canals

Transportation

- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

MAP INFORMATION

Map Scale: 1:2,440 if printed on A size (8.5" × 11") sheet.

The soil surveys that comprise your AOI were mapped at 1:20,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 16N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Tuscaloosa County, Alabama
Survey Area Data: Version 5, May 27, 2008

Date(s) aerial images were photographed: 6/20/2006

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Tuscaloosa County, Alabama (AL125)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
8	Bama-Urban land complex, 2 to 6 percent slopes	11.5	94.3%
33	Smithdale fine sandy loam, 6 to 15 percent slopes	0.7	5.7%
Totals for Area of Interest		**12.1**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If

intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Tuscaloosa County, Alabama

8—Bama-Urban land complex, 2 to 6 percent slopes

Map Unit Setting

Elevation: 660 to 1,310 feet
Mean annual precipitation: 40 to 56 inches
Mean annual air temperature: 52 to 75 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Bama and similar soils: 50 percent
Urban land: 45 percent
Minor components: 5 percent

Description of Bama

Setting

Landform: Ridges
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear
Parent material: Loamy fluviomarine deposits derived from sedimentary rock

Properties and qualities

Slope: 2 to 6 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: Moderate (about 8.8 inches)

Interpretive groups

Land capability (nonirrigated): 2e

Typical profile

0 to 5 inches: Fine sandy loam
5 to 54 inches: Sandy clay loam
54 to 72 inches: Sandy clay loam

Description of Urban Land

Setting

Landform: Hillslopes
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear

Minor Components

Shatta

Percent of map unit: 3 percent

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear

Smithdale
Percent of map unit: 2 percent
Landform: Ridges
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex

33—Smithdale fine sandy loam, 6 to 15 percent slopes

Map Unit Setting
Elevation: 660 to 1,310 feet
Mean annual precipitation: 40 to 56 inches
Mean annual air temperature: 52 to 75 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition
Smithdale and similar soils: 85 percent
Minor components: 11 percent

Description of Smithdale

Setting
Landform: Ridges
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loamy marine deposits derived from sedimentary rock

Properties and qualities
Slope: 6 to 15 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water capacity: High (about 9.3 inches)

Interpretive groups
Land capability (nonirrigated): 3e

Typical profile
0 to 5 inches: Fine sandy loam
5 to 42 inches: Loam

42 to 72 inches: Sandy loam

Minor Components

Bama

Percent of map unit: 3 percent
Landform: Ridges
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear

Luverne

Percent of map unit: 2 percent
Landform: Ridges
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex

Flomaton

Percent of map unit: 2 percent
Landform: Ridges
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex

Pikeville

Percent of map unit: 2 percent
Landform: Ridges
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex

Ruston

Percent of map unit: 2 percent
Landform: Ridges
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Linear

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Appendix B-3: Biological Resource Evaluation – Federally Protected Species

July 2011

BIOLOGICAL RESOURCE EVALUATION – FEDERALLY PROTECTED SPECIES

Proposed NOAA National Water Center

at the University of Alabama, Tuscaloosa, Alabama

Introduction

The National Oceanic and Atmospheric Administration (NOAA), within the U.S. Department of Commerce, is proposing to build and operate a National Water Center at a preferred site location within the University of Alabama campus in Tuscaloosa, Alabama. The proposed two-story, 58,000 square-foot structure would replace an existing UA building within a previously disturbed, urbanized environment on a 3.5-acre project area on the main campus. A review for effects to species protected under the federal Endangered Species Act (ESA), the Bald and Golden Eagle Protection Act (BGEPA), and the Migratory Bird Treaty Act (MBTA) has been considered and findings prepared. Based on this evaluation, NOAA anticipates that the proposed action at the preferred site would have "no effect" to federally protected species listed in Tuscaloosa County under the ESA, or adverse effects under the BGEPA and the MBTA.

Federally Listed Threatened, Endangered, and Candidate Species

The proposed action and project area is more thoroughly described in the Final EA and includes maps, aerial photographs and site photographs of the existing site conditions. The document also identifies the federally listed threatened, endangered and candidate species provided in the table below.

Table: Federally Listed Threatened, Endangered, and Candidate Species

Class	Scientific Name	Common Name	Federal Status
Amphibia	*Necturus alabamensis*	Black Warrior waterdog	C
Aves	*Picoides borealis*	Red-cockaded woodpecker	E
	Mycteria americana	Wood stork	E
	Haliaeetus leucocephalus	Bald eagle	BGEPA
Bivalvia	*Pleurobema decisum*	Southern clubshell mussel	E
	Pleurobema furvum	Dark pigtoe mussel	E
	Pleurobema perovatum	Ovate clubshell mussel	E
	Medionidus acutissimus	Alabama moccasinshell mussel	T
	Potamilus inflatus	Inflated heelsplitter mussel	T
	Hamiota (=Lampsilis) altilis	Fine lined pocketbook mussel	T
	Hamiota (=Lampsilis) perovalis	Orange nacre mucket mussel	T
Insecta	*Neonympha mitchellii mitchellii*	Mitchell's satyr butterfly	E
Monocots	*Platanthera integrilabia*	White fringeless orchid	C
Reptilia	*Sternotherus depressus*	Flattened musk turtle	T

E - Endangered **T** - Threatened **C** - Candidate Species BGEPA - Bald & Golden Eagle Protection Act

May 2011

Table: Federally Listed Threatened, Endangered, and Candidate Species

Class	Scientific Name	Common Name	Federal Status

Source: U.S. Fish and Wildlife Service, 2010. "*Alabama's Federally Listed Species*." March 2, 2010. Online at http://www.fws.gov/daphne/es/specieslst.html#Tuscaloosa (accessed September 23, 2010).

