ENVIRONMENTAL ASSESSMENT

of Modifications to the

RAW WATER STORAGE IMPOUNDMENT

APPENDIX D: WILDLIFE HAZARD MANAGEMENT PLAN

SAVANNAH HARBOR EXPANSION PROJECT

Chatham County, Georgia and Jasper County, South Carolina

July 2013

US Army Corps of Engineers
Savannah District
South Atlantic Division

Wildlife Hazard Management Plan
for the
Raw Water Storage Impoundment
as part of the
Savannah Harbor Expansion Project

Introduction:

This document was prepared in response to consultation with the Federal Aviation Administration (FAA), the US Department of Agriculture (USDA), and the Savannah Hilton Head International Airport on the potential for wildlife and aviation interactions at an impoundment to be constructed as part of the Savannah Harbor Expansion Project (SHEP).

Previous environmental studies concluded that the SHEP would increase chloride concentrations in Abercorn Creek and a RWSI was included in SHEP to mitigate for those effects. The structure would store low chloride raw water for use when higher chloride levels occurred at the City of Savannah's water intake in Abercorn Creek. Construction of the impoundment was approved during public and agency coordination of the SHEP Environmental Impact Statement (EIS).

After SHEP was approved, Savannah District began detailed engineering and environmental design studies as part of its preparation of contract drawings and specifications. As those studies progressed, it became apparent that alternate locations should be considered to minimize environmental effects and maximize the efficiency of the RWSI. The following table summarizes the changes that are proposed as a result of the detailed studies:

Changes in RWSI from 2012 SHEP EIS

Issue	SHEP EIS	RWSI EA
Project Purpose	Mitigate chloride impacts to City of Savannah Abercorn Creek water intake	Unchanged
Location	Parcel 3 of GPA's Savannah International Trade Park near Mulberry Grove	New location (Site 4)
Threatened & Endangered Species	No effect	Unchanged
Wetlands	Potential for impacts to small amount of wetlands	13.5 acres (2.1 acres under restrictive covenant)
Size	Approximately 35 acres	33 acres
Cultural Resources	No effect	Unchanged

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The primary changes to the approved design are its location and the extent of wetland impacts that would occur.

The RWSI is now proposed for construction at a site between the City of Savannah's raw water pumping station at Abercorn Creek and its Industrial and Domestic Water Treatment Plant in Port Wentworth, Georgia. The selected parcel of land (117 acres) is between the City's raw water pipeline and Interstate 95. The property would be acquired by the non-Federal sponsor (NFS) for SHEP and used to construct and operate an above-ground raw water storage impoundment on approximately 33 acres of the property. A 3,300-foot access road (1.7 acres) located on top of the existing raw water pipeline is included in the proposed action. Borrow material will be required for the construction of the earthen dikes around the impoundment and will be obtained from an off-site source.

The 33-acre RWSI facility includes an earthen dike surrounding the impoundment that is approximately 3,400 feet in total length, with a maximum height of 29 feet, requiring a total material volume of approximately 440,000 cubic yards. The impoundment would have a maximum storage capacity of 62.5 Million Gallons per Day (MGD). It includes the placement of a High Density Polyethylene (HDPE) liner; associated piping and valves; a mechanical mixing system; a 1 megawatt generator with fuel storage; a pump station and electrical building; a powdered activated carbon system with a silo and feed equipment; a groundwater well, a hydropneumatic tank, and fencing around the entire facility. Influent and effluent pipelines will be required between the impoundment and the existing City of Savannah water lines. The proposed action also includes upgrades to 19 existing pipeline air release valves and construction of 3 new valves (most from 6 to 8 or 10 inches) on the City of Savannah's existing raw water pipeline. Although USACE Civil Works activities are not governed by the USACE Section 404 regulatory permitting process, upgrades to existing valves (and new valves that may be required) that occur within wetlands would be installed following the conditions in the Nationwide Permit 12 (Utility Line Activities). After construction of the RWSI and associated features is completed, the facility would be turned over to the City of Savannah for operation and maintenance.

In accordance with the 2007 FAA advisory circular (AC) number 150/5200-33B and a 2003 Memorandum of Agreement (MOA) between Federal Resource Agencies (including USACE, consultation with the FAA on developments that may pose a potential for wildlife and aircraft interactions shall be conducted in an effort to minimize risk of wildlife aviation interactions and threats to human safety.

