



Restoring and Protecting the Satilla, Educating her Citizens

March 8, 2021

Via Electronic Mail

Diana Taylor
Cc: Mr. Doug Haymans, Director
Georgia Department of Natural Resources
Coastal Resources Division
One Conservation Way
Brunswick, GA 31520

CRD.Comments@dnr.ga.gov

RE: Proposed Coastal Consistency Certification For Spaceport Camden

Thank you for the opportunity to submit public comments on the Coastal Consistency Certification for Spaceport Camden. We also appreciate the extension of the original public comment deadline in order to allow for a thorough review of the documents associated with the project.

Satilla Riverkeeper requests that the Coastal Resources Division of the Georgia Department of Natural Resources (CRD) **deny the Coastal Consistency for this project** due to the fact that the applicant has not provided enough information for CRD to ensure that their proposal is consistent with Georgia's statutes and regulations encompassed in the Coastal Zone Management Program. The applicant has overlooked many elements of their project that could result in negative impacts to our coastal ecosystems, recreation, and commercial uses along the Georgia Coast.

Satilla Riverkeeper® is a nonprofit 501c3 organization whose mission is to protect, restore, and educate about the Satilla River and its watershed. We have been carrying out this mission for 15 years. The Satilla River's watershed lies entirely within the coastal plain of Georgia, and the river ecosystems are heavily influenced by the coastal and estuarine waters. The site of the proposed Spaceport Camden sits on the banks of the Satilla River estuary.

We are especially concerned about the disregard for the hazardous waste landfill located on the banks of Todd Creek adjacent to the proposed Spaceport site. This landfill is adjacent to an erosional bank, and Union Carbide Corporation has recently sought a shoreline protection permit to start work on bank stabilization because erosion has reached "trigger points," as detailed in their bank stabilization plan with the Georgia Environmental Protection Division (EPD). The hazardous waste landfill is on the property owned by Union Carbide Corporation that Camden



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County intends to purchase a portion for the Spaceport Camden project. The entire property has an Environmental Covenant which restricts certain types of uses of the property. Regardless of whether Camden County intends to purchase the hazardous waste landfill, they must consider the impacts of construction, operation, and potential failures on the hazardous waste landfill. It is unacceptable for any actions to cause the hazardous constituents present in the landfill and in the groundwater on the site to mobilize into the surface waters of the marshes, Todd Creek, and the Satilla River.

There are known areas of contamination on other parts of the property, and it is probable that other contamination or hazards exist on the property from its past industrial uses. Disturbing the soil through construction activities or vibrations through launch activities could mobilize contaminants and/or cause risk to human health of those that are working on the property. In particular, the area of the proposed launch site is a munitions response area that could contain unexploded ordinances.

Additionally, the threats to the Satilla River estuary from a launch failure are unacceptable. With a failure rate of 20% and an expected 12 launches per year, we can expect more than 2 failures each year. Failures could result in fuel, contaminants, and debris entering the estuary, and/or wildfires.

Rocket launches will require extensive closures of public waterways including the Satilla River, St. Andrews Sound, and the Intracoastal Waterway that will block access to public fishing areas including inshore, offshore, bait zones, and shellfish harvest areas. These closures will often be made on short notice and will change and/or be extended if a launch is cancelled due to weather or technical difficulties, making it difficult for the public to plan for recreational or commercial fishing trips and other activities.

The state has recently invested over \$10 million dollars to acquire Ceylon Wildlife Management Area and Cabin Bluff Wildlife Management Area adjacent to the proposed site for Spaceport Camden, and is now charged with the stewardship of these lands for wildlife habitat and public recreation. The State is also investing several million dollars in the estuarine restoration effort to close Noyes Cut and other cuts to restore fish habitat and improve recreational access in the northern portion of the Satilla River Estuary.

Listed below are items that must be more thoroughly examined in order to make a determination on the consistency with Georgia's statutes and regulations related to Coastal Zone Management.



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Coastal Marshlands Protection (O.C.G.A. 12-5-280)

The applicant's intent to use Georgia's coastal marshes as a buffer area to accept wastes and debris from rocket launch failures and tests is inconsistent with the Coastal Marshlands Protection Act.

In the document "Spaceport Camden Coastal Consistency Certification, Dec 2020" the applicant states "The County proposes to construct the *majority* of the Spaceport infrastructure on uplands within the Union Carbide Corporation property," (emphasis added). The construction proposed for the marshlands and wetlands must be described, and an explanation of how these would be consistent with Georgia's statutes and regulations must be provided.

The applicant also claims private ownership of 2,800 acres of marshlands. This is not consistent with the Coastal Marshlands Protection Act. Coastal Resources Division must verify the ownership of these tidal marshlands in order to determine if the proposed actions are consistent with Georgia's statutes and regulations.

The applicant also stated that "launch vehicle debris landing in tidally influenced marsh or State waters must be recovered *when feasible*" (emphasis added). Define who determines and how it is determined when recovery would be feasible and when it would not be feasible. If recovery of debris is not feasible, this seems to be a violation of the Coastal Marshlands Protection Act, and the Georgia Litter Control Law (O.C.G.A 16-7-40).

If damage does occur to Georgia's coastal marshlands as a result of Spaceport Camden, the applicant needs to detail what mitigation measures they would take while they restore damaged marshlands.

Safe Drinking Water (O.C.G.A. 12-5-170)

The applicant states that they plan to use two existing drinking water wells on site. In order to ensure the water from these is safe to drink, these wells must be tested for the hazardous constituents found in Table 2 of the RCRA Hazardous Waste Permit and any other contaminants that pose a risk to human health.

Furthermore, the Environmental Covenant on the UCC property prohibits "the use or extraction of groundwater beneath the area (4,011.54 acres), including the RCRA landfill for drinking water or for many other non-remedial purposes." The applicant's stated plans for groundwater withdrawal are inconsistent with the current permits and Covenant associated with the property. The applicant must explain their plan to provide safe



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drinking water to persons on-site to protect the health and safety of construction workers and other operational personnel.

Endangered Wildlife (O.C.G.A. 27-3-130)

Georgia's 2015 State Wildlife Action Plan (SWAP) identifies the Satilla River as a High Priority site:

“The Satilla River watershed supports a number of high priority natural communities, including beech-magnolia forest, xeric sandhills, pond pine flatwoods, maritime forest, tidal marsh, and tidal swamp. Rare animals known from this watershed include spotted turtle, Say's spiketail, gopher frog, eastern indigo snake, swallow-tailed kite, southern hognose snake, gopher tortoise, shortnose sturgeon, and manatee. Rare plants documented from the Satilla drainage include purple honeycomb head, hairy rattleweed, sandhill rosemary, Georgia plume, Ochoopee bumelia, cutleaf beardtongue, and pond spice. The Satilla River watershed provides habitat connectivity between the greater Okefenokee Swamp region and the lower Altamaha River corridor.”

The SWAP also lists conserving key Swallow-tailed Kite nesting habitat along the Satilla River as a high priority conservation action.

In Appendix C of the Woodbine Site Characterization Report, a letter from the Wildlife Resources Division lists these priority species that are known to occur in the vicinity of the site:

- *Drymarchon couperi* (Eastern Indigo Snake)
- *Gopherus polyphemus* (Gopher Tortoise)
- *Haliaeetus leucocephalus* (Bald Eagle)
- *Nycticorax nycticorax* (Black-crowned Night-heron)
- *Pelecanus occidentalis* (Brown Pelican)
- *Plegadis falcinellus* (Glossy Ibis)
- *Trichechus manatus* (Manatee)
- *Wading Bird Colony* (Wading Bird Colony) approx. 1.5 mi. E of site
- *Wading Bird Colony* (Wading Bird Colony) approx. 2.5 mi. E of site

Appendix B of the Woodbine Site Characterization Report lists the plant species on site. This should be cross-referenced with lists of priority species for protection.

The applicant did not address and species specifically of concern in Georgia. According to the SWAP, below are species that could be impacted by the construction, operation, and/or failures associated with a spaceport at the proposed site:



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- *Calidris canutus* (Red Knot) - rare
- *Charadrius melodus* (Piping Plover) - threatened
- *Charadrius wilsonia* (Wilson's Plover) – threatened
- *Elanoides forficatus* (Swallow-tailed Kite) – rare
- *Falco peregrinus* (Peregrine Falcon) – rare
- *Falco sparverius Paulus* (Southeastern American Kestrel) – rare
- *Gelochelidon nilotica* (Gull-billed Tern) – threatened
- *Haematopus palliatus* (American Oystercatcher) – rare
- *Haliaeetus leucocephalus* (Bald Eagle) – threatened
- *Mycteria americana* (Wood Stork) – endangered
- *Acipenser brevirostrum* (Shortnose Sturgeon) – endangered
- *Acipenser oxyrinchus oxyrinchus* (Atlantic Sturgeon) – endangered
- *Geomys pinetis* (Southeastern pocket gopher) – threatened
- *Caretta caretta* (Loggerhead Sea Turtle) – endangered
- *Chelonia mydas* (Green Sea Turtle) – threatened
- *Dermochelys coriacea* (Leatherback Sea Turtle) – endangered
- *Heterodon simus* (Southern hognose snake) - threatened

Environmental Policy (O.C.G.A 12-16-1)

The applicant changed the rocket size class in their application without doing further analysis or revision to the Draft EIS. Therefore, accurate information on the actual environmental impacts of the project will not be made available for public review before the final Environmental Impact Statement and a Record of Decision or scheduled to be released. This is in violation of the National Environmental Policy Act (NEPA).

The applicant states that State agencies and the public had the opportunity to review the Draft EIS. Please ensure that all of the concerns regarding environmental policies brought up in public comments on the Draft EIS were adequately addressed to ensure consistency with Georgia's Coastal Zone Management statutes and regulations. Additionally, the Draft EIS did not include any analysis on small-lift class rockets. Therefore, the Coastal Resources Division does not have sufficient information to make an informed Coastal Consistency Determination.

Erosion and Sedimentation Control (O.C.G.A. 12-7-1)

Regarding the discharge of sediments, that could be carrying other contaminants, into State waters, please require a detailed plan for monitoring to determine the presence of contaminants and a plan to mitigate any contaminants that enter the waterways.