Black Warrior waterdog (*Necturus albamensis*), candidate species: Habitat for Black Warrior waterdogs (*Necturus alabamensis*) is the Black Warrior River, a tributary of the Alabama River, near Tuscaloosa, Tuscaloosa County, Alabama. They apparently are confined to medium–large streams of the upper Black Warrior River system above the Fall Line, including Yellow Creek and North River in Tuscaloosa County. Their geographic distribution is thought to essentially mimic that of flattened musk turtles (*Sternotherus depressus*) and their habitat is associated with submerged leaf beds and rock crevices near streams[1].

The proposed action would occur approximately 1,500 feet south of the Black Warrior River's south bank and well away from its tributaries. The project area is previously disturbed and does not contain the stream water flow, submerged leaf bed or rock crevices associated with their habitat.

Red-cockaded woodpecker (*Picoides borealis*), endangered species: The red-cockaded woodpecker is unique among the North American woodpeckers in that it is the only woodpecker that excavates its roost and nest cavities in living pine trees. Each group member has its own cavity, although there may be multiple cavities in a single pine tree. The aggregate of cavity trees is called a cluster. Clans of this non-migratory woodpecker maintain year-round territories around nesting and roost trees. Red-cockaded woodpeckers forage almost exclusively on pine trees and they generally prefer pines greater than 10 in (25 cm) in diameter at breast height. Foraging habitat is contiguous with the cluster. The number of acres required to supply adequate foraging habitat depends on the quantity and quality of the pine stems available. For nesting, red-cockaded woodpeckers use old-growth trees of most southern pine species, except for sand pine, spruce pine, white pine, and table-mountain pine. The woodpecker shows some preference for mature longleaf pine (*Pinus palustris*). Most active colonies are found in open, park-like stands of pine with sparse hardwood midstories[2].

The proposed action is located within the UA campus and adjacent to the former Bryce Hospital property. These large properties have been effectively cleared and developed throughout; the proposed project site and adjacent areas do not contain preferred or marginal habitat for the Red cockaded woodpecker, such as mature pine forest, particularly those with sparse understory. A

[1] AmphibiaWeb. Online at http://amphibiaweb.org/cgi/amphib_query?where-genus=Necturus&where-species=alabamensis&account=lannoo, accessed May 2011).

[2] Online at http://www.answers.com/topic/red-cockaded-woodpecker, accessed May 2011.

cursory review of known clan or cluster locations was conducted using mapping provided by the USFWS[3]. No known occurrences of this species were identified within of the UA campus or the former Bryce Hospital and the areas immediate beyond these properties. No taking of suitable habitat or foraging area for this species would occur due to the proposed project.

Wood stork (*Mycteria americana*), endangered species: The wood stork breeding population is believed to be greater than 8,000 nesting pairs (16,000 breeding adults). Nesting has been restricted to Florida, Georgia, and South Carolina; however, they may have formerly bred in most of the southeastern United States and Texas. Nests are frequently located in the upper branches of large cypress trees or in mangroves on islands. Wood storks have also nested in man-made structures. The generally accepted explanation for the decline of the wood stork is the reduction in food base (primarily small fish) necessary to support breeding colonies. This reduction is attributed to loss of wetland habitat as well as to changes in water hydroperiods from draining wetlands and changing water regimes by constructing levees, canals, and floodgates to alter water flow, particularly in south Florida. Optimal water regimes for the wood stork involve periods of flooding, during which prey (fish) population increases, alternating with dryer periods, during which receding water levels concentrate fish at higher densities coinciding with the stork's nesting season[4].

The proposed action is substantially away from wetlands or water regimes associated with foraging, breeding and nesting habitat for this species. A cursory review of known clan or cluster locations was conducted using mapping provided by the USFWS[5]. No known occurrences of this species were identified within of the UA campus or the former Bryce Hospital and the areas immediate beyond these properties. No taking of suitable habitat or foraging area for this species would occur due to the proposed project.

Bald eagle (*Haliaeetus leucocephalus*), BGEPA: The bald eagle is found near large bodies of open water with an abundant food supply and old-growth trees for nesting. It prefers habitats near seacoasts, rivers, large lakes, oceans, and other large bodies of open water with an abundance of fish. The bald eagle requires old-growth and mature stands of coniferous or hardwood trees for perching, roosting, and nesting. Selected trees must have good visibility, an open structure, and proximity to prey. It is extremely sensitive to human activity, and is found most commonly in areas free of human disturbance. In the late 20th century the bald eagle was

[3] Online at http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B04F, accessed March 2011.

[4] Online at http://www.fws.gov/northflorida/species-accounts/wood-stork-2005.htm, accessed May 2011.

[5] Online at http://ecos.fws.gov/speciesProfile/profile/speciesProfile.action?spcode=B06O, accessed March 2011.

on the brink of extirpation in the continental United States, however it was removed from the *List of Endangered and Threatened Wildlife* in the lower 48 states on June 28, 2007[6].

The proposed action is not at or near key foraging or nest sites that would support this species, including old-growth or mature stands of trees. The proposed action would not disturb nesting activity, should it occur, due to its proximity away from suitable stands of trees or structure likely to be used for nests.

Mitchell's satyr butterfly (*Neonympha mitchellii mitchellii*), endangered species: The Mitchell's satyr butterfly, a small chocolate brown butterfly, is one of the rarest butterflies in North America and was historically known from approximately 30 sites in southern Michigan, northern Indiana, northern Ohio, and northern New Jersey. Most historical satyr sites were known from Michigan, which could indicate this was the core of their range[7]. The butterfly is now considered extirpated in New Jersey and Ohio, although new records exist in isolated locations in Virginia, North Carolina, and Alabama[8]. One population of Mitchell's satyr butterfly was identified in Alabama in 2000[9].