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Study Area:

The impoundment site is located northwest of and five miles from the Savannah Hilton Head International Airport. Figure 1 shows the general project location in relation to the airport. The site overlaps two adjacent properties: BLS Development Inc., and Georgia Department of Transportation (GA DOT). The City owns an existing 100-foot wide utility easement which they use for access along their pipeline. An overhead electrical power line owned by Georgia Power travels down the center of the easement. Two 48-inch raw water lines run parallel and east of the electrical line within the easement. A sewer force main easement owned by the City of Port Wentworth runs parallel to the east of the City of Savannah utility easement and contains two 12-inch PVC force mains that carry raw sewage from Rice Hope Plantation pump stations to the City of Port Wentworth Wastewater Treatment Plant. Figure 2 shows the impoundment site location.

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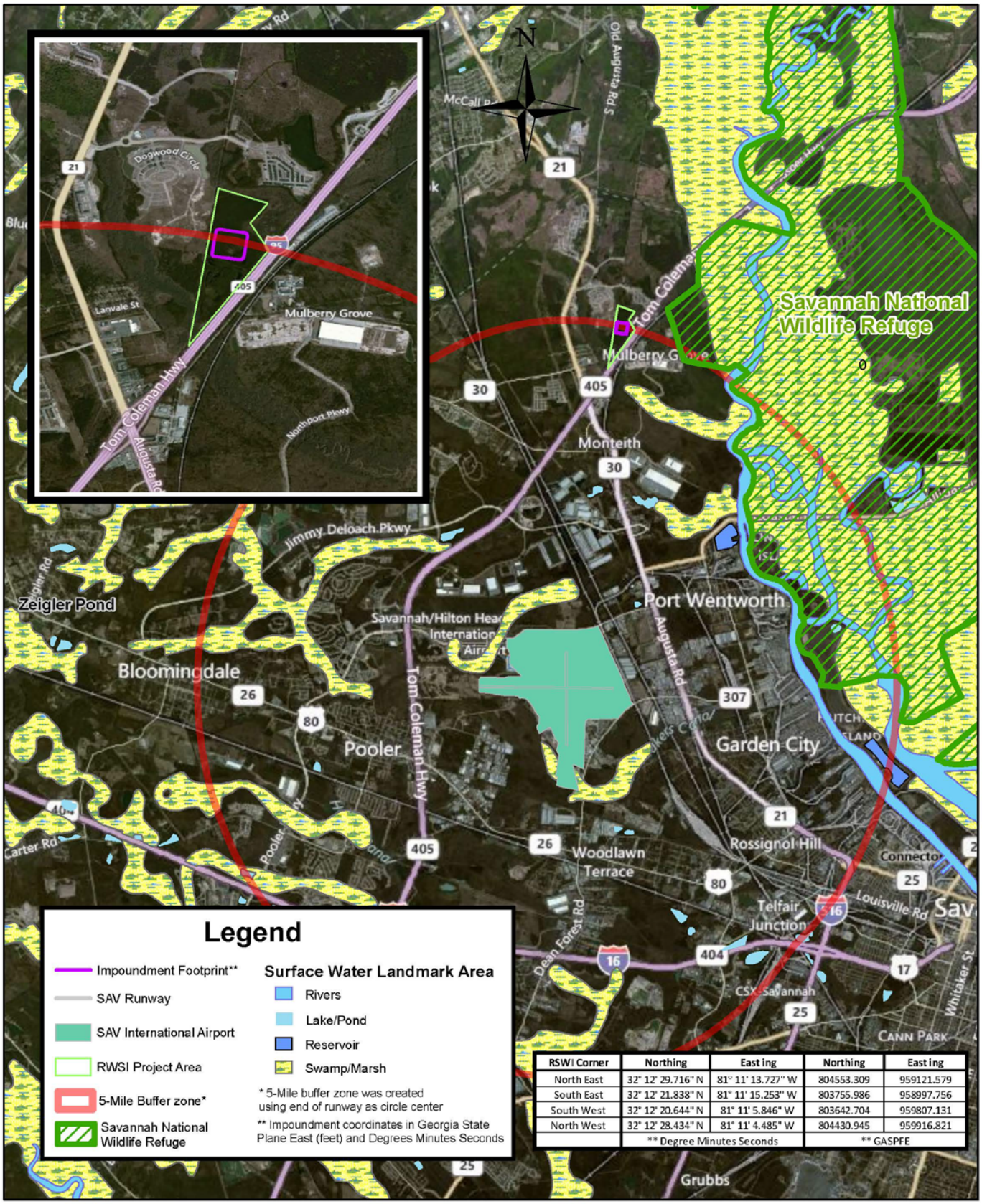