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Hazardous Waste Management (O.C.G.A 12-8-60)

The applicant states the hazardous wastes and solid wastes generated during construction and operation would be “minimal.” This is not sufficient information for CRD to evaluate. Please require a quantitative amount of waste to be estimated and verify that there is a plan for proper safe disposal of hazardous wastes and other solid wastes. Please require an explanation of which landfills will be used for hazardous waste disposal and solid waste disposal, and their respective remaining capacities. The applicant states that Conditionally Exempt Small-Quantity Generators can dispose of hazardous wastes in municipal waste landfills, but the applicant does not state whether Spaceport Camden will fall under this category, and if so where they plan to dispose of their waste.

There is a hazardous waste landfill on the banks of Todd Creek on the Union Carbide Corporation’s (UCC) property that is proposed site of the Spaceport facility. This landfill is subject to the Resource Conservation Recovery Act (RCRA) hazardous waste facility permit HW-063(D). (Permit is attached.) Plans previously available to the public note that Camden County does not intend to purchase the small section of the property that contains the landfill. However, it is vitally important that the presence of this hazardous waste landfill adjacent to a rocket-launching facility be acknowledged, and that the impacts of the facility on this landfill be thoroughly analyzed. This important analysis was omitted from the Draft Environmental Impact Statement. The applicant also failed to give adequate information on how the applicant will prevent, monitor, mitigate, or resolve any impacts to the hazardous waste landfill in their Coastal Consistency Determination.

There exists an Environmental Covenant on the property proposed for Spaceport Camden. This Environmental Covenant imposes limitations on the 4,000+ acres owned by Union Carbide Corporation (UCC), and grants Georgia Department of Natural Resources the express power to enforce. This Environmental Covenant on the 4,011.54 acres owned by UCC at the Woodbine Facility will run with the land and apply to future purchasers or transfers of the land. The Environmental Covenant states: “Any activity on the area (4,011.54 acres), including the RCRA landfill that may result in the release or exposure of hazardous wastes, hazardous constituents, hazardous waste constituents or the constituents of concern that were contained as part of the post-closure care and corrective action program, or create a new exposure pathway, is prohibited.” Certainly, construction on the property, operations of a Spaceport, and rocket failures may result in the release or exposure of the hazardous waste or constituents of hazardous waste that already exist on the property. (Environmental Covenant is attached.)



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The applicant states that “the County has not identified any significant adverse impacts associated with hazardous materials.” The County should establish whether contaminants from the existing hazardous waste landfill are currently moving offsite in State waters through shallow groundwater, runoff, or surface water drainage. A monitoring program should be put in place to detect any offsite transport of contaminants during construction and operations on the site. A plan should be developed to address any movement of contamination should it be detected.

Heritage Trust and Historic Areas (O.C.G.A. 12-3-70, O.C.G.A 12-3-50)

The State Historic Preservation Office and national Advisory Council on Historic Preservation did not agree with the Section 106 review. Their respective letters to the FAA are attached.

Explain how the applicant knows that there will be no adverse impacts to National Register of Historic Places eligible components of the property.

In 1971, there was a deadly explosion at the Thiokol facility on the site, killing 29 individuals and injuring many others. Survivors, family members, and community members have been working to preserve and share this history, through the Thiokol Memorial Project. In 2019, the Georgia General Assembly dedicated the I-95 interchange at Exit 7 (Woodbine) as the “Patriots of Thiokol Memorial Interchange.” In February 2021, a 50th anniversary ceremony was held at Chris Gilman Stadium in Kingsland. This is an important piece of local black history that the applicant failed to acknowledge at all in potential impacts on historical areas. (See the 50th anniversary commemoration article, and copy of House Resolution 346 attached.)

Natural Areas (O.C.G.A 12-3-90)

There is no mention of Ceylon WMA and Cabin Bluff WMA in the applicant’s Coastal Consistency Determination document, nor in the Draft EIS. These areas, now under the State’s care and management, should be carefully considered for adverse impacts from a Spaceport.

With the proximity of the Satilla River Marsh Island Natural Area to the proposed launch site, it is probably that the area will experience impacts from construction, launches, and failures.



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Right of Passage (O.C.G.A 52-1-30)

In the Draft EIS, the applicant stated that areas of the marsh (a 7,300 ft radius around the launch site) may be closed to the public at all times for security reasons. This is not consistent with the Right of Passage statutes.

In the Coastal Consistency Determination, the applicant states that the Overflight Exclusion Zone (OEZ) for the pre-launch testing operations activities is a 4,021 ft radius, which they state does not extend beyond the marshlands bordering the site. However, this radius would encompass parts of Todd Creek. Closing this section of Todd Creek to the public would interfere with passage to and from the Satilla River to Todd Creek. This would also interfere with small boat travel to/from launch points at Ceylon Wildlife Management Area. (See Figure X). In Figure 3, the OEZ shows that it would encompass parts of Todd Creek and Floyd Creek.

It is unclear based on the Coastal Consistency Determination document prepared by the applicant whether public waters would be closed to the public during wet dress rehearsals and static engine tests. In Figure 3, it shows the OEZ extending as an oblong shape following the 100 degree trajectory, rather than a radius from the launch site. This is important to know in determining the degree of impact on the public's access and right of passage on waters of the State.

The USCG Security Zone demonstrates much wider closures, including the Satilla River, St. Andrews Sound, and the Cumberland River. The applicant does not address impacts to navigation and heavy traffic on the Intracoastal Waterway (ICW) from closures for rocket launches, wet dress rehearsals, and static engine tests.

River Corridor Protection (O.C.G.A 12-2-1)

The applicant states that the Satilla River is located more than 1 mile from the proposed construction. However, it is important to understand that the river system includes all the tidal waters that flow up to the uplands on the property. Contaminants and/or debris from the site could be transported to the mainstem of the Satilla River by tides and currents.

Upland habitats are an important part of river corridor protections. Fences and other structures on the uplands prevent movement of wildlife along the river corridor. The proposed site is within an intended conservation area for the Satilla River corridor, as prioritized in the SWAP.



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Scenic Rivers (O.C.G.A 12-5-350)

The Satilla River is listed on the Nationwide Rivers Inventory and is eligible to be listed as a Wild and Scenic River. The applicant's proposed operations could jeopardize that eligibility (light, noise, visual impact, ecological impacts). The applicant must have a plan to prevent and mitigate any impacts that would jeopardize the Satilla River's eligibility to be designated as a Wild and Scenic River in the future.

Shore Protection (O.C.G.A. 2-5-230)

Driving on the beaches for "patrols", fight fires, and/or to retrieve debris can cause damage to the shoreline and dune system. The applicant must explain how they will prevent damage and/or mitigate and restore damage to the sand-sharing system. Driving on the beach with trucks or other heavy equipment can also destroy habitat for nesting shorebirds and sea turtles. Although seemingly insignificant, tire ruts can become insurmountable hurdles to hatchling sea turtles and shorebird chicks.

Solid Waste Management (O.C.G.A. 12-8-21)

The applicant should state where it plans to dispose of the C&D debris and confirm that the landfill has sufficient capacity to accept the estimated volume of waste.

The applicant should explain how they plan to recycle wooden forms, not simply state that it "could be done."

The applicant states that soil excavated during construction will be stockpiled and repurposed. This site is known to have vast contamination spread throughout the site. The applicant must explain their plans for testing the soil for hazardous contaminants, protecting the health and safety of workers on site, and how and where they will safely dispose of the soil if it is found to be contaminated.

Protection of Tide Waters (O.C.G.A 52-1-1)

The State is granted ownership of the beds of all tidewaters unless the title can be traced to a valid British Crown or State land grant. The applicant must prove ownership of the marshland for which it claims ownership in the Coastal Consistency Determination document and in the Draft Environmental Impact Statement.

Water Quality Control (O.C.G.A 12-5-20)

The applicant does not adequately address the proposed Spaceport's impacts on water quality. It is very important to prevent any contaminants currently in the soil or shallow groundwater (as a result of historical industrial uses on the property) from entering into



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the adjacent tidewater and tidal marshes via groundwater seeps, surface water runoff, or channel drainage. It is also important to prevent any new contaminants from Spaceport construction, operations, and failures that could enter these waterways. A water quality monitoring plan seems essential. Plans also need to be in place to fix any water quality contamination as soon as it is detected.

The applicant states: “Launch failures on the launch pad or during ascent could result in the release of hazardous chemicals into wetland and surface water areas. ... These chemicals could be released as direct spills or burning byproducts. Chemicals that reach these waters could also degrade water quality.” The applicant does not clearly explain how this does not violate the statutes meant to protect water quality.

Water Wells Standard (O.C.G.A. 12-5-120)

The Environmental Covenant on the UCC property prohibits “the use or extraction of groundwater beneath the area (4,011.54 acres), including the RCRA landfill for drinking water or for many other non-remedial purposes.” The applicant’s stated plans for groundwater withdrawal are inconsistent with the current permits and Covenant associated with the property.

It is unclear whether the applicant intends to construct any new wells on the site. The applicant should explain their plans for any new wells. A plan is needed to test the existing drinking water wells on site due to the known contamination on the property.

Further, the applicant lists **incorrectly** that the following statutes are not applicable to the proposed Spaceport Camden. The Coastal Resources Division and/or the applicant must consider the impacts from a Spaceport on the following statutes.

Game and Fish Code (O.C.G.A. 27-1-3)

This code section deals with disturbing or destruction of wildlife habitat. The applicant should clearly explain whether or not its proposed actions will affect wildlife or fish habitat. It is likely that both construction and operations will disturb wildlife habitat, and may interfere with wildlife management efforts by DNR on the adjacent Ceylon WMA and Cabin Bluff WMA.

Scenic Trails (O.C.G.A. 12-3-110)

The proposed Spaceport site is in the vicinity of several scenic trails. If the facility is visible from nearby trails, it could interfere with the scenic nature of such trails.



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Construction and operations at the site could degrade the scenic quality and ability for the public to enjoy the trails due to impacts from noise, light, and dust. Wet dress rehearsals, static engine tests, and launches may prohibit access to some of these trails as part of the proposed USCG Security Zone and Overflight Exclusion Zones. Nearby trails include those on the Ceylon WMA, Cabin Bluff WMA, Cabin Bluff's private retreat center, Cumberland Island National Seashore, Little Cumberland Island, Crooked River State Park, Crooked River State Park's blue trails, and the Satilla River Water Trail.