The Mitchell's satyr was first listed as endangered in 1991, primarily due to loss and modification of habitat, loss of habitat to succession, habitat fragmentation, and collection by butterfly enthusiasts. This rare species is found in peatlands ranging from prairie/bog fen to sedge meadow/swamp. Prairie fens, typically thought to be the butterfly's characteristic habitat, are shrub and herb peatlands where calcium-rich groundwater seeps through the surface maintaining wet and calcareous conditions. Much remains unknown about this species biology, but it is thought that sedges, in particular *Carex stricta*, are the primary host plants. The primary threat to the Mitchell's satyr is the loss and disruption of suitable fen habitats and alterations in natural drainage and wetlands from disturbances[7].

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[6] USFWS, News Release, http://www.fws.gov/news/NewsReleases/showNews.cfm?newsId=72A15E1E-F69D-06E2-5C7B052DB01FD002, June 28, 2007.

[7] Center for Biological Diversity. Measuring the Success of the Endangered Species Act: Recovery Trends in the Northeastern United States. Online at http://www.esasuccess.org/reports/northeast/ne_species/mitchells-satyr-butterfly.html, accessed March 2011.

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[9] Barton, B. 2004. "*Neonympha mitchellii*", Animal Diversity Web. Online at http://animaldiversity.ummz.umich.edu/site/accounts/information/Neonympha_mitchellii.html, accessed March, 2011.

The proposed action is not located at or near habitat that would support this species and the rare population known to occur in Alabama does not occur within the project's potential area of influence.

White fringeless orchid (*Platanthera integrilabia*), candidate species: The white fringeless orchid is a perennial herb that blossoms from late July to early September. It has traditionally been found in the southern states of Texas, Alabama, Louisiana, Mississippi, Georgia, Tennessee, Kentucky, Virginia, North Carolina and South Carolina, with the species only being found in certain counties. In Alabama it is known to occur in the coastal plain. The natural habitat of the white fringeless orchid is damp, boggy areas, close to streams and shade. The population of the species continues to shrink due to a change in natural habitat, particularly from drained areas used for farm ponds or development projects. As the hydrology of the area is removed, the white fringeless orchid is either damaged or "dies out"[10].

The proposed action is not located at or near habitat commonly associated with this species, specifically shaded damp, boggy areas in the coastal plain of Alabama. No effect to this candidate species is anticipated to occur due to the proposed action.

Flattened musk turtle (*Sternotherus depressus*), threatened species: Although the flattened musk turtle is found in a variety of streams and in the headwaters of some dammed lakes, its optimum habitat appears to be free-flowing large creeks or small rivers with vegetated shallows, alternating with deeper, rock-bottomed pools. The flattened musk turtle was once found in the upper Black Warrior River system of Alabama, upstream from Tuscaloosa, which is on the fall line between the Piedmont Plateau and the coastal plain. Genetically pure populations of this turtle are now believed to exist only in the Black Warrior River system, upstream from Bankhead Dam in Blount, Cullman, Etowah, Jefferson, Lawrence, Marshall, Tuscaloosa, Walker, and Winston counties of north-central Alabama. Optimal habitat is permanent oligotrophic streams from one to five feet deep containing abundant rocky ledges, slabs, logs, debris, and pools. Generally, aquatic habitats that lack flowing water, relatively clean substrates, benthic macroinvertebrates, and low turbidity are unsuitable[11]. Clay siltation in the river system also may

[10] Falsetto, S. 2010. The Threat of Extinction to the White Fringeless Orchid. Online at http://www.suite101.com/content/the-threat-of-extinction-to-the-white-fringeless-orchid-a317525, accessed March 2011.

[11] USFWS, Flattened Musk Turtle General Sampling Protocol, 2000. Online at http://www.fws.gov/daphne/pdf/FMT.pdf, accessed March 2011.

have had a great impact on the population size. Silting has been caused by a combination of forest clear-cuts, agricultural run-off, and mining operations[12].

The proposed project would not cross or release discharges into streams or disturb a stream. The project is over 1,500 feet from the southern bank of the Black Warrior River and would require temporary excavation of portions of the 3.5 acre project site; however, the proposed action includes the use of on- and near-site silt fences and screens placed to prevent sediment runoff into adjacent areas or into the existing drainage system. Re-vegetation and landscaping are proposed that would limit long-term sedimentation of soils on-site due to rain or watering.

Listed Bivalvia Class Species:

The USFWS has designated 26 river and stream segments (units) in the Mobile River Basin as critical habitat for these 11 mussel species. These units encompass a total of approximately 1,760 kilometers (km) (1,093 miles (mi)) of river and stream channels. Critical habitat includes portions of the Tombigbee River drainage in Mississippi and Alabama; portions of the Black Warrior River drainage in Alabama; portions of the Alabama River drainage in Alabama; portions of the Cahaba River drainage in Alabama; portions of the Tallapoosa River drainage in Alabama and Georgia; and portions of the Coosa River drainage in Alabama, Georgia, and Tennessee. For the proposed NOAA action at UA in Tuscaloosa County, the following listed species of bivalvia were considered in the assessment for the project to potentially have an effect upon them, as required under the Endangered Species Act. These species and their suitable or critical habitat are described and a discussion of potential direct or indirect impacts discussed to support a conclusion regarding effects. A majority of the species habitat descriptions are taken from the USFWS[13].

Southern clubshell (*Pleurobema decisum*): With the exception of the Tensas/Mobile River, the southern clubshell was formerly known from every major river system in the Mobile River Basin, including the Alabama, Tombigbee, Black Warrior, Cahaba, Tallapoosa, and Coosa Rivers and many of their tributaries in Mississippi, Alabama, Georgia, and Tennessee. This species has disappeared from the Cahaba River drainage, the main channels of the Tombigbee and Black Warrior Rivers, and from a number of tributaries in all of the drainages.

[12] Online at http://www.answers.com/topic/flattened-musk-turtle, accessed March 2011.