RSWI Corner	Northing	Easting	Northing	Easting
North East	32° 12' 29.716" N	81° 11' 13.727" W	804553.309	959121.579
South East	32° 12' 21.838" N	81° 11' 15.253" W	803755.986	958997.756
South West	32° 12' 20.644" N	81° 11' 5.846" W	803642.704	959807.131
North West	32° 12' 28.434" N	81° 11' 4.485" W	804430.945	959916.821
	** Degree Minutes Seconds		** GASPFE	

RWSI Airport Buffer Zone

3 1.5 0 3 Miles

Figure 1. Location of the impoundment in relation to the airport

Figure 2. Location of raw water storage impoundment (center coordinates approximately 32.205536 N & -81.186436 W)

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Issue of Concern:

The raw water impoundment would be located at the edge of FAA's 5-mile buffer zone for the Savannah Hilton Head International Airport. Using the closest end of runway 19, the 5-mile distance would cross the middle of the impoundment. The concern is that any structure located within the buffer zone would pose a potential safety risk to aircraft calling at the airport. In this case, the concern is that birds that may use the impoundment would interact with passing aircraft, thereby jeopardizing human safety. Since the impoundment would be located at the edge of the 5-mile buffer zone, the concern is for large birds that soar high above the impoundment could cross into an aircraft's flight path and place the plane at risk. According to FAA guidelines, aircraft approaching runway 19 should be 2,000 feet from the ground at a distance of 5.9 nautical miles from the end of the runway. At a 3 percent glide slope, aircraft should be 1,700 feet from the ground when they are 5 miles from the runway, the location of the impoundment. Therefore, normal bird transits -- which occur within 500 feet of the ground -- would not present a risk to aircraft that may pass overhead. Migrating birds fly at higher altitudes, but those flights occur across a wide general area and would not concentrate over this impoundment. The main concern would be from large birds that soar high above the ground and may enter an aircraft's flight path. Vultures sometimes soar at high altitudes. Pelicans are large birds found in the general area, but they are not found this far from the coast. Seagulls can frequent areas away from the coast when a specific site provides some desirable habitat quality.

Siting and Design Analysis:

Nine potential locations (shown in Figure 3) were evaluated for the impoundment. Aerial photos were examined to identify undeveloped land areas located between the City's raw water intake and their water treatment facility. After examining the aerials, USACE conducted site visits to ascertain if the sites appeared buildable and acceptable for further investigation. Each site was screened for practicability and reasonableness using the following criteria: topography, groundwater, subsurface soils, property impacts, size/shape, pump station location, raw water line and wetland impacts.

Site 1 was eliminated because it was from the raw water pipeline and the City's water plant, the additional costs required to run ½ mile pipeline to the existing raw water pipeline, and the expected high water table. Site 2 was eliminated from further consideration based on distance to the City's water plant and the expected high water table. Site 3 was eliminated because its distance from the raw water pipeline, the cost to run a pipeline nearly one mile and under a major highway, and the proximity to residential development. Site 5 was eliminated because it would require a pipeline to be installed under an active Class 3 railroad. Such a pipeline would present an unacceptable risk of a railway accident or pipeline rupture that would endanger human health and safety and critical infrastructure. Site 6 was eliminated because of its distance to the City's raw water pipeline and water treatment plant, and design constraints imposed by the small size of the site. Site 7 was eliminated because of its distance to the City's raw water pipeline and water treatment plant, access road issues, and design constraints imposed by the small size of the site. Site 8 was eliminated