Shellfish (O.C.G.A 27-4-190)

There are several commercial and recreational shellfish beds near the proposed Spaceport site. Operations of a Spaceport, and potential rocket failures could impact these shellfish harvest areas. The applicant needs to acknowledge this and explain their plans for mitigating impacts to shellfish harvesting areas. Debris from rocket failures could damage shellfish beds, but contaminants entering the waterways could also impact shellfish beds and pose risks to human health through consumption of contaminated shellfish. CRD should also consider the impacts of frequent waterway closures on access to shellfish harvesting areas. Of notable concern are the recreational shellfish areas at Abraham Point on the northern end of Cumberland Island, and the harvest areas bordering Cabin Bluff.

In conclusion, there is not adequate information available for Coastal Resources Division to accurately determine the consistency of the proposed Spaceport Camden project with Georgia's statutes and regulations relating to Coastal Zone Management. Since there is no process for piece-meal approval, nor another opportunity for Coastal Resources Division to review the project again for consistency at a later date, it is prudent that CRD deny the Coastal Consistency Determination for Spaceport Camden.

Sincerely,

A handwritten signature in black ink that reads "Laura Early".

Laura Early

Satilla Riverkeeper and Executive Director



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Attachments:

Hazardous Waste Permit HW-063(D)

Environmental Covenant – UCC, 2011.

UCC Woodbine Site Characterization Report – CH2MHill, 2014.

Recreational Shellfish Harvest Areas – Camden County.

State Historic Preservation Letter – Section 106 Review

Advisory Council on Historic Preservation Letter – Section 106 Review

PERMIT NO. HW-063(D)
ISSUANCE DATE: JUN 07 2017



GEORGIA

DEPARTMENT OF NATURAL RESOURCES

ENVIRONMENTAL PROTECTION DIVISION

AMENDMENT TO HAZARDOUS WASTE FACILITY PERMIT

In accordance with the provisions of the Georgia Hazardous Waste Management Act and the Rules, Chapter 391-3-11, (as amended through **June 22, 2016**), adopted pursuant to that Act, Permit No. **HW-063(D)**, issued on **June 6, 2011**, to

Union Carbide Corporation

I.D. No. GAD981235294

for the following:

Post-closure care and corrective action for a closed hazardous waste landfill

Is hereby amended as follows:

By incorporating the modifications on the attached pages.

Reason for Amendment:

Five-year regulatory completeness review of the permit as required by 40 CFR 270.50(d) and Rule 391-3-11.11(9)(a), as well as modification of the Todd Creek Bank Stabilization Plan.

This Permit Amendment is further subject to and conditioned upon the terms, conditions, limitations, standards, or schedules contained in or specified on the attached **25** pages, which pages are a part of this Amendment. This Amendment is hereby made a part of Permit No. **HW-063(D)** and compliance with this Amendment is hereby ordered.




Richard E. Dunn, Director
Environmental Protection Division

Permit Number: HW-063(D)

Union Carbide Corp., GAD981235294 is hereinafter referred to as the Permittee.

SECTION I. GENERAL PERMIT CONDITIONS

I.A. Scope and Effect of Permit

- I.A.1. The Permittee is allowed to treat, store, and dispose of hazardous waste only in accordance with the conditions of this permit. Any hazardous waste treatment, storage or disposal not authorized in this permit is prohibited. The Permittee must comply with the Georgia Hazardous Waste Management Act and the Rules for Hazardous Waste Management, Chapter 391-3-11, which Rules include certain portions of the Federal Hazardous Waste Regulations (found at 40 CFR Parts 260-268, 270, 273, 279, and 124). Where a citation to the Federal Regulations is made in this permit, it refers to the specific regulations adopted by the Environmental Protection Division (EPD) of the Georgia Department of Natural Resources.
- I.A.2. The issuance of this permit does not convey any property rights in either real or personal property, nor any exclusive privileges, nor does it authorize any injury to private property or any invasion of personal rights, nor any infringement(s) of Federal, State or local laws or regulations.
- I.A.3. Compliance with the permit does not constitute a defense to any action brought by the Director under Section 18, Emergency Powers, of the Georgia Hazardous Waste Management Act, O.C.G.A. §12-8-75, as amended.
- I.A.4. Nothing in this permit shall be construed to preclude the institution of any legal action under Section 3008 of the Federal Resource Conservation and Recovery Act (RCRA) or under the Georgia Hazardous Waste Management Act, O.C.G.A. §12-8-81 - §12-8-82, as amended.
- I.A.5. This Permit may be modified, revoked and reissued, or terminated for cause as specified in Rule 391-3-11-.11(7) and 40 CFR 270.41, 270.42, 270.43, 270.50(d) and 270.51(a). The filing of a request for a permit modification, revocation and reissuance, or termination; or the notification of planned changes or anticipated non-compliance on the part of the Permittee, does not stay the applicability of any permit condition.
- I.A.6. The provisions of this permit are severable, and if any provision of this permit or the application of any provision of this permit to any circumstances is held invalid, the application of such provision to other circumstances, and the remainder of this permit, shall not be affected thereby.

I.B. Management Requirements

- I.B.1. The Permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions to the permitted facility, or any planned changes in the process generating the hazardous waste, which changes might affect the performance of the permitted facility with respect to any regulated activities.

- I.B.2. The Permittee shall maintain at the facility, the following documents and amendments, revisions and modifications to these documents:
 - I.B.2.a Complete copy of this permit and permit application, including all amendments, revisions and modifications;
 - I.B.2.b. Post-Closure Care Plan;
 - I.B.2.c. Operating record as required by 40 CFR 264.73;
 - I.B.2.d. Inspection schedule and log(s);
 - I.B.2.e. Corrective Action Plan;
 - I.B.2.f. Groundwater Sampling and Analysis Plan;
 - I.B.2.g. Institutional and/or engineering control instruments/plans (including hazardous waste-related deed notices and environmental covenants);
 - I.B.2.h Cost estimate for post-closure care and corrective action; and
 - I.B.2.i. Proof of financial assurance for post-closure care and corrective action as required by the Georgia Hazardous Waste Management Act, O.C.G.A. §12-8-68, as amended.
- I.B.3. All amendments, revisions and modifications to any plan or cost estimates required by this permit shall be submitted to the Director for approval and permit modification, as necessary.
- I.B.4. When the Permittee becomes aware that the Permittee failed to submit any relevant facts in the permit application, or submitted incorrect information in a permit application or in any report to the Director, the Permittee shall promptly submit corrected facts or information.
- I.B.5. The Permittee shall at all times properly operate and maintain all facilities which are installed or used by the Permittee to achieve compliance with the conditions of this permit. Proper operation and maintenance includes effective performance, adequate funding, adequate operator staffing and training, and adequate laboratory and process controls, including appropriate quality assurance procedures. This provision requires the operation of a back-up or auxiliary facility or similar systems only when necessary to achieve compliance with the conditions of this permit.
- I.B.6. The Permittee may not commence treatment, storage or disposal of hazardous waste at any new or modified portion of the facility or corrective action for contaminated groundwater or soil until the Permittee has submitted to the Director by certified mail, or hand delivery, a letter signed by the Permittee and a registered professional engineer or, when appropriate, registered professional geologist, stating that the facility has been constructed or modified in compliance with the permit where appropriate; and the Director has inspected the modified or newly constructed facility and finds it is in compliance with the conditions of the permit; or the Director has either waived the inspection, or within fifteen (15) calendar days has not notified the Permittee of his or her intent to inspect.

I.C. Monitoring and Reporting

- I.C.1. Samples and measurements taken for the purpose of monitoring shall be representative of the monitored activity. The method used to obtain a representative sample of the waste/media to be analyzed must be the appropriate method from Appendix I of 40 CFR Part 261. Laboratory methods must be those specified in the most recent editions of Test Methods for Evaluating Solid Waste; Physical/Chemical Methods, SW 846 or Standard Methods for the Examination of Water and Wastewater (or an equivalent method as specified in the Waste Analysis Plan). Sampling and analyses of soil, sediment, surface water and groundwater samples shall be conducted in accordance with methods and procedures in the Sampling and Analysis Plan, as amended, and the USEPA Region IV Quality System & Technical Procedures for SESD Field Branches, as revised, or in accordance with those methods and procedures otherwise acceptable to the Director.
- I.C.2. The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original strip chart recordings for continuous monitoring instrumentation, copies of all reports and records required by this permit, the certification required by Condition I.G.1 and 40 CFR 264.73(b)(9), and records of all data used to complete the application for this permit, for a period of at least three (3) years from the date of the sample, measurement, report, certification, record, or application. These periods are automatically extended during the course of any unresolved enforcement action regarding this facility and also may be extended at any time at the Director's discretion.
- I.C.3. The Permittee shall maintain records for all groundwater monitoring wells and associated groundwater surface elevations, including groundwater flow rate and direction throughout the post-closure period.
- I.C.4. Records of monitoring information shall include:
- I.C.4.a. The date, exact place, and time of sampling or measurements;
 - I.C.4.b. The individual(s) who performed the sampling or measurements;
 - I.C.4.c. The date(s) analyses were performed;
 - I.C.4.d. The individual(s) who performed the analyses;
 - I.C.4.e. The analytical techniques or methods used, the method of sample preservation, and quality assurance methods;
 - I.C.4.f. The flow directions and flow rates in the uppermost aquifer; and
 - I.C.4.g. The results of such analyses and measurements presented in a table and/or figure format.
- I.C.5. The Permittee shall report to the Director or his representative orally within twenty-four (24) hours from the time the Permittee becomes aware of any circumstances resulting from the operation and/or maintenance of the hazardous

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waste management facility (including periods of non-compliance) which may endanger human health or the environment, including but not limited to:

- I.C.5.a. Release of any hazardous waste, hazardous waste constituent(s), or hazardous constituent(s) that may cause an endangerment to public drinking water supplies;
- I.C.5.b. Release or discharge of hazardous waste, hazardous waste constituent(s), or hazardous constituent(s) or a fire or explosion which could threaten human health or the environment outside the facility. The description of the occurrence shall include:
 - I.C.5.b.i. Name, address and telephone number of the owner or operator;
 - I.C.5.b.ii. Name, address, and telephone number of facility;
 - I.C.5.b.iii. Date, time, and type of incident;
 - I.C.5.b.iv. Name and quantity of materials involved;
 - I.C.5.b.v. The extent of injuries, if any;
 - I.C.5.b.vi. An assessment of actual or potential hazards to the environment and human health outside the facility, where this is applicable; and
 - I.C.5.b.vii. Estimated quantity and disposition of recovered material that resulted from the incident.
- I.C.6. Within fifteen (15) calendar days of becoming aware of any reportable incident as in Condition I.C.5 above which may endanger human health or the environment, the Permittee shall submit a written report of the incident covering the following:
 - I.C.6.a. Description of occurrence as in Condition I.C.5 above;
 - I.C.6.b. Cause of occurrence;
 - I.C.6.c. Period of occurrence, including exact dates and times;
 - I.C.6.d. Time occurrence expected to continue (if not already corrected); and
 - I.C.6.e. Steps taken or planned to reduce, eliminate, and prevent recurrence.
- I.C.7. Reports of compliance and noncompliance with, or any progress reports on, interim and final requirements contained in any compliance schedule of this permit shall be submitted no later than fourteen (14) calendar days following each schedule date.
- I.C.8. The Permittee shall report instances of non-compliance, other than those described in conditions I.C.5 and I.C.7, semi-annually on July 15 (covering January 1- June 30) and January 15 (covering July 1 – December 31). The report shall cover the information requested in Condition I.C.5 for each incident.
- I.C.9. All reports or other information requested by the Director shall be signed and certified according to the requirements in 40 CFR 270.11.