[13] Online at http://www.fws.gov/southeast/hotissues/mussels/proposed_rule.html, accessed March 2011.

Dark pigtoe (*Pleurobema furvum*): Synonymous with *Pleurobema rubellum* (**Warrior Pigtoe**), this species is listed as likely extinct in *Alabama Wildlife*; however, it is a P1/Highest Conservation Concern[14].

Ovate clubshell (*Pleurobema perovatum*): The ovate clubshell was historically distributed in the Tombigbee, Black Warrior, Alabama, Cahaba, and Coosa Rivers and their tributaries in Mississippi, Alabama, Georgia, and Tennessee; and in Chewacla, Uphapee and Opintlocco Creeks in the Tallapoosa River drainage, Alabama. It has disappeared from the Black Warrior, Cahaba, and Alabama River drainages, as well as the mainstem Tombigbee River and Uphapee and Opintlocco Creeks.

Alabama moccasinshell mussel (*Medionidus acutissimus)*: Sand/gravel/cobble shoals with moderate to strong currents in small creeks and rivers. Major causes of decline to mussel species is attributed to destruction of habitat (deforestation, riparian zone destruction) by siltation, dredging, channelization, impoundments, and pollution. Causes of decline in some species may be due to loss of host fish needed to complete their metamorphosis. Zebra mussels have also been a serious impact on indigenous mussel species in some areas[15].

Inflated heelspliter (*Potamilus inflatus)*: The preferred habitat of this endangered species is soft, stable substrate in slow to moderate currents. It has been found in sand, mud, silt, and sandy-gravel, but not in large gravel or armored gravel. It is usually collected on the protected side of bars and may occur in depths over 20 ft (6 m). The occurrence of this species in silt may not indicate that the life cycle can be successful in that substrate. Adult mussels may survive limited amounts of time in silt where juveniles would suffocate. The occurrence of this species in silt may be because it was established prior to deposition of the silt. The species is currently known from only the Amite, Tombigbee, and Black Warrior Rivers. Other historic habitat has been affected by channel modification for navigation and flood control, impoundment (the collection and confining of water, as in a reservoir), pollution, and gravel dredging. Impoundments for navigation and sedimentation from surface mining have affected the Black Warrior River[16].

Fine-lined pocketbook (*Lampsilis altilis*): The fine-lined pocketbook was historically reported from the Tombigbee, Black Warrior, Cahaba, Alabama, Tallapoosa, and Coosa Rivers and many of their tributaries in Alabama, Georgia, Mississippi, and Tennessee. The species has apparently

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[14] Online at http://www.conservation.alabama.gov/research-mgmt/cwcs/Appendix1-2.pdf, accessed March 2011.

[15]Online at http://el.erdc.usace.army.mil/tessp/profile.cfm?Type=Freshwater%20Mussels&Name=Alabama%20Moccasinshell&View=Species, accessed March 2011.

[16] Online at http://www.answers.com/topic/alabama-heelsplitter-endangered-species, accessed March 2011.

disappeared from the Tombigbee and Alabama River drainages, and possibly from the Black Warrior River drainage. Since publication of its listing, the fine-lined pocketbook mussel continues to survive in numerous counties in Alabama and other states; however, critical habitat in Tuscaloosa County is not sited in the USFWS Proposed Designation prepared in 2003[17].

Orange-nacre mucket (*Lampsilis perovalis*): The orange-nacre mucket was historically known from the Alabama, Tombigbee, Black Warrior, and Cahaba Rivers and their tributaries in Alabama and Mississippi. The species has disappeared from the mainstem Tombigbee, Black Warrior, and Alabama Rivers, but continues to survive in Tombigbee tributaries, including the Buttahatchee River (Lowndes/Monroe County, Mississippi; Lamar County, Alabama), and East Fork Tombigbee River (Itawamba/Monroe County, Mississippi), Luxapalila Creek and tributaries Yellow Creek (Monroe County, Mississippi; Lamar County, Alabama) and Cut Bank Creek (Lamar County, Alabama), Sipsey River (Greene/Pickens/Tuscaloosa County, Alabama),

The disappearance of these bivalvia (mussel) species from significant portions of their ranges is primarily due to changes in river and stream channels caused by dams, dredging, or mining, and historic or episodic pollution events. None of the species are known to survive in impounded waters. Riverine mussels are killed during construction of dams, they may be suffocated by sediments that accumulate behind the dams; and the reduced water flow behind dams limits food and oxygen available to mussels. Other forms of habitat modification — such as channelization, channel clearing and de-snagging (woody debris removal), and gold and gravel mining — caused stream bed scour and erosion, increased turbidity, reduction of groundwater levels, and sedimentation, often resulting in severe local impacts to, and even extirpation of, mussel species.

Water pollution from coal mines, carpet mills, fabric dying mills, large industrial plants, inadequately treated sewage, and land surface runoff also contributed to the demise of the species in certain portions of their historic ranges. Freshwater mussels, especially in their early life stages, are extremely sensitive to many pollutants (e.g., chlorine, ammonia, heavy metals, high concentrations of nutrients) commonly found in municipal and industrial wastewater effluents. Stream discharges from these sources may result in decreased dissolved oxygen concentration, increased acidity and conductivity, and other changes in water chemistry, which may impact mussels or their host fish.

A number of the Mobil River Basin's imperiled mussel populations have become restricted to small tributaries or river segments and many eventually disappeared because of individual or cumulative impacts of land uses such as urbanization, industrialization, mining, and certain agricultural activities and practices that resulted in sedimentation, eutrophication. Human

[17] Online at http://www.fws.gov/southeast/hotissues/mussels/proposed_rule.html, accessed March 2011.

populations and associated needs for housing, commerce, recreation, water, electricity, forest and agricultural products, waste disposal, and mineral exploitation continue to increase in the Basin.