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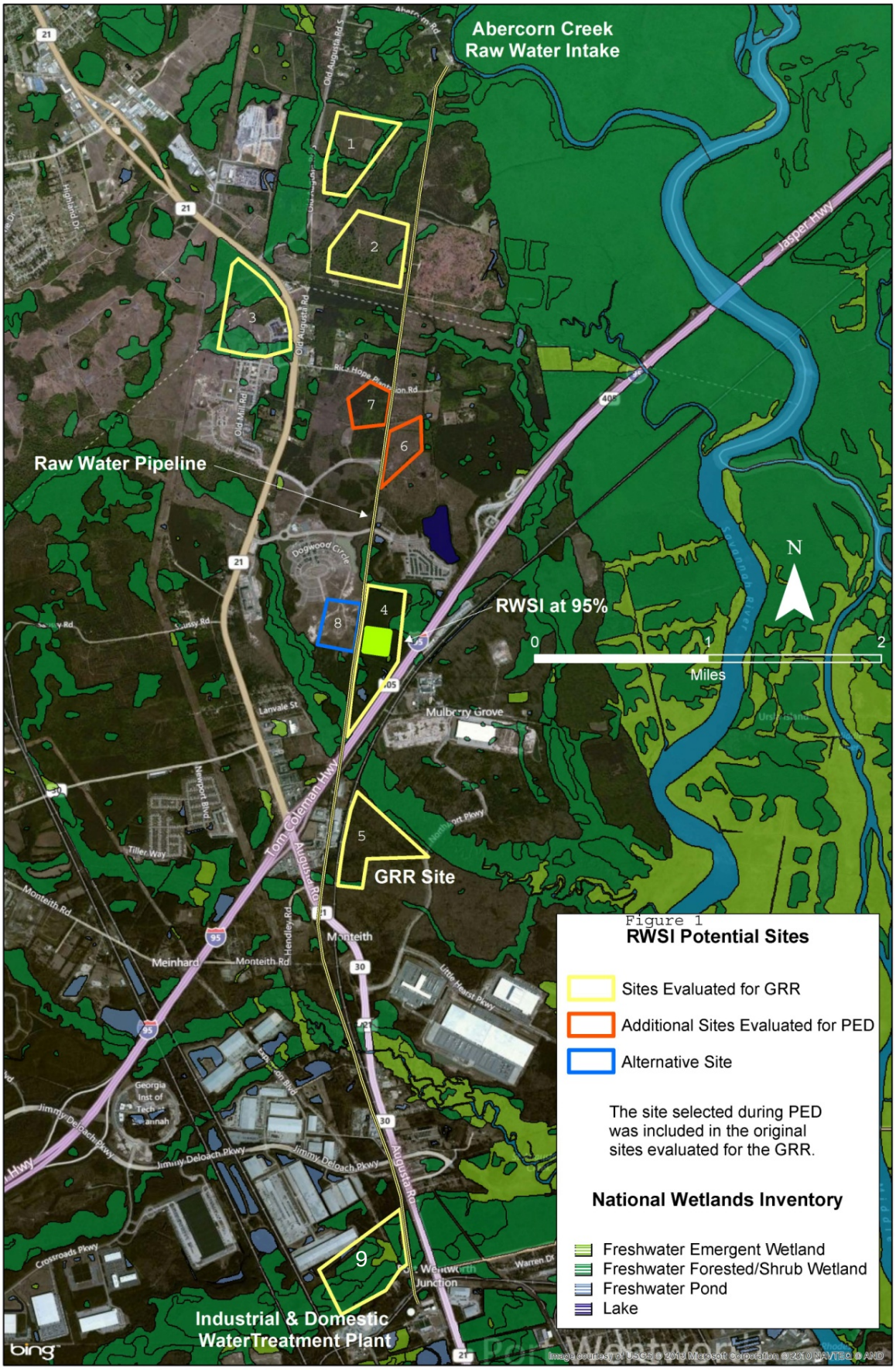

Figure 3. Location of Nine Potential Sites for the Raw Water Storage Impoundment

because of its potential for flood damage to adjacent residential dwellings if the impoundment fails, and increased noise and visibility impacts to a nearby residential area. Site 9 was eliminated because of a large amount of expected impacts to wetlands, the presence of a covenant that restricts development on the site, a high probability of impacting cultural resources, and potential risk to nearby infrastructure.