I.C.10. All geologic and engineering reports required by this permit shall be signed and sealed by the appropriate Georgia registered professional as defined by state law. Additionally, the following certification statement shall accompany reports containing groundwater data or interpretation:

I certify that I am a qualified groundwater scientist who has received a baccalaureate or post-graduate degree in the natural sciences or engineering, and have sufficient training and experience in groundwater hydrology and related fields, as demonstrated by state registration and completion of accredited university courses, that enable me to make sound professional judgments regarding groundwater monitoring and contaminant fate and transport. I further certify that this report was prepared by myself or by a subordinate working under my direction.

I.C.11. The Permittee shall immediately notify EPD through the Department of Natural Resources Emergency Operations Center of any spill or release of oil or a hazardous substance as soon as the Permittee knows of the spill or release, as required by O.C.G.A. §12-14-3.

I.D. Responsibilities

I.D.1. Right of Entry. The Permittee shall allow the Director of EPD, the Regional Administrator of EPA, and/or their authorized representatives, agents, or employees, upon the presentation of credentials and other documents as may be required by law to:

- I.D.1.a. Enter at reasonable times upon the Permittee's premises where a regulated facility or activity is located or conducted, or where records must be kept under the conditions of this permit;
- I.D.1.b. Have access to and copy, at reasonable times, any records that must be kept under the conditions of this permit;
- I.D.1.c. Inspect at reasonable times any facilities, equipment (including monitoring and control equipment), practices, or operations regulated or required under this permit; and
- I.D.1.d. Sample or monitor, at reasonable times, for the purposes of assuring permit compliance or as otherwise authorized by the Georgia Hazardous Waste Management Act, any substances or parameters at any locations.

I.D.2. Transfer of Permits. This permit is not transferable to any persons except after notice to the Director. This permit may be transferred to a new owner or operator only if it is modified or revoked and reissued pursuant to 40 CFR 270.40(b) or 270.41(b)(2). Before transferring ownership or operation of the facility during its operating life or during its post-closure care period, the Permittee shall notify the

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new owner or operator in writing of the applicable requirements of 40 CFR 264 and 270.

- I.D.3. Duty to Comply. The Permittee shall comply with all conditions of this permit, except to the extent and for the duration such non-compliance is authorized by an emergency permit. Any other non-compliance with this permit constitutes a violation of the Georgia Hazardous Waste Management Act and is grounds for enforcement action, permit termination, revocation and reissuance, modification, or denial of a permit renewal application.
- I.D.4. Duty to Reapply. If the Permittee wishes to continue an activity regulated by this permit after the expiration date of this permit, the Permittee must submit a complete application for a new permit at least one hundred eighty (180) calendar days before this permit expires. Pursuant to 40 CFR 270.51, this permit and all conditions herein will remain in effect beyond the permit's expiration date if the Permittee has submitted a timely and complete application for a new permit and, through no fault of the Permittee, the Director has not issued a new permit on or before the expiration date of this permit.
- I.D.5. Need to Halt or Reduce Activity Not a Defense. It shall not be a defense for a Permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.
- I.D.6. Duty to Mitigate. The Permittee shall take all reasonable steps to minimize or correct any adverse impact on the environment or human health resulting from non-compliance with this permit.
- I.D.7. Duty to Provide Information. The Permittee shall furnish to the Director, within a reasonable time, any relevant information which the Director may request to determine whether cause exists for modifying, revoking and reissuing, or terminating this permit or to determine compliance with the permit. The Permittee shall also furnish to the Director, upon request, copies of records required to be kept by this permit.
- I.D.8. Anticipated Non-Compliance. The Permittee shall give advance notice to the Director of any planned changes in the permitted facility or activity which may result in non-compliance with the permit requirements.
- I.D.9. Reporting Planned Changes. The Permittee shall give notice to the Director as soon as possible of any planned physical alterations or additions which impact any SWMUs, AOCs or the areas contaminated by them, including voluntary corrective measures.

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I.E. Definitions

For the purpose of this permit, terms used herein shall have the same meaning as those in 40 CFR Parts 124, 260 through 279, unless this permit specifically provides otherwise. Where terms are not defined in the regulations or the permit, the meaning associated with such terms shall be defined by a standard dictionary reference or the generally accepted scientific or industrial meaning of the term.

- I.E.1. Area of Concern (AOC) for the purpose of this permit includes any area having a probable release of a hazardous waste, hazardous waste constituent, or hazardous constituent which is not from a solid waste management unit and is determined by the Director to pose a current or potential threat to human health or the environment. Such areas of concern may require investigations and remedial action as required under the Georgia Hazardous Waste Management Act, §12-8-60, et.seq. and 40 CFR 270.32(b)(2) in order to ensure adequate protection of human health and the environment.
- I.E.2. Contamination for the purpose of this permit refers to the presence of any hazardous waste, hazardous waste constituent or hazardous constituent in a concentration which exceeds the naturally occurring concentration of that waste or constituent in the immediate vicinity of the facility (in areas not affected by the facility).
- I.E.3. Corrective Action for prior or continuing releases from solid waste management units, as well as for other releases as described in Condition I.E.14, for the purpose of this permit shall be as specified in 40 CFR 264.101 and may include “corrective action” as provided for in 40 CFR 264.100, and other remedial actions for any environmental media as deemed appropriate by the Director to protect human health or the environment. The terms “releases” and “other releases”, when used in reference to corrective action requirements of this permit, shall not include releases that the Permittee can satisfactorily demonstrate to the Director have been fully remediated within thirty (30) calendar days of discovery.
- I.E.4. Corrective Action Management Unit (CAMU) for the purpose of this permit includes any area within a facility that is designated by the Director under 40 CFR 264.552 for the purpose of implementing corrective action requirements under 40 CFR 264.101. A CAMU shall only be used for the management of remediation waste pursuant to implementing such corrective action requirements at the facility.
- I.E.5. Director shall mean the director of the EPD or his/her authorized representative.
- I.E.6. EPA shall mean the United States Environmental Protection Agency and any successor departments or agencies of the United States.

- I.E.7. EPD shall mean the Georgia Environmental Protection Division of the Department of Natural Resources and any successor departments or agencies of the State of Georgia.
- I.E.8. Extent of Contamination for the purpose of this permit is defined as the horizontal and vertical area/volume in which the concentrations of hazardous waste, hazardous waste constituent(s) or hazardous constituent(s) in the environmental media being investigated are above estimated quantitation limits, as defined in the most recent version of SW-846 or naturally occurring concentrations representative of areas not affected by the facility.
- I.E.9. Hazardous Constituents for the purpose of this permit are those substances listed in 40 CFR Part 261 Appendix VIII and 40 CFR Part 264 Appendix IX, as revised or superseded.
- I.E.10. Institutional Controls for the purpose of this permit are non-engineered instruments, such as administrative and legal controls, that help minimize the potential for human exposure to contamination and/or protect the integrity of the corrective measures.
- I.E.11. Interim Measures for the purpose of this permit are actions necessary to minimize or prevent the migration of contamination or limit actual or potential human and environmental exposure to contamination while long-term corrective action remedies are evaluated and, if necessary, implemented.
- I.E.12. Land Disposal Facility for the purpose of this permit is a facility (and all contiguous property under control of the owner or operator) that uses a surface impoundment, landfill, land treatment, waste pile, or miscellaneous unit to manage or dispose of hazardous waste pursuant to §12-8-66 of the Georgia Hazardous Waste Management Act, as amended, and §3004 of RCRA, as amended.
- I.E.13. Qualified Groundwater Scientist for the purpose of this permit means a scientist who has received a baccalaureate or post-graduate degree in the natural sciences or engineering and has sufficient training and experience in groundwater hydrology and related fields, as demonstrated by current State of Georgia registration and completion of accredited university courses, that enable that individual to make sound professional judgments regarding groundwater monitoring and contaminant fate and transport.
- I.E.14. Release for the purpose of this permit includes any spilling, leaking, pumping, pouring, emitting, emptying, discharging, injecting, escaping, leaching, dumping, or disposing into the environment of any hazardous waste, hazardous waste constituent(s) or hazardous constituent(s).

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I.E.15. Remediation Waste for the purpose of this permit includes all solid and hazardous wastes, and all media (including groundwater, surface water, soil, and sediment) and debris, which contain listed hazardous waste(s) or which themselves exhibit a hazardous waste characteristic, that are managed for the purpose of implementing corrective action requirements under 40 CFR 264.101 and §3008(h) of RCRA. For a given facility, remediation waste(s) may originate only from within the facility boundary, but may include waste managed in implementing corrective action requirements under 40 CFR 264.101 and §3004(v) or §3008(h) of RCRA for releases beyond the facility boundary.

I.E.16. Solid Waste Management Unit (SWMU) for the purpose of this permit includes, but is not limited to, any landfill, surface impoundment, waste pile, land treatment unit, incinerator, injection well, tank (including storage, treatment, and accumulation tanks), container storage unit, wastewater treatment unit, including all conveyances and appurtenances used in waste management or storm water handling, elementary neutralization unit, transfer station, or recycling unit from which hazardous waste, hazardous waste constituent(s) or hazardous constituent(s) might migrate, irrespective of whether the units were intended for the management of solid and/or hazardous waste. SWMUs include, but are not limited to, areas that have been contaminated by routine and systematic releases of hazardous waste, hazardous waste constituent(s), or hazardous constituent(s).