The Black Warrior River and its tributaries historically supported populations of the orange-nacre mucket, Alabama moccasinshell, Coosa moccasinshell, southern clubshell, ovate clubshell, dark pigtoe, triangular kidneyshell, and upland combshell. There are also records of the fine-lined pocketbook from the drainage. Dam construction for navigation and hydropower and episodic water pollution resulted in the extirpation of the Coosa moccasinshell, southern clubshell, ovate clubshell, and upland combshell from this drainage. Three tributary drainages continue to support two or more endangered and threatened mussels. Dams and impounded waters currently isolate these drainages from each other.

Federal actions that, when carried out, funded or authorized by a Federal agency, may destroy or adversely modify critical habitat for these protected mussels include, but are not limited to:

1) Actions that would alter the minimum flow or the existing flow regime to a degree that appreciably reduces the value of the critical habitat for both the long-term survival and recovery of the species. Such activities could include, but are not limited to, impoundment, channelization, water diversion, and hydropower generation.

2) Actions that would significantly alter water chemistry or temperature to a degree that appreciably reduces the value of the critical habitat for both the long-term survival and recovery of the species. Such activities could include, but are not limited to, release of chemicals, biological pollutants, or heated effluents into the surface water or connected groundwater at a point source or by dispersed release (non-point).

3) Actions that would significantly increase sediment deposition within the stream channel to a degree that appreciably reduces the value of the critical habitat for both the long-term survival and recovery of the species. Such activities could include, but are not limited to, excessive sedimentation from livestock grazing, road construction, timber harvest, off-road vehicle use, and other watershed and floodplain disturbances.

4) Actions that would significantly increase the filamentous algal community within the stream channel to a degree that appreciably reduces the value of the critical habitat for both the longterm survival and recovery of the species. Such activities could include, but are not limited to, release of nutrients into the surface water or connected groundwater at a point source or by dispersed release (non-point).

5) Actions that would significantly alter channel morphology or geometry to a degree that appreciably reduces the value of the critical habitat for both the long-term survival and

recovery of the species. Such activities could include, but are not limited to~~,~~ channelization, impoundment, road and bridge construction, mining, destruction of riparian vegetation.

6) Actions that would introduce, spread, or augment nonnative aquatic species into critical habitat to a degree that appreciably reduces the value of the critical habitat for both the long-term survival and recovery of the species. Such activities could include, but are not limited to, stocking for sport, biological control, or other purposes; aquaculture; and construction and operation of canals.

The proposed action involves a preferred alternative to replace an existing structure at the UA campus to build a proposed NOAA National Water Center on a similar footprint. None of the actions that would affect bivalvia species, as described above, apply to the proposed NOAA action.

Reasonable and prudent measures presented in previous USFWS biological opinions for these mussels have included maintaining State water quality standards, maintaining adequate stream flow rates, minimizing work in the wetted channel, restricting riparian clearing, monitoring channel morphology and mussel populations, installing signage, protecting buffer zones, avoiding pollution, using cooperative planning efforts, minimizing ground disturbance, using sediment barriers, relocating recreational trails, using best management practices to minimize erosion, and funding research useful for mussel conservation[18].

The proposed project will adhere to state and federal water quality standards and not impede or add measureable amounts of pollution to the nearest water body, the Black Warrior River, located over 1,500 feet to the north of the 3.5 acre project site. The project, as proposed, includes a goal of minimizing ground disturbance, using silt barriers, and applying best management practices to minimize erosion. No additional conservation measures are warranted beyond those identified as part of the proposed NOAA action.

Effects to Raptors and Migratory Birds

Due to the urbanized conditions and lack of critical habitat at and near the Preferred Site Alternative, no direct or cumulative impacts to habitat are anticipated. The project would not displace habitat suitable to support protected species and does not involve tall structures with hard-to-see elements or lighting that may attract or present a hazard to raptors or migratory birds. No nesting habitat would be disturbed or removed during construction; therefore, no short-term or long-term impacts to migratory birds would occur.

[18] Online at http://www.fws.gov/southeast/hotissues/mussels/proposed_rule.html, accessed March 2011.

Conclusions

As discussed above, the proposed action at the preferred site will not impact federally listed species, raptors or migratory birds, protected under state or federal laws or statutes. As such, a "no effect" determination under the federal Endangered Species Act is appropriate for the proposed action at the preferred site. No impacts under the Migratory Bird Treaty Act or the Bald and Golden Eagle Protection.

Appendix B-4: FEMA Flood Insurance Rate Map #01125C0508F

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' NAVD 88. Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Universal Transverse Mercator (UTM) Zone 16. **Horizontal datum** was NAD 83, GRS80 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov/.

Base map information shown on this FIRM was derived from multiple sources. Base map files were provided in digital format by the City of Tuscaloosa and Tuscaloosa County. This information was photogrammetrically compiled from aerial photographs taken March 2002.

Based on updated topographic information, this map reflects more detailed and up-to-date **stream channel configurations and floodplain delineations** than those shown on the previous FIRM for this jurisdiction. As a result, the Flood Profiles and Floodway Data tables may reflect stream channel distances that differ from what is shown on the map. Also, the road to floodplain relationships for unrevised streams may differ from what is shown on previous maps.