After completion of the alternatives analysis, USACE identified Site 4 as the most practicable site for construction of the impoundment. Compared to all the other sites considered, construction of the impoundment at Site 4 minimizes potential land use compatibility issues, minimizes risk to human health and safety, and optimizes the criteria of being adjacent to the existing raw water pipeline and relatively close to the City's municipal and industrial water treatment facility.

USACE then considered several alternative designs for siting the impoundment within the selected site's property boundaries. The selected layout best satisfies the design criteria while minimizing wetland impacts and costs. Elements of the engineering design included a dam failure analysis, reservoir circulation, pumping stations, powdered activated carbon (PAC) system, instrumentation and process control system, electrical, architectural, structural design, HVAC, plumbing and fire protection, scheduling, and construction costs. Extensive analysis was conducted on potential berm failure events. Potential hazards from flooding included raw water pipeline exposure, impacts to Interstate 95, and risks to neighboring communities.

Results of Design Analysis:

Based on the design analysis, the impoundment would be approximately 117 acres in size. The footprint would include 55 acres of isolated freshwater wetlands and 62 acres of uplands. The land has been used for slash pine harvesting in the past. The impoundment design includes a 40-acre holding area with a capacity of 77 million gallons of water, with a depth of 29 feet. The project would include a 3,150 meter-long corridor for access/construction. The impoundment crest elevation design is 47 feet. Figure 3 shows the typical cross-section schematic.

In accordance with the FAA AC which recommends coordination on projects that are located outside the 5,000/10,000-foot criteria but within 5 statute miles of the airport's air operations area (AOA), USACE personnel contacted the FAA to discuss the proximity of the impoundment to the airport. The FAA may review development plans, proposed land-use changes, operational changes, or wetland mitigation plans to determine if such changes present potential wildlife hazards to aircraft operations. A United States Department of Agriculture Animal and Plant Health Inspection Service Wildlife Specialist (USDA-APHIS-WS) biologist visited the site (18 Dec 12) along with USACE personnel to determine if the site was indeed within 5 miles of the airport and posed a potential for wildlife aircraft interactions.

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The site is within 5 miles of the AOA. Figure 1 shows the 5-mile radius crossing the middle of the impoundment. USACE held a teleconference discussion about this issue on 6 Feb 13 with USDA, FAA, GADOT, and CDMSMITH (under contract to USACE to design the structure). The FAA expressed concern that the impoundment may attract waterfowl (i.e., ducks and geese) within the AOA and subsequently requested that the USACE provide a list of wildlife deterrents currently provided within the 95% project design documents. In response to the request, CDMSMITH prepared a technical memorandum listing descriptions of wildlife deterrents. The wildlife deterrents incorporated into the raw water impoundment design specifications are listed below.

1. The inner slope of the impoundment embankment will be lined with an HDPE liner on a 3:1 (H:V) slope from the top elevation down to and including the reservoir floor. Since the slope will not be grassed, there will be no natural habitat for waterfowl to forage or nest adjacent to the water surface.

2. A guardrail will be installed along the top of the inner embankment slope. The guardrail may perform as a deterrent given its similar relationship to the string method that is often used around water surfaces to deter waterfowl. This method can be effective when birds feel a sense of confinement in the presence of danger when required to duck below an obstruction to reach water. This sense of confinement may lead some fowl to avoid the water body altogether.

3. The outside slope of the impoundment will be planted with Bermuda grass and maintained in a mowed condition. With the low lying grass and the 3:1 (H:V) slope, visiting waterfowl will not be inclined to nest and establish permanent residence.

4. Two floating reservoir circulators will be positioned in the middle of the storage impoundment to circulate water within the reservoir to prevent the formation of algae. The circulators pull water from the bottom of the reservoir and push the water outward toward the shore such that the upper water level is constantly moving. This upper level water movement may have the potential to detract waterfowl from gathering on the water surface.

5. During the normal Empty/Fill cycle of the impoundment, the water level will rise and fall approximately 5 feet possibly as often as 3 times per day during peak usage. The changing water levels would tend to make the impoundment less attractive to waterfowl as a permanent residence.

6. The influent pipeline discharges raw water from Abercorn Creek into the northeast corner of the impoundment. The pipe will discharge the water vertically towards the water surface generating a turbulent movement of water when the reservoir is low and a steady circulation of water when the reservoir is full. That corner of the reservoir would likely be less attractive to waterfowl due to the stronger inlet currents.