I.E.17. Staging Pile for the purpose of this permit includes temporary storage for mixing, sizing, blending, or other similar physical operations as long as they are intended to prepare the waste for subsequent management or treatment as defined in 40 CFR 264.554.

I.E.18. Temporary Unit (TU) for the purpose of this permit includes any temporary tank and/or container storage area used solely for treatment or storage of hazardous remediation waste during remediation activities required under 40 CFR 264.101. Designated by the Director, such units must conform to specific standards as defined in 40 CFR 264.553, and may only be in operation for a period of time as specified in this permit.

I.F. Conditions Related to Compliance General Facility Standards
(40 CFR 264 Subparts B, C, D, E, G, and H)

I.F.1. The Permittee must follow the procedures and plans described in detail in the permit application dated January 2011, as amended, which are hereby incorporated by reference and include at least the following:

| | |
|---|-------------|
| I.F.1.a. Post-Closure Care Plan | Section 18 |
| I.F.1.b. Corrective Action Plan | Sections 11 |
| I.F.1.c. Sampling and Analysis Plan | Section 11 |
| I.F.1.d. Revised Todd Creek Stabilization Plan, dated October 14, 2016 | Section 12 |

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I.F.2. The following activities must be carried out as prescribed in 40 CFR 264 Subparts B, C, D and E and in accordance with Sections 13, 14, and 18 of the permit application:

I.F.2.a. Security – 40 CFR 264.14(b) and (c)

I.F.2.b. Repair and Inspection Log – 40 CFR 264.15(c) and (d)

I.F.2.c. Personnel Training – 40 CFR 264.16

I.F.2.d. Operating Record – 40 CFR 264.73

I.F.2.e. Retention and Disposition of Records – 40 CFR 264.74

I.F.2.f. Reports – 40 CFR 264.73, 264.74, 264.75, and 264.77

I.F.3. The following activities must be carried out as prescribed in 40 CFR Part 264 Subparts G and H and in accordance with Sections 18, 19, 20, & 21 of the permit application, as revised or amended, O.C.G.A. §12-8-68, Rule 391-3-11-.05 and Rule 391-3-11-.10:

I.F.3.a. Post-Closure Care and Use of Property – 40 CFR 264.117

I.F.3.b. Post-Closure Plan, Amendment of Plan – 40 CFR 264.118

I.F.3.c. Notices to Local Land Authority and in Deed to Property – 40 CFR 264.119 and 264.120

I.F.3.d. Financial Assurance for Post-Closure and Corrective Action. Continuous compliance with 40 CFR 264.145 must be maintained by the Permittee for the amount of the cost estimate for post-closure and corrective action as required by 40 CFR 264.144 until released by the Director as provided in 40 CFR 264.145(i). Continuous compliance with O.C.G.A. §12-8-68, and Rule 391-3-11-.05 is also required.

I.F.4. The Permittee must comply with 40 CFR 264.148 whenever necessary.

I.G. Special Conditions Applicable to Entire Facility

I.G.1. Waste Minimization: The Permittee shall be required to certify no less often than annually that the Permittee has a program in place to reduce the volume and toxicity of hazardous waste that is generated to the degree determined by the Permittee to be economically practicable, and the proposed method of treatment, storage or disposal is that practicable method currently available to the Permittee which minimizes the present and future threat to human health and the environment in accordance with 40 CFR 264.73(b)(9).

I.G.2. Land Disposal Restrictions: 40 CFR Part 268 identifies hazardous wastes that are restricted from land disposal and defines those limited circumstances under which an otherwise prohibited waste may continue to be placed on or in a land treatment, storage or disposal unit. The Permittee shall maintain compliance with the requirements of 40 CFR Part 268. Where the Permittee has applied for an extension, waiver or variance under this Part, the Permittee shall comply with all

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restrictions on land disposal under this Part once the effective date for the waste has been reached pending final approval of such application.

SECTION II. CONDITIONS RELATED TO POST-CLOSURE CARE

II.A. Unit Identification

The Permittee shall provide post-closure care in accordance with 40 CFR 264.310 for a landfill closed with wastes in place (maximum of 314 acre-feet), at the sites identified as Landfill Areas A, B, C, D, E, F, G, H, I, J, and K. The unit is also known as the RCRA hazardous waste regulated unit. The location of the closed unit is identified on Figure 5-1 of the permit application.

II.B. Waste Identification

The Permittee managed Aldicarb hazardous waste (listed P070) in the landfill identified in Condition II.A. The landfill and its associated waste streams are described in the permit application dated January 2011.

II.C. Monitoring and Inspection

II.C.1. The Permittee shall follow the inspection schedule and document inspections performed in accordance with Sections 11, 13, and 18 of the permit application, as revised and as required by 40 CFR 264.15 and 264.310. Inspections shall include the operation and maintenance of all corrective action equipment at the facility.

II.C.2. The Permittee shall follow the bank stabilization monitoring plan in Section 12 of the permit application (as revised on October 14, 2016) in order to maintain the integrity of the landfill as required in 40 CFR 264.310(b)(1).

II.D. Post-Closure Care

II.D.1 The Permittee shall perform post-closure care for the landfill identified in Condition II.A in accordance with the post-closure plan in Section 18 of the permit application, and as required by 40 CFR 264.117 through 264.120 and 264.310.

II.D.2 The facility's post-closure care period will continue until an adequate site specific demonstration can be made that the contamination no longer poses a threat to human health and the environment, pursuant to 40 CFR 264.117(a)(2)(ii).

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SECTION III. GROUNDWATER MONITORING

III.A. Well Location and Construction

The Permittee shall install and/or maintain a groundwater monitoring system to comply with the requirements of 40 CFR 264.95, 264.97 and 264.100 as specified below:

III.A.1. The Permittee shall maintain the following groundwater monitoring wells and withdrawal wells at the locations specified on Figure 11-1, and in accordance with Section 11 of the permit application, and any other groundwater monitoring wells or withdrawal wells deemed appropriate by the Director to monitor groundwater conditions within and adjacent to all plumes of contamination associated with the facility:

| | | | | |
|-------|-------|-------|-------|-------|
| MW-1 | MW-6 | MW-7 | MW-8 | MW-10 |
| MW-16 | MW-17 | MW-18 | MW-19 | MW-20 |
| MW-21 | MW-22 | MW-23 | MW-24 | MW-25 |
| MW-31 | MW-32 | MW-33 | MW-34 | MW-35 |
| MW-36 | MW-37 | MW-38 | MW-39 | MW-40 |
| MW-41 | MW-42 | MW-43 | MW-44 | MW-45 |
| MW-46 | MW-47 | MW-48 | MW-49 | MW-50 |
| MW-51 | MW-52 | ORP-1 | ORP-2 | ORP-3 |
| TE-1 | TE-2 | TE-3 | | |

III.A.2. The following groundwater monitoring well shall define the background monitoring well for the facility:

MW-1

If the groundwater in this well no longer represents background water conditions for the facility, the Permittee shall submit a plan to install a new background well(s).

III.A.3. The following groundwater monitoring wells shall define the point of compliance (POC) for the landfill:

| | | | | |
|-------|------|------|-------|-------|
| MW-6 | MW-7 | MW-8 | MW-34 | MW-38 |
| MW-39 | | | | |

III.A.4. The Permittee shall install and maintain additional groundwater monitoring wells as necessary, to assess changes in the rate and extent of any plume of contamination or as otherwise deemed necessary to maintain compliance with 40 CFR 264.95, 264.97 and 264.100. A plan specifying the design, location and installation of any additional monitoring wells shall be submitted no later than thirty (30) calendar days prior to installation, (unless it is deemed appropriate by

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the Director and the Permittee that the wells should be installed on an accelerated schedule), which at a minimum, shall include:

- III.A.4.a. Well construction techniques including casing depths and proposed total depth of well(s);
- III.A.4.b. Well development method(s);
- III.A.4.c. A complete analysis of well construction materials;
- III.A.4.d. A schedule of implementation for construction; and
- III.A.4.e. Provisions for determining the lithologic character, hydraulic conductivity and grain size distribution for the applicable aquifer unit(s) at the location of the new wells(s).

III.B. Groundwater Protection Standard

III.B.1. The groundwater protection standard, as required under 40 CFR 264.92, shall consist of Table A, which lists the hazardous constituents and their respective concentration limits required under 40 CFR 264.93 and 264.94.

III.B.2. The groundwater protection standard further applies to all hazardous waste, hazardous waste constituent, or hazardous constituent releases as deemed appropriate by the Director to protect human health and the environment.

III.C. Compliance Period

III.C.1. The compliance period under 40 CFR 264.96 shall continue until the end of the post-closure period established by Condition II.D.2. and defined in 40 CFR 264.117.

III.C.2. If the Permittee is engaged in a corrective action program at the end of the compliance period as defined in Condition III.C.1., the compliance period is extended until the Permittee demonstrates that the groundwater protection standard has not been exceeded for a period of three (3) consecutive years, and corrective action as required under 40 CFR 264.100 has been terminated as required by 40 CFR 264.96(c).

III.D. Monitoring Program to Demonstrate Effectiveness of Corrective Action Program

The Permittee shall implement and maintain a groundwater monitoring program to demonstrate the effectiveness of the corrective action program required under 40 CFR 264.100 (and 40 CFR 264.101 as related to other releases of hazardous waste, hazardous waste constituents, or hazardous constituents). Groundwater monitoring shall be conducted in conformance with the requirements of 40 CFR 264.100(d) and as specified below:

III.D.1. The Permittee shall collect, preserve and analyze all groundwater samples as required by Condition III.F.