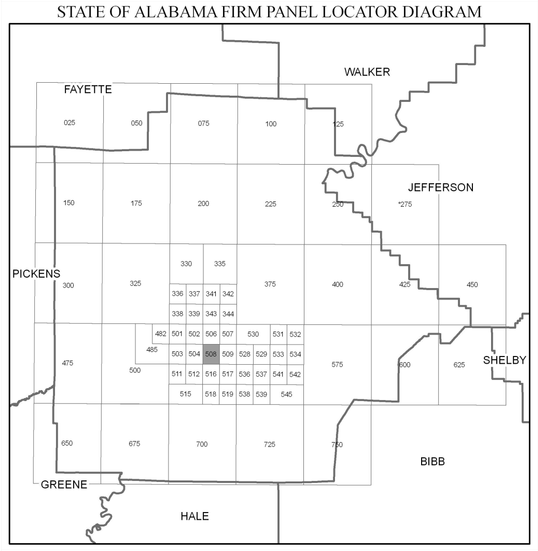
Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and /or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

STATE OF ALABAMA FIRM PANEL LOCATOR DIAGRAM



In cooperation with the Federal Emergency Management Agency (FEMA) and local communities in Alabama, this Flood Insurance Rate Map was developed by the Alabama Office of Water Resources in a digital statewide format to assist communities in their efforts to minimize the loss of property and life through effectively managing development in flood-prone areas. The State of Alabama has implemented a long term approach to floodplain management to reduce the impacts of flooding. This is demonstrated by the State's commitment to map floodplain areas at the local level. As part of this effort, the Alabama Office of Water Resources is working closely with FEMA as a Cooperating Technical Partner to produce and maintain this digital FIRM.

LEGEND

SPECIAL FLOOD HAZARD AREAS (SFHAs) SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard

Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAS)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

1% annual chance floodplain boundary

0.2% annual chance floodplain boundary

Floodway boundary

Zone D boundary

CBRS and OPA boundary

Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.

513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 - - - 23	Transect line
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
$^{42}76^{000m}$E	1000-meter Universal Transverse Mercator grid values, zone 16
600000 FT	5000-foot grid ticks: Alabama State Plane coordinate system, west zone (FIPSZONE 0102), Lambert Conformal Conic projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
● M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP

SEPTEMBER 28, 2007

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'

250 0 500 1000 FEET

150 0 150 300 METERS

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0508F

FIRM
FLOOD INSURANCE RATE MAP

TUSCALOOSA COUNTY, ALABAMA
AND INCORPORATED AREAS

PANEL 508 OF 750
(SEE LOCATOR DIAGRAM OR MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
TUSCALOOSA, CITY OF	010203	0508	F

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

EFFECTIVE DATE **MAP NUMBER**
SEPTEMBER 28, 2007 **01125C0508F**

State of Alabama
Federal Emergency Management Agency

Appendix C: Public Comments and Agency Correspondence

URS

May 3, 2011

Elizabeth Ann Brown
Deputy State Historic Preservation Officer
c/o Greg Rhinehart
State of Alabama
Alabama Historical Commission
468 South Perry Street
Montgomery, AL 36130-0900

Re: AHC 11-0156
NOAA IWRSS National Water Center
University of Alabama
Tuscaloosa, Tuscaloosa County, Alabama

Dear Ms. Brown:

This letter is prepared in response to Alabama Historical Commission (AHC) review and comment regarding Section 106, National Historic Preservation Act (NHPA), compliance documentation submitted by URS Group (URS). The documentation was submitted in support of the proposed National Oceanic and Atmospheric Administration (NOAA) National Weather Service (NWS) Integrated Water Resources Science and Services (IWRSS) National Water Center proposed on the campus of the University of Alabama (UA), in Tuscaloosa (AHC 11-0156). As part of the proposed undertaking, the UA Environmental Health and Safety (EHS) building would be demolished and replaced with the NWS National Water Center. The January 25, 2011, letter received from the AHC requested further information regarding the ca. 1946 EHS building for eligibility to the National Register of Historic Places (NRHP) due to its association with Bryce Hospital. Further clarification of information sought by the AHC was discussed during a conference call with Mr. Greg Rhinehart of the AHC on March 3, 2011. The following letter includes the requested information prepared in response to the AHC letter and our discussion with Mr. Rhinehart. A copy of the original AHC letter is included as an attachment (Attachment A). This information was prepared by URS Group, the designated representative of NOAA for AHC coordination regarding this federal project.

AHC Comment: *If any project activities take place on previously undisturbed land, we will request that a professional archaeologist conduct a cultural resource assessment for the area of impact*

On March 3, 2011, Mr. Mark George, NOAA Environmental Engineer, Mr. John Chamberlain, URS Project Manager, and Mr. Jeremy Hollins, URS Senior Architectural Historian, participated in a teleconference with Mr. Greg Rhinehart of the AHC, regarding the comments included in the January 25, 2011, AHC Letter. During the call, Mr. Rhinehart noted the above-comment was included in most AHC project reviews, and that an archaeological assessment of the area's previously undisturbed land may not be necessary, since the project is anticipated to remain within the existing prism of disturbance. However, the design and engineering of the new facility has not been completed yet (only schematic plans have been prepared), and in the event that the project would impact previously undisturbed lands, an archaeological assessment will be prepared prior to construction activities.

URS Corporation
100 W San Fernando Street,
Suite 200
San Jose, CA
Tel: (408) 297-9585

AHC Comment: *The [EHS] building may be eligible for the National Register of Historic Places because of its association with Bryce Hospital*

The following discusses the previous and current NRHP-eligibility recommendations of the EHS building as a contributor to a historic district and as an individual resource.

Previous NRHP-Eligibility Determinations for the Bryce Hospital Complex Historic District

The EHS building is located on the western portion of the former Bryce Hospital Complex, which originally encompassed approximately 200 acres. In 1997, portions of Bryce Hospital were surveyed for archaeological and historic architecture resources, prior to the University of Alabama's acquisition of 38 acres of the former Bryce Hospital Complex (Ford 1997; Rooney 1997). The result of these surveys was the identification of Site 1Tu808, the Bryce Hospital Complex Historic District, which was recommended as an NRHP-eligible geographic historic district, comprised of one NRHP-listed building (the Bryce Hospital main building [see discussion below]), six additional contributing resources (primarily buildings and archaeological resources), the landscaped institution grounds, and a cemetery. There were also numerous non-contributing resources, including several historic-period and non-historic period buildings, as well as non-contributing archaeological sites. The boundaries of the Bryce Hospital Complex Historic District were identified as the Black Warrior River to the north, Campus drive to the south, with an access road running from Campus Drive to the river to the east, and the UA campus to the west. The boundaries were based on the former hospital complex's boundaries. Attachment B contains a figure depicting the boundaries of Site 1Tu808.