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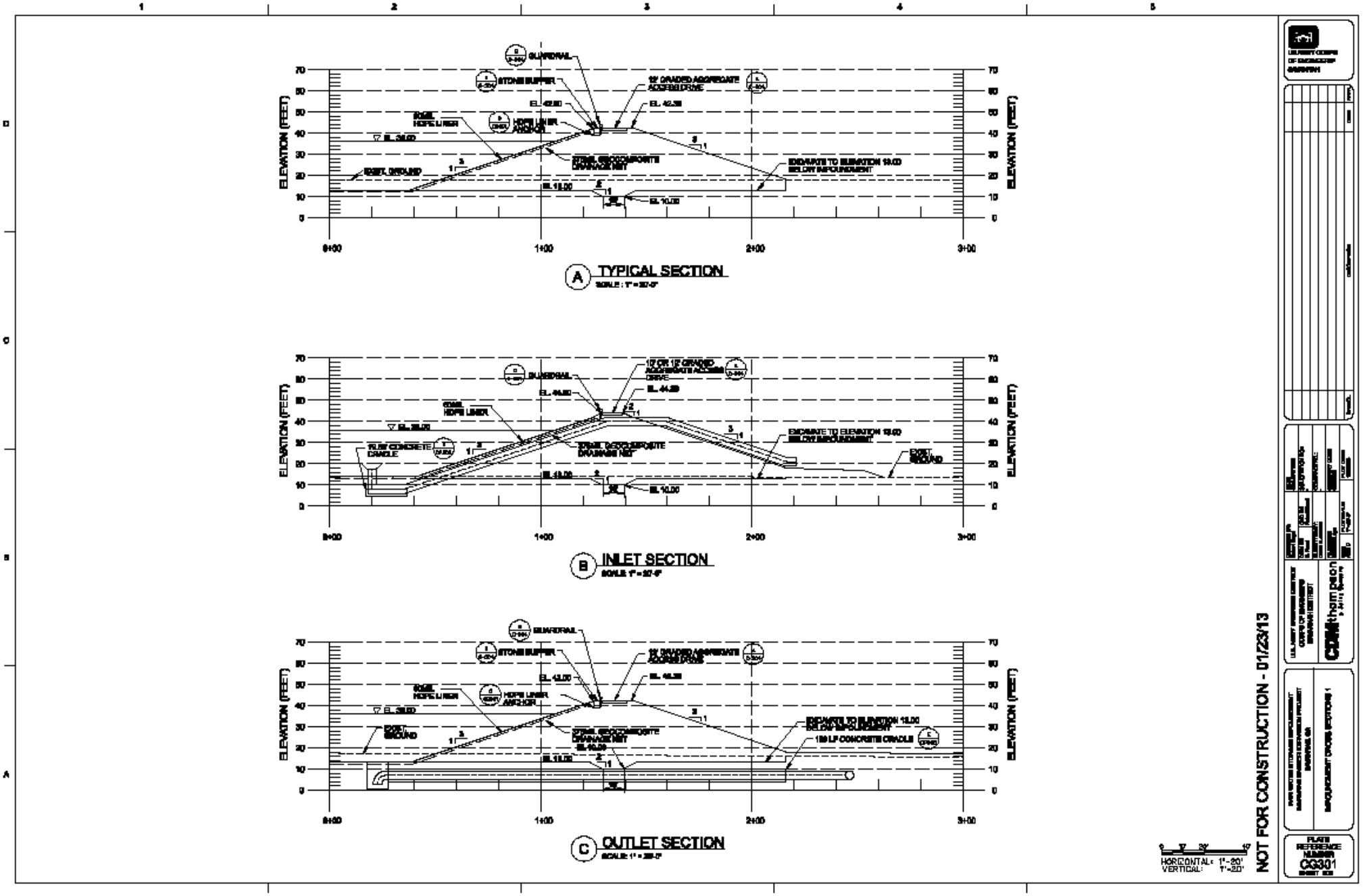

Figure 3. Typical cross-section for proposed raw water impoundment

7. All water from Abercorn Creek is pumped through a fine mesh screen prior to placing it into the pipeline to the water treatment plant. This screen prevents fish from Abercorn Creek from entering the piping system. When the impoundment is placed into the system, the screening means that fish would not be delivered to the impoundment, thus minimizing that as a food source for waterfowl.