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- III.D.2. The Permittee shall determine the concentration of all constituents specified in Table A, by collecting and analyzing samples according to the Sampling and Analysis Plan in Section 11 of the permit application.
- III.D.3. The groundwater monitoring program must include a determination of the groundwater surface elevation in all monitoring and extraction wells identified in Condition III.A.1. each time groundwater is sampled.
- III.D.4. The Permittee shall determine the groundwater flow rate and direction in the uppermost aquifer at least semi-annually.
- III.D.5. Background concentrations for Table A parameters shall be based on analysis of samples taken from background monitoring well MW-1. The Permittee shall maintain all monitoring data from the wells pursuant to 40 CFR 264.97(j) and shall submit the data for purposes of background determination upon the Director's request. The acceptable demonstration of a lack of statistically significant difference between a background concentration and the concentrations at compliance point wells shall consist of application of the statistical method per 40 CFR 264.97(h) to a minimum of six (6) sets of sampling events from the above listed background monitoring well.
- III.D.6. The Permittee must obtain samples from one of the six POC wells specified in Condition III.A.3. at least annually and on a rotating basis such that each POC well is sampled every six years, plus any additional wells specified by the Director, for all constituents in Appendix IX of 40 CFR Part 264 to determine whether additional hazardous constituents are present in the uppermost aquifer and, if so, at what concentrations. The Appendix IX results must be submitted to the Director within one hundred twenty (120) calendar days of the sampling.

If the Permittee finds Appendix IX constituent(s) in the groundwater that are not identified on Table A, then the Permittee may resample within one (1) month of receiving the results of the initial analysis and repeat the analysis. If the second analysis confirms the presence of new hazardous constituent(s), then the Permittee must report the concentrations of these additional hazardous constituents to the Director within seven (7) calendar days of the second analysis and submit a permit modification requesting these hazardous constituent(s) be added to Table A.

Alternatively, if the second analysis confirms the presence of new Appendix IX constituents, the Permittee may, at the time of the next sampling required by Condition III.D.2, sample the well that the new Appendix IX constituents were detected in, the nearest down-gradient well, and any additional down-gradient wells to which groundwater may have traveled (based upon the evaluation required by Conditions III.D.3 and III.D.4) and analyze for the new Appendix IX constituents. If the new Appendix IX constituents are not identified in any of

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these wells, the Permittee is relieved of the requirement to add the new constituents to Table A.

If the Permittee chooses not to resample under either of the above regimes, then the Permittee must report the concentrations of those additional hazardous constituents to the Director within seven (7) calendar days after completion of the initial analysis and submit a permit modification requesting these hazardous constituents be added to Table A.

III.D.7. Compliance with the groundwater protection standard, as defined under Condition III.B., will be based upon groundwater monitoring data obtained under Condition III.D.2. that indicate that all constituents listed in Table A no longer exceed the groundwater protection standard at the point of compliance or any other monitoring point within or adjacent to the plume(s) of contamination. Comparisons for the purpose of determining compliance shall be made utilizing the statistical procedure described in 40 CFR 264.97(h) and (i).

III.E. Corrective Action Program

III.E.1. The Permittee shall continue the corrective action program for releases of hazardous constituents to groundwater from the unit identified in Condition II.A. as required under 40 CFR 264.100, and as described in Section 11 of the January 2011 permit application, as revised or amended, for those hazardous constituents that exceed the groundwater protection standard in Table A.

III.E.2. The Permittee shall conduct a corrective action program to remove or treat in place any hazardous constituents that exceed concentration limits in Table A in groundwater between the point of compliance and the downgradient facility property boundary as required under 40 CFR 264.100(e)(1), and beyond the facility boundary as required under 40 CFR 264.100(e)(2), unless the Permittee can demonstrate to the satisfaction of the Director that:

III.E.2.a. Despite the Permittee's best efforts, the Permittee was unable to obtain the necessary permission to undertake such action beyond the facility property boundary, or

III.E.2.b Such action is not necessary to protect human health or the environment.

III.E.3. The Permittee is not relieved of all responsibility to clean up a release that has migrated beyond the facility's boundary where off-site access is denied as required under 40 CFR 264.100(e)(2).

III.E.4. The corrective action system must be installed and operated in such a manner as to mitigate the release of any hazardous waste, hazardous constituent(s) or hazardous waste constituent(s) to the environment.

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III.E.5. The corrective action system must be installed and operated in a manner so as to preclude further migration of the contaminant plume.

III.E.6. The Permittee shall treat, store and dispose of all contaminated groundwater in accordance with all applicable federal, state and local laws.

III.E.7. If the groundwater protection standard is met during the compliance period, the Permittee must continue corrective action to the extent necessary to ensure that the groundwater protection standard is not exceeded. The Permittee may request EPD to allow the corrective action program to be terminated if the groundwater protection standard is not exceeded for three (3) consecutive years as provided in 40 CFR 264.100(f).

III.F. Sampling and Analysis Procedures

The Permittee shall use the following techniques and procedures when obtaining and analyzing samples from the groundwater monitoring wells described in Condition III.A. to provide a reliable indication of the quality of the groundwater as required under 40 CFR 264.97(d) and (e);

III.F.1. Samples shall be collected, preserved, and shipped (when shipped off-site for analysis) in accordance with the procedures specified in Section 11.1.3 of the permit application, which incorporates the EPA's Region IV Science and Ecosystem Support Division (SESD) Procedures found in its Field Branches Quality System and Technical Procedures. This includes sampling of groundwater and management of samples prior to analysis, pump operation, groundwater level and well depth measurement, and field measurement procedures.

III.F.2. Samples shall be analyzed according to the procedures specified in Section 11.1.3 of the permit application, or as specified in the current Test Methods for Evaluating Solid Waste: Physical/Chemical Methods, SW-846 using whichever procedure is more recent at the time of analysis.

III.F.3. Samples shall be tracked and controlled using the chain of custody procedures specified in Section 11.1.3 of the permit application.

III.G. Reporting, Recordkeeping, and Response

III.G.1. The Permittee shall enter all monitoring, testing, and analytical data obtained pursuant to Condition III in the operating record, as required by 40 CFR 264.73(b)(6).

III.G.2. The Permittee shall submit a report to the Director on the effectiveness of the corrective action program semi-annually to include all monitoring, testing and analytical data obtained under Condition III. The report shall be submitted within

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sixty (60) calendar days after receiving the laboratory analytical data. The following information must be provided in the report:

- III.G.2.a. A clear indication of those hazardous constituents which exceed the groundwater protection standard established under Condition III.B.;
- III.G.2.b. A comparison with previous monitoring data;
- III.G.2.c. A discussion of trends toward improvement or degradation of groundwater quality;
- III.G.2.d. Updated calculation(s) and a discussion regarding the estimated time remaining to complete corrective action;
- III.G.2.e. Purge volume calculations, purge adequacy and field measurements (data sheets); and
- III.G.2.f. The assessment of groundwater flow rate and direction required under Condition III.D.4.

III.H. Permit Modification

III.H.1. If the Permittee or the Director at any time determines that the corrective action program no longer satisfies the requirements of 40 CFR 264.100 or Condition III.E. for releases of hazardous waste, hazardous waste constituent(s), or hazardous constituent(s) that originate from the regulated unit, the Permittee must within ninety (90) calendar days submit an application for a permit modification to make any appropriate changes in the program.

III.H.2. If the Permittee meets or exceeds the requirements of 40 CFR 264.100 and meets the groundwater protection standard at the point of compliance and throughout the contaminant plume for three (3) consecutive years, the Permittee may submit an application for a permit modification pursuant to 40 CFR 270.41 or 40 CFR 270.42 to terminate corrective action and establish an alternate groundwater monitoring program.

III.I. Duty of Permittee

The Permittee shall assure that groundwater monitoring and corrective action measures necessary to achieve compliance with 40 CFR 264.100 and the groundwater protection standard under 40 CFR 264.92 are taken during the compliance period.

SECTION IV. CORRECTIVE ACTION FOR SOLID WASTE MANAGEMENT UNITS AND AREAS OF CONCERN

IV.A. Applicability

The requirements of this Section apply to the determination of the need for and subsequent implementation of corrective action for releases from all solid waste management units (SWMUs) and areas of concern (AOCs) contained within the facility

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property boundary as required by 40 CFR 264.101(a), and those extending beyond the facility property boundary, as required by 40 CFR 264.101(c) and §12-8-66 of the Georgia Hazardous Waste Management Act. The requirements of this Section apply, but are not limited to, the following SWMUs and AOCs:

IV.A.1. The SWMUs and AOCs identified in Appendix A.

IV.A.2. Any additional SWMUs or AOCs discovered after the date of issuance of this permit due to groundwater monitoring, on-going field investigations, environmental audits, or other means.

IV.B. Notification and Assessment Requirements for Newly Identified SWMUs and AOCs

IV.B.1. Within fifteen (15) calendar days of the Permittee's discovery of any SWMU or AOC under Condition IV.A.2., the Permittee shall notify the Director in writing of such discovery.

IV.B.2. The Director shall notify the Permittee in writing of the discovery of any SWMU or AOC under Condition IV.A.2.

IV.B.3. Within sixty (60) calendar days of the Permittee's discovery pursuant to Condition IV.B.1. or within sixty (60) calendar days of receipt of the Director's notification under Condition IV.B.2., the Permittee shall submit to the Director the following information for each SWMU or AOC:

IV.B.3.a. Location on a topographic map of appropriate scale as required under 40 CFR 270.14(b)(19);

IV.B.3.b. Designation of type and function of SWMU/AOC;

IV.B.3.c. General dimensions, capacities and structural description (supply any available plans/drawings);

IV.B.3.d. Dates of SWMU/AOC operation;

IV.B.3.e. Specification of all wastes that have been managed at/in the SWMU or AOC to the extent available; and

IV.B.3.f. All available information pertaining to any release of hazardous waste, hazardous constituent(s) or hazardous waste constituent(s) (to include soil analyses, sediment, air, groundwater, and/or surface water data).

IV.B.4. The Director shall review the information submitted pursuant to Condition IV.B.3. and notify the Permittee in writing as to the need for further investigation, interim measures/stabilization requirements and/or corrective action as required by Condition IV.D., IV.E., IV.F., or IV.G.

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IV.C. Notification Requirements for Newly Discovered Releases at Previously Identified SWMUs and AOCs

- IV.C.1. Within thirty (30) calendar days of the Permittee's discovery of (a) previously unidentified release(s) from any SWMU or AOC identified under Condition IV.A, the Permittee shall notify the Director in writing of such discovery.
- IV.C.2. The Director shall notify the Permittee in writing of the discovery of any previously unidentified release(s) from any SWMU or AOC identified in Condition IV.A.
- IV.C.3. Within ninety (90) calendar days of the Permittee's discovery under Condition IV.C.1. or within ninety (90) calendar days of the date of receipt of the Director's notification under Condition IV.C.2., the Permittee shall submit to the Director, a RCRA Facility Investigation Workplan pursuant to Condition IV.F.