As noted above, within Site 1Tu808, the Bryce Hospital main building is also individually listed on the NRHP for its contribution to the history of psychiatry (Criterion A) and for its architectural value as an example of asylum architecture (Criterion C). The main building of Bryce Hospital was constructed according to the Kirkbride Plan, which utilized architecture and landscape in the treatment of mental illness. Bryce Hospital was the first hospital to incorporate the Kirkbride Plan and was recognized as one of the best surviving examples. The building was placed on the NRHP on 1977 and has been assigned NR77000216.

Previous NRHP-Eligibility Determination for the EHS Building

The EHS building was evaluated for significance in 1997 by Carey B. Oakley as part of the above-mentioned historic architecture survey for the University of Alabama. At the time, the EHS building was found to be a contributing resource to the Bryce Hospital Complex Historic District for its contribution history of psychiatry (Criterion A) and for its architectural value as an example of asylum architecture (Criterion C). The building was constructed ca. 1946 and was originally Male Tuberculosis Ward-18W. Later, the building served as a schoolhouse for adult and adolescent patients. The EHS building was originally part of a 1940s building campaign that saw new construction and additions to existing buildings at the hospital campus. Of note, as a result of this investigation, the EHS building was not recommended as being individually eligible for listing to the NRHP. Attachment B depicts the location of the EHS building, and Attachment C contains present-day photographs of the property.

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April 2011 NRHP-Eligibility Determination for the EHS Building

An updated survey of the EHS building was performed by Mr. Kendall Rich, Professional Geologist and Archaeological Field Technician, on April 19, 2011, under the direction of Mr. Hollins, who meets the Secretary of Interior's Professional Qualification Standards in History and Architectural History. The survey found that the exterior and interior of the building have been significantly altered to accommodate the University's use of the building through the removal of historic-period fabric and materials, and the addition of non-historic period features. Overall, these changes have affected the historic context, visual feel, and character-defining features of the EHS building. Consequently, it no longer retains its essential physical features, conveys its significance, or resembles an example of 1940s asylum architecture. A summary of the major alterations are listed below:

- Windows throughout the building have been filled in and/or modified to accommodate equipment (Photos 4 and 5 of Attachment C, Site Photos).
- Original doors (appears to be single panel with transom) have been replaced with non-historic industrial metal doors with metal frames. Some doors have awnings installed above (Photos 6 and 7 of Attachment C, Site Photos).
- The front exterior door on the primary façade (west) has been replaced with a metal gate (Photo 8 of Attachment C, Site Photos).
- The porch on the northern end of the east elevation (rear) has been enclosed on one end and has equipment contained within a metal cage on the other end. The original porch supports have been replaced with metal supports (Photo 9 of Attachment C, Site Photos).
- The porch on the southern end of the east elevation (rear) has been enclosed to accommodate a computer lab. Original exterior windows within the computer lab have been filled in (Photos 10 and 11 of Attachment C, Site Photos).
- A non-historic period metal industrial door and awning has replaced what appears to have been a picture window on the central projection on the east elevation (rear). A second window appears to have been filled in (Photos 12 of Attachment C, Site Photos).
- Acoustic tile drop ceilings and fluorescent lights have been installed in the interior of the building (Photos 13 and 14 of Attachment C, Site Photos).
- Original flooring and baseboards have been replaced with non-historic period materials (Photo 15 of Attachment C, Site Photos).
- Non-historic period kitchen has been installed (Photo 16 of Attachment C, Site Photos).
- Equipment has been installed in various areas of the building to accommodate present use (Photo 17 of Attachment C, Site Photos).

These changes to both the exterior and interior of the EHS building have affected its ability to convey a specific time, theme, or place. In its current appearance and form, the EHS building no longer reflects a historic trend (history of psychiatry) under Criterion A or a specific architectural sub-type (asylum architecture) under Criterion C. Though the building was previously recognized as a contributing resource to the historic district, the alterations to the building during the past 14 years have diminished its ability to convey a significant linkage to the other contributing resources united historically and aesthetically by the Kirkbride Plan or the 1940s development within the district.

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Further, the EHS building has experienced several losses to its aspects of historic integrity, which would affect the building's ability to convey its significance. Of seven aspects of historic integrity, the EHS building only retains one element – location. The historic integrity aspects of the EHS building based on the April 2011 survey are:

Location – The building remains in its original location.

Design – The building has been substantially altered to accommodate present use. Significant spaces have been rearranged or removed, and major elements, such as patterns of fenestration and porch arrangements, have been disrupted, enclosed, or removed. The present-day design of the building does not match how it looked in the 1940s.

Setting – The setting of the building has been disrupted by the introduction of power lines, cooling towers, realignment of Hackberry Lane, surface parking lots, chain link fencing, and other non-historic period visual intrusions. There has been a considerable amount of in-fill construction shoehorned into the existing historic district, as well as changes that have occurred just outside the district, which has affected the district's continuity (see Photos 18, 19, and 20 of Attachment C, Site Photos).

Materials – Although historic materials are still present in the building, a significant amount of new materials have been added, including non-historic period metal industrial doors, equipment, flooring, baseboards, and acoustic tile ceilings. Important historic finishes and materials have been removed.

Workmanship – The building does not possess any evidence of an artisan's labor or skill – it is typical of other buildings constructed during this period and would not be considered an exceptional or distinctive example of workmanship.