8. Management Practices – The current design includes a security camera installed along the top of the impoundment that will allow the City of Savannah to monitor the impoundment for waterfowl use from a remote location.

Potential Additional Measures:

1. Monitoring of the impoundment after construction.
A variety of low-cost motion sensor cameras are available so that wildlife use of the site could be monitored remotely. These cameras could be used in addition to the security cameras to detect wildlife using the impoundment on a given day. Review of these recordings could allow one to document trends in wildlife use over time. However, since the cameras would likely be aimed at the surface of the impoundment, they would not provide information directly related to the issue at hand – potential interactions of wildlife with aircraft passing >1,500 feet overhead. Thus, they are likely to be ineffective in addressing the issue at hand.

Wildlife use of the impoundment could also be monitored in person. Such monitoring could identify the types and numbers of birds using the impoundment. When performed over a period of time, the information would allow one to document trends in wildlife use over time. The observers could also identify and document birds flying over the impoundment that had the potential for interacting with aircraft passing >1,500 feet overhead.

2. Development of an Emergency Response Plan. One could develop a plan of action that could be implemented in the event there is a potential hazard observed at the impoundment. This plan could include a list of contacts at the various organizations that have an interest in the issue of wildlife interactions at this site with aircraft.

3. Other wildlife deterrents. Acoustic and/or visual deterrents are available to discourage wildlife. Coordination with the US Fish and Wildlife Service may be necessary if a protected species is observed and a "take" permit may be required to allow interference. The Corps believes that it has incorporated reasonable wildlife deterrents into the present design.

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4. Continued coordination between FAA, USDA, City of Savannah, and Savannah Hilton Head International Airport. The present design and siting of the impoundment leads one to believe that the impoundment will not serve as a wildlife attractant. However, it is impossible to know the extent to which that evaluation is correct until the impoundment is constructed. The City of Savannah does not want the impoundment to serve as a wildlife attractant, since the structure is intended to supply drinking water and wildlife use would conflict with that basic purpose. USACE expects the City will be proactive in monitoring the site and effective in deterring substantial wildlife use of the structure. In the event the impoundment does attract substantial numbers of wildlife, a Wildlife Hazard Assessment should be considered.

Additional Measures That Will Be Taken:

1. Monitoring after construction. Since one cannot completely know the level of wildlife use of the impoundment until after it is constructed, USACE will monitor wildlife use in person after the impoundment is constructed and placed into service. USACE will monitor bird use of the site one day in each of the first four seasons. It will document the types and numbers of birds using the impoundment, as well as those flying overhead. At the conclusion of the monitoring, USACE will prepare a report that documents the findings and make a recommendation on the need for additional monitoring and the need for preparation of a Wildlife Hazard Assessment. The report will be provided to the City of Savannah, the FAA, and the Savannah Hilton Head International Airport.

2. Development of an Emergency Response Plan. USACE and the City will jointly develop a plan of action that the City of Savannah would implement in the event there is a potential wildlife hazard observed at the impoundment. This plan would include a rapid response contact list.

Conclusion:

USACE believes that construction of the impoundment will not increase the risk of wildlife hazards to aircraft calling at the Savannah Hilton Head International Airport. There are many extensive wetted areas in the local area that are intended to attract wildlife, specifically the Savannah National Wildlife Refuge complex. The design deterrents identified above, in combination with the small size of the impoundment in relation to much more attractive sites for birds in the local area, make the impoundment an unlikely choice for wildlife especially waterfowl and shorebirds. The Savannah Airport Commission also believes construction of the raw water impoundment will not pose a safety hazard (refer to letter dated 5 Feb 2013 from Greg Kelly, Assistant Executive Director to Ms. Dana Perkins, FAA Atlanta Airports District Office). To ensure the impoundment does not attract wildlife, specifically large birds, which may present a risk to aircraft passing nearby, USACE will monitor bird use of the impoundment each season during the first year after the structure is placed

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into operation. USACE will also work with the City of Savannah to prepare an Emergency Response Plan with a plan of action that the City would implement should a wildlife hazard be observed at the impoundment.

References:

95% Basis of Design Report Raw Water Storage Impoundment Design Savannah Harbor Expansion Project Savannah, Georgia. January 2013. CDMthompson.