IV.D. Verification Investigation

- IV.D.1. The Director may require the Permittee to submit a Verification Investigation (VI) Workplan for any SWMU or AOC discovered under Condition IV.A.2. in a schedule to be determined by the Director. The VI Workplan shall describe all actions necessary to verify the presence or absence of a release for any SWMU or AOC. The VI Workplan shall include a schedule of implementation which includes intermediate milestones beginning with the Permittee's receipt of the Director's written approval of the VI Workplan continuing through submission of the VI Report required by Condition IV.D.3.
- IV.D.2. Upon receipt of the Director's written approval of the VI Workplan, the Permittee shall implement the Workplan in accordance with the schedule of implementation contained therein.
- IV.D.3. The Permittee shall submit a VI Report in accordance with the schedule of implementation contained within the approved VI Workplan. The VI Report shall describe all actions taken to verify the presence or absence of releases including all data collected during the VI. The Director shall review the VI Report and notify the Permittee in writing of the need for further investigation, interim measures and/or corrective action pursuant to Condition IV.E., IV.F., and/or IV.G., or of a finding of no further action required.

IV.E. Interim Measures

- IV.E.1. Upon the Director's concurrence, the Permittee may conduct interim measures to contain, remove, or treat contamination resulting from releases from any SWMU or AOC as necessary to protect human health and the environment. Such interim measures may be conducted concurrently with any investigations required by this permit.

- IV.E.2. Within thirty (30) calendar days of the Permittee's determination that interim measures are necessary, or within thirty (30) calendar days of receipt of the Director's written notice that interim measures are necessary, the Permittee shall submit to the Director an Interim Measures (IM) Workplan. The IM Workplan shall describe all measures necessary to contain, remove or treat contamination resulting from releases from any SWMU or AOC. The IM Workplan shall include a schedule of implementation, which includes intermediate milestones beginning with the Permittee's receipt of the Director's written approval of the IM Workplan and continuing through submission of the IM Report required by Condition IV.E.5.
- IV.E.3. Upon receipt of the Director's written approval of the IM Workplan, the Permittee shall implement the Workplan in accordance with the schedule of implementation contained therein.
- IV.E.4. The Permittee shall provide written notice to the Director as soon as possible of any planned changes, reductions or additions to the interim measures described in the IM Workplan.
- IV.E.5. The Permittee shall submit an IM Report in accordance with the schedule of implementation contained in the approved IM Workplan. The IM Report shall describe all interim measures taken to contain, remove or treat contamination resulting from releases from any SWMU or AOC. The IM Report shall also provide a summary of all data or other information obtained during implementation of the IM Workplan and a summary of the effectiveness of the interim measures in achieving the objective of Condition IV.G.

IV.F. RCRA Facility Investigation

- IV.F.1. Within ninety (90) calendar days of the date of receipt of the Director's written notice pursuant to Condition IV.B.4., IV.C.3., and/or IV.D.3. the Permittee shall submit to the Director a RCRA Facility Investigation (RFI) Workplan.
- IV.F.2. The RFI Workplan shall provide a description of the specific actions necessary to determine the full nature and extent of contamination associated with releases from any SWMU and AOC identified by Condition IV.A., IV.B., IV.C., and IV.D., including potential migration pathways for those releases (e.g. air, land, surface water, and groundwater), actual or potential receptors and applicable background concentrations. The Permittee must provide sufficient justification that migration through a potential pathway is not likely if a potential migration pathway associated with a release is not included in the Workplan. Such deletions are subject to the approval of the Director.
- IV.F.3. The RFI Workplan shall include a schedule of implementation, which includes intermediate milestones beginning with the Permittee's receipt of the Director's

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written approval of the RFI Workplan and continuing through submission of the RFI Report required by Condition IV.F.5.

- IV.F.4. The Permittee shall implement the RFI in accordance with the approved RFI Workplan required by Condition IV.F.2. and IV.F.3.
- IV.F.5. The Permittee shall submit a RFI Report in accordance with the schedule of implementation contained in the approved RFI Workplan. The Report shall provide a summary of all activities undertaken during the RFI to implement the approved Workplan. The Report shall provide a complete description of the nature and extent of contamination associated with all releases evaluated during the RFI including sources, migration pathways, actual or potential receptors, and applicable background concentrations. The RFI Report shall address all releases which extend beyond the facility property boundary unless the Permittee demonstrates to the Director's satisfaction that, despite the Permittee's best efforts, the Permittee was unable to obtain permission to undertake actions required by the Workplan, or such action is not necessary to protect human health or the environment.
- IV.F.6. The Director shall review the RFI Report required under Condition IV.F.5. and notify the Permittee in writing of the need for further investigation and/or corrective action as required by Condition IV.G., 40 CFR 264.101(a) and 40 CFR 264.101(c), or of a finding of no further action required.
- IV.F.7. Within thirty (30) calendar days of the Permittee's receipt of the Director's written notice for further investigation referenced in Condition IV.F.6., the Permittee must address, to the Director's satisfaction, all comments and concerns included in the Director's written notice referenced in Condition IV.F.6.

IV.G.1 Corrective Action

- IV.G.1. Within ninety (90) calendar days of the Permittee's receipt of the Director's written notice referenced in Condition IV.B.4., IV.D.3., and IV.F.6., the Permittee shall submit a Corrective Action Plan (CAP) to the Director. The CAP shall provide a description of the corrective measures to be taken with regard to releases from any SWMU and AOC identified in Condition IV.B.4., IV.D.3., and IV.F.1. The CAP shall be submitted as a request for permit modification in accordance with 40 CFR 270.41 and 270.42. The Permittee is not relieved of all responsibility to clean up a release that has migrated beyond the facility's boundary where offsite access is denied as required under 40 CFR 264.101(c).
- IV.G.2. The CAP shall include a schedule of implementation with intermediate milestones beginning with the issuance of the permit modification requested pursuant to Condition IV.G.1. and continuing through the compliance period.

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- IV.G.3. The CAP shall include a cost estimate and demonstration of financial responsibility for completing such corrective action as required by 40 CFR 264.101(b), O.C.G.A. §12-8-68, and Rule 391-3-11-.05.
- IV.G.4. The Director shall review the CAP required under Condition IV.G.1. and notify the Permittee in writing of the need for further corrective measures as required by 40 CFR 264.101(a) and 40 CFR 264.101(c), or of an approval of the CAP.
- IV.G.5. Within thirty (30) calendar days of Permittee's receipt of Director's written notice for further corrective measures referenced in Condition IV.G.4., the Permittee must address, to the Director's satisfaction, all comments and concerns included in the Director's written notice referenced in Condition IV.G.4.
- IV.G.6. The Revised Todd Creek Stabilization Plan, dated October 14, 2016, is incorporated by reference. The following provisions are requirements of this permit:
 - IV.G.6.a. For ECM-2, ECM-3, and ECM-4, the Primary Contingency Plan design and permitting must be initiated no later than the point in time which is concurrent with bank erosion reaching the 115-ft Trigger Pin (115-ft distance from the baseline);
 - IV.G.6.b. For ECM-0, ECM-1, ECM-2, ECM-3, and ECM-4, corrective action activities described in the approved Primary Contingency Plan must be completed prior to or concurrent with bank erosion reaching the 100-ft Trigger Pin (100-ft distance from the baseline);
 - IV.G.6.c. For ECM-0, ECM-1, ECM-2, ECM-3, and ECM-4, the Secondary Contingency Plan must be evaluated/designed prior to or concurrent with: (1) greater than 1 ft of bluff lost within a 12 month period; and/or (2) a total distance of 5 ft of bluff lost past the 100-ft Trigger Pin (i.e. 95-ft distance from the baseline);
 - IV.G.6.d. For ECM-0, ECM-1, ECM-2, ECM-3, and ECM-4, corrective action activities described in the approved Secondary Contingency Plan must be completed prior to or concurrent with bank erosion reaching the 85-ft Trigger Pin (i.e. 85-ft distance from the baseline);

IV.H. Schedule of Compliance

- IV.H.1. All plans and reports required by this Section are subject to the approval of the Director prior to implementation. The Director shall specify in writing any deficiencies of any plan and/or report submitted by the Permittee pursuant to this Section, including a schedule for resubmission of revised documents to address said deficiencies. The Permittee shall revise all submittals as specified by the Director, and must address, to the Director's satisfaction, all comments and concerns included in the Director's written notice.

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- IV.H.2. For any schedule of implementation required by this Section, if the time required to complete any interim activity is more than one year, the schedule shall specify interim dates for the submission of reports of progress toward satisfaction of the interim requirements.
- IV.H.3. The results of all plans and reports shall be submitted in accordance with the approved schedule. Extensions of the due date for the submittal of any plan or report may be granted by the Director based on the Permittee's demonstration that sufficient justification for the extension exists. Extensions of over thirty (30) calendar days must be requested in writing.
- IV.H.4. Upon approval by the Director, all plans, reports and schedules shall be enforceable as conditions of this permit.
- IV.H.5. If at any time the Permittee determines that any plan, report or schedule required under this Section no longer satisfies the requirements of this permit or 40 CFR 264.101, the Permittee must submit an amended plan, report or schedule to the Director within thirty (30) calendar days of such determination.
- IV.H.6. If at any time the Director determines that any plan, report or schedule required under this Section no longer satisfies the requirements of this permit or 40 CFR 264.101, the Director will so notify the Permittee in writing and request that an amended plan, report or schedule be submitted in accordance with a schedule to be specified.

IV.I. Permit Modification

If required to develop a CAP under Condition IV.G. and 40 CFR 264.101, or amend/modify a CAP, the Permittee shall apply for a permit modification pursuant to 40 CFR 270.41 and 270.42.