Feeling – The building has been significantly altered to accommodate the present use and does not convey the aesthetic or historic sense of the historic district. Changes to both interior and exterior spaces have affected the building's ability to express a particular period of time.

Association – The building has been significantly altered and does not retain its association to Bryce Hospital Complex. Presently, the building would appear to be associated with the University of Alabama and not neccearily part of a large intact hospital complex.

In summary, based on its current appearance and form, the EHS building does not appear to be individually NRHP-eligible and would no longer be considered a contributing resource to the Bryce Hospital Historic District.

National Register Bulletin 15 How to Apply the National Register Criteria for Evaluation recognizes that a historic district can contain properties that lack individual distinction as well as non-contributing properties without affecting the district's ability to convey its sense of time and place, and historical development. Overall, the EHS building is not considered a key Bryce Hospital building, was not part of the original Kirkbride Plan, and does not retain its feeling and association with the larger district. The demolition of the EHS building for the National Water Center is unlikely to affect the significance of the potential historic district. The boundaries of the district contain many non-contributing properties such as existing buildings, parking lots, water cooling towers,

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power lines, and storage units. Thus, the project is unlikely to adversely affect the historic character and significance of the potential Bryce Hospital Complex Historic District, or any individual buildings.

AHC Comment: *We request plans and specifications for the proposed building.*

During the March 3, 2011 teleconference, Mr. Chamberlain noted to Mr. Rhinehart the design and engineering of the new National Water Center facility has not been completed yet, and only a schematic plan has been prepared. The schematic plan is included as Attachment D. Overall, the propose design of the National Water Center is not expected to cause a visual or atmospheric intrusion to any of the contributing features within the Bryce Hospital Complex Historic District. The design of the new building would match the visual narrative and context of the area's historic-period features, and would not diminish their significance or create a false sense of history. The design of the new building is expected to be consistent to the *Secretary of Interior's Standards for Rehabilitation*, particularly the guidelines for district settings, retaining the characteristics which define the district, and would have a similar massing, size, and scale to other properties nearby.

We seek your written concurrence with this evaluation, or other AHC opinion, leading to conclusion of the consultation process under Section 106 of the NHPA. Should you have additional questions, please contact Mr. Chamberlain by telephone at (408) 961-8441, or email at John_Chamberlain@urscorp.com. Thank you.

Sincerely,

John Chamberlain
URS Project Manager

Jeremy Hollins
URS Senior Architectural Historian

Attachment A: State of Alabama, Alabama Historic Commission letter dated January 25, 2011
Attachment B: Project Maps
Attachment C: Site Photos
Attachment D: Schematic Plans

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July 1, 2011

Mr. John Chamberlain
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Re: AHC 11-0156
National Oceanic and Atmospheric Administration (NOAA) National Water Center
University of Alabama
Tuscaloosa County, Alabama

Dear Mr. Chamberlain:

Thank you very much for the opportunity to review the additional information you have submitted about the old Men's Tuberculosis Building at the former Bryce Hospital. After a thorough review by this office, we find the building is eligible for the National Register of Historic Places (NRHP) as part of a Bryce Hospital District. Although you do point out ways in which the integrity of the building has suffered, it still has sufficient integrity of location, design setting, materials, workmanship, feeling, and association to remain eligible for the NRHP.

We believe demolition of the EHS building will be an adverse effect. As we have basic information on this building and we feel measured drawings and extensive photography would not be as beneficial, we believe that mitigation of the adverse effect should address something that we have determined would be more useful and productive. Therefore, our mitigation request is as follows:

An accurate and to-scale map on acid-free archival bond paper shall be created for the entire Bryce NRHP district as depicted in AHC Site 1TU808 and shall include:

1. Locations of approximately 20 remaining buildings within the district and associated with Bryce Hospital. A recent aerial photograph will be used as a base map for spatial accuracy and location relative to existing features.
2. The map should indicate the date or era of construction, i.e. the original hospital in the 1850s through the final construction period of the 1940s – 1950s. It is understood that the precise date of construction for smaller structures at Bryce Hospital are not well documented and may not be readily available for inclusion in this effort.
3. One archival quality black and white photograph of each remaining buildings' front elevation shall be taken and keyed to the map. When possible, multiple buildings may be captured on the same photograph to assist depiction of the historic district's spatial relationships, historic context, and visual narrative.
4. One archival quality photograph of the front elevation of the Men's Tuberculosis Building along with two (2) archival quality photographs representing the interior of the Men's Tuberculosis Building.

5. Photographs will be large-format, 8" x 10", and will be accompanied by contact-style prints produced from scanned TIFF (Tagged Image File Format) of the negatives. Copies of the negatives will not be required.

This documentation should be overseen by someone who has experience in completing Historic American Building Survey documentation, and with a good track record for having that documentation accepted. Up to three (3) printed copies (one unbound) of the map and photographs, as described above, will be provided on 8 1/2 x 11 inch pages and delivered to the AHC. It is our opinion that this level of recording will mitigate the adverse effect of the demolition of this NRHP eligible structure.

Regarding other cultural resource issues at the site, as the area has been previously disturbed there should be no effect to archaeological resources listed on or eligible for the NRHP. We concur with the design and setting of the new building. Following the mitigation measures described, the project will have no adverse effect on the Bryce Hospital NRHP district.

We appreciate your continued efforts on this project and we look forward to working with you to its conclusion. Should you have any questions, please contact Greg Rhinehart at (334) 230-2662. Please have the AHC tracking number referenced above available and include it with any correspondence.

Truly yours,

Elizabeth Ann Brown
Deputy State Historic Preservation Officer

EAB/RG/GCR/gcr

cc: Mr. Mark George, NOAA Safety and Environmental Compliance Office
NOAA DSRC Routing: MC43
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Boulder, CO 80305