FAA Wildlife Deterrents Technical Memorandum to USACE. February 2013. CDMSMITH.

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February 5, 2013

Ms. Dana Perkins
Atlanta Airports District Office
Federal Aviation Administration
1701 Columbia Avenue – Ste 2-260
College Park GA 30337-2747

Re: City of Savannah Raw Water Storage Savannah/Hilton Head International Airport

Dear Ms. Perkins:

Pursuant to our conversation of February 4, 2013, we want to reiterate that our letter to you dated January 14, 2013, was not intended to imply that we had any concerns or objections to the proposed Raw Water Site. It was merely intended to make the observation that its proposed location is in the vicinity of waypoint SUTME in response to questions posed.

We want to clarify that we do not have any objections or concerns about this project, and we agree with the Corp's assessment in that it does not pose an impact to safety at the Airport.

We are in support of this project as proposed as it will be of great benefit to the economy of our community and our region. Please let us know if you have any questions.

Sincerely,

Greg Kelly
Assistant Executive Director

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Technical Memorandum

To: *Ellie Covington, USACE – Savannah District*

From: *Daniel Johnson, P.E., CDM Smith*

Date: *February 20, 2013*

Subject: *Raw Water Storage Impoundment, Savannah, Georgia*
W91278-10-D-0026, Delivery Order No. CV01
FAA Wildlife Management

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Introduction & Purpose

The Federal Aviation Administration (FAA) has determined the location of the proposed Raw Water Storage Impoundment to be within the five mile air operations area (AOA) of the Savannah/Hilton Head International Airport. Due to an FAA concern that the proposed impoundment will attract waterfowl (i.e., ducks and geese) within the AOA, the FAA has requested that the U.S. Army Corps of Engineers provide a list of wildlife deterrents currently provided within the 95% project design documents. In response to the request, a description of wildlife deterrents is provided below.

Design Elements with the Potential to Deter Wildlife

The following design elements are currently incorporated into the 95% design documents for the Raw Water Storage Impoundment with the potential to deter wildlife within the water body.

- The inner slope of the impoundment embankment will be lined with an HDPE liner on a 3:1 (H:V) slope from the top elevation down to and including the reservoir floor. Given that the slope will not be grassed, there will be no natural habitat for waterfowl to forage or nest adjacent to the water surface.
- A guardrail will be installed along the top of the inner embankment slope. The guardrail may perform as a deterrent given its similar relationship to the string method that is often used around water surfaces to deter waterfowl. This method can be effective when birds feel a sense of confinement in the presence of danger when required to duck below an obstruction to reach water. This sense of confinement may lead some fowl to avoid the water body altogether.

- The outside slope of the impoundment will be planted with Bermuda grass and maintain in a mowed condition. Given the low lying grass and 3:1 (H:V) slope, visiting waterfowl will not be inclined to nest and establish permanent residence.
- Two floating reservoir circulators will be positioned in the middle of the storage impoundment to circulate the upper water level of the reservoir to prevent the formation of algae. The circulators pull water from the bottom of the reservoir and push the water outward toward the shore such that the upper water level is constantly moving. This upper level water movement may have the potential to detract waterfowl from gathering on the water surface.
- During the normal Empty/Fill cycle of the impoundment, the water level will rise and fall approximately five-feet up to three times per day during peak usage. The changing water levels may detract waterfowl from making a permanent residence within the water body.
- The influent pipeline discharges the raw water from Abercorn Creek in the north east corner of the impoundment. The pipe will discharge the water vertically towards the water surface generating a turbulent movement of water when the reservoir is low and a steady circulation of water when the reservoir is full. This corner of the reservoir would likely be less attractive to waterfowl due to the stronger inlet currents.
- All water from Abercorn Creek is pumped through a fine mesh screen prior to delivery to the Raw Water Storage Impoundment. This screen will keep fish from Abercorn Creek from entering into the piping system and making their way to the impoundment thus minimizing the source of food available for waterfowl.
- Management Practices – The current design includes a security camera installed along the top of the impoundment that will allow the City of Savannah to monitor the impoundment for waterfowl from a remote location.

cc: Jason O'Kane, USACE
Laurie Sattler, USACE
Mackie McIntosh, USACE
Hope Moorer, Georgia Ports Authority

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