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Table A

| Hazardous Constituent | Concentration (µg/l) | Basis |
|---------------------------------------|-----------------------------|----------------------------|
| 2,4,5-T (Trichlorophenoxyacetic Acid) | 122 | ACL* |
| 2,4-D (Dichlorophenoxyacetic Acid) | 100 | Table 1 from 40 CFR 264.94 |
| 2-Chlorophenol | 71 | ACL* |
| 2-Methylnaphthalene | 27 | ACL* |
| 3-Methylphenol (m-Cresol) | 716 | ACL* |
| 4-Methylphenol (p-Cresol) | 72 | ACL* |
| Acetone | 12714 | ACL* |
| Acetonitrile | 257 | ACL* |
| Aldicarb | 15 | ACL* |
| Antimony | 6 | ACL* |
| Arsenic | 50 | Table 1 from 40 CFR 264.94 |
| Barium | 1000 | Table 1 from 40 CFR 264.94 |
| Carbon Disulfide | 559 | ACL* |
| Chromium | 50 | Table 1 from 40 CFR 264.94 |
| Cyanide | 200 | ACL* |
| Ethylbenzene | 700 | ACL* |
| Fluoride | 4000 | ACL* |
| Formaldehyde | 2 | ACL* |
| Methyl Ethyl Ketone | 6549 | ACL* |
| Methacrylonitrile | 1 | ACL* |
| Methylene Chloride | 5 | ACL* |
| Naphthalene | 1 | ACL* |
| Nickel | 100 | ACL* |
| Phenol | 4475 | ACL* |
| Pyridine | 15 | ACL* |
| Selenium | 10 | Table 1 from 40 CFR 264.94 |
| Silvex (2,4,5,-TP) | 10 | Table 1 from 40 CFR 264.94 |
| Sulfide | Background | Background |
| Toluene | 1000 | ACL* |
| Vanadium | 1 | ACL* |
| Xylenes | 10000 | ACL* |
| Zinc | 4674 | ACL* |
| 4-Chloroaniline | 0.40 | ACL** |
| Dibenzofuran | 1.2 | ACL** |
| 1,4-dichlorobenzene | 75 | ACL** |
| Fluorine | 43 | ACL** |
| Phenanthrene | 11 | ACL** |

*See Section 10 of the January 2011 permit application

** See Attachment B of the October 14, 2016 Union Carbide revised permit modification request

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APPENDIX A

SOLID WASTE MANAGEMENT UNIT AND AREA OF CONCERN SUMMARY

| SWMU or AOC | 40 CFR 264.90(a)(2) Regulated Unit? | RFI Required? | RFI Complete? | Corrective Action Required? | No Further Action |
|--|-------------------------------------|---------------|---------------|-----------------------------|-------------------|
| SWMU 01A – Munitions Debris Area | No | Yes | Yes | U | No |
| SWMU 01 – Closed Landfill | Yes | Yes | Yes | Yes | No |
| SWMU 02 – Surface Storage of Empty Drums | No | Yes | Yes | No | Yes |
| SWMU 03 – Buried CS Trench and Surface Debris Area, Aldicarb Disposal Area | No | Yes | Yes | No | Yes |
| SWMU 04 – Acetone Evaporation Pond | No | Yes | Yes | No | Yes |
| SWMU 05 – Disposal Trench | No | Yes | Yes | No | Yes |
| SWMU 06 – Surface Disposal Area, Trench Area 1, Trench Area 2, Borrow Pit | No | Yes | Yes | No | Yes |
| SWMU 07 – Surface Disposal Area | No | Yes | Yes | No | Yes |
| SWMU 08 – 2015 MEC/MC Disposal Area 1 | No | Yes | No | U | No |
| SWMU 09 – 2015 MEC/MC Disposal Area 2 | No | Yes | No | U | No |

U – Undetermined

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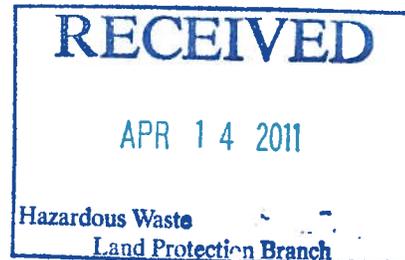
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Georgia Environmental Protection Division
Land Protection Branch
Hazardous Waste Corrective Action Program
2 Martin Luther King Jr. Drive, SE
Suite 1154 East
Atlanta, Georgia 30334



Environmental Covenant

This instrument is an Environmental Covenant executed pursuant to the Georgia Uniform Environmental Covenants Act, OCGA § 44-16-1, *et seq.* This Environmental Covenant subjects the Property identified below to the activity and/or use limitations specified in this document. The effective date of the Environmental Covenant shall be the date upon which the fully executed Environmental Covenant has been recorded in accordance with OCGA § 44-16-8(a)

Fee Owner of Property/Grantor:

Union Carbide Corporation
A wholly owned subsidiary of the Dow Chemical
Company
P.O. Box 4393
Houston, TX 77210

Grantee/Holder:

Union Carbide Corporation
A wholly owned subsidiary of the Dow Chemical
Company
P.O. Box 4393
Houston, TX 77210

**Grantee/Entity with
Express power to enforce:**

State of Georgia
Department of Natural Resources
Environmental Protection Division
2 Martin Luther King, Jr. Drive, SE
Suite 1154 East
Atlanta, Georgia 30334

Parties with interest in the Property:

N/A

Property:

The area subject to this Environmental Covenant is 4,011.54 acres entirely within the Union Carbide Corporation (hereinafter "UCC") Woodbine Facility, located at 5954 Union Carbide Road in Woodbine, Camden County, Georgia. The tract of land containing this area (4,011.54 acres) was conveyed on November 1976 from Thiokol Corporation to Union Carbide Corporation recorded in Deed Book 262, Page 227, Camden County Records. The area is located in the 31st G.M.D. District of Camden County, Georgia. The area includes a closed

landfill that is approximately 22-acres in size. The buffer zone around the landfill includes another 36 acres, therefore the combined landfill and buffer total 58.16-acres (hereinafter "RCRA landfill"). A complete legal description of the RCRA landfill is attached as Exhibit A and a map of the area is attached as Exhibit B.

Tax Parcel Number(s):

155 001 of Camden County, Georgia

Name and Location of Administrative Records:

The post-closure care and corrective action at the RCRA landfill that is the subject of this Environmental Covenant is described in the following document:

- Revised Hazardous Waste Facility Permit Renewal Application – Permit No. HW-063(D), dated August 20, 2010, as amended or renewed.

This document is available at the following locations:

Georgia Environmental Protection Division
Land Protection Branch
Hazardous Waste Corrective Action Program
2 Martin Luther King, Jr. Drive, SE
Suite 1154 East
Atlanta, Georgia 30334

Union Carbide Corporation
5954 Union Carbide Road
Woodbine, Georgia 31569

Description of Contamination, Post-Closure Care and Corrective Action:

This property is subject to a Resource Conservation Recovery Act (RCRA) hazardous waste facility permit [HW-063(D)] and has been designated as needing corrective action due to the presence of hazardous waste, hazardous waste constituents, or hazardous constituents regulated under the Georgia Hazardous Waste Management Act, § 12-8-60 et seq. (Act) and the Georgia Hazardous Waste Management Rules, 391-3-11 (Rules). Contact the property owner or the Georgia Environmental Protection Division for further information concerning this property.

This Declaration of Covenant is made pursuant to the Georgia Uniform Environmental Covenants Act, O.C.G.A. § 44-16-1, *et seq* by UCC, its successors and assigns, Camden County Planning and Building Department, and the State of Georgia, Department of Natural Resources, Environmental Protection Division (hereinafter "EPD"), its successors and assigns. This Environmental Covenant is required because the property was used for the disposal of both hazardous and non-hazardous waste. The hazardous waste, hazardous waste constituents, or hazardous constituents disposed of in the landfill are listed in Section II and Table A of Hazardous Waste Facility Permit HW-063(D) (hereinafter "constituents of concern"). Post-closure care and corrective action, as required by Hazardous Waste Facility Permit HW-063(D) Sections II and III, consists of, but is not limited to, the installation and maintenance of engineering controls (clay cap, fencing, maintenance of vegetative cover, and groundwater

monitoring and corrective action system) and institutional controls (limit use to non-residential activities, prohibit groundwater use) to protect human health and the environment.

Grantor, UCC, hereby binds Grantor, its successors and assigns to the activity and use restriction(s) for the area (4,011.54 acres), including the RCRA landfill identified herein and grants such other rights under this Environmental Covenant in favor of Camden County Planning and Building Department and EPD. EPD shall have full right of enforcement and the rights conveyed under this Environmental Covenant pursuant to the Act and Rules. Failure to timely enforce compliance with Environmental Covenant or the use or activity limitation contained herein by any person shall not bar subsequent enforcement by such person and shall not be deemed a waiver of the person's right to take action to enforce any non-compliance. Nothing in this Environmental Covenant shall restrict EPD from exercising any authority under applicable law.

UCC makes the following declaration as to limitations, restrictions, and uses to which the area (4,011.54 acres), including the RCRA landfill may be put and specified that such declarations shall constitute covenants to run with the land, pursuant to O.C.G.A § 44-16-5 (a); is perpetual, unless modified or terminated pursuant to the terms of this Covenant pursuant to O.C.G.A § 44-16-9; and shall be binding on all parties and all persons claiming under them, including all current and future owners of any portion of or interest in the RCRA landfill (hereinafter "Owner"). Should a transfer or sale of the area (4,011.54 acres), including the RCRA landfill occur before such time as this Environmental Covenant has been amended or revoked then said Environmental Covenant shall be binding on the transferee(s) or purchaser(s).

The Environmental Covenant shall inure to the benefit of EPD, Camden County Planning and Building Department, UCC and their respective successors and assigns and shall be enforceable by the Director of EPD (hereinafter "Director") or his agents or assigns, UCC or its successors and assigns, Camden County Planning and Building Department or its successors and assigns, and other party(ies) as provided for in O.C.G.A V § 44-16-11 in a court of competent jurisdiction.

Activities and/or Use Limitation(s)

1. **Registry.** Pursuant to O.C.G.A. § 44-16-12, this Environmental Covenant and any amendment or termination thereof, may be contained in EPD's registry for environmental covenants.
2. **Notice.** The Owner of the area (4,011.54 acres), including the RCRA landfill must give thirty (30) day advance written notice to EPD of the Owner's intent to convey any interest in the area (4,011.54 acres), including the RCRA landfill. No conveyance of title, easement, lease, or other interest in the area (4,011.54 acres), including the RCRA landfill shall be consummated by the Owner without adequate and complete provision for continued monitoring, operation, and maintenance of the post-closure care and corrective action program. The Owner of the area (4,011.54 acres), including the RCRA landfill must also give thirty (30) day advance written notice to EPD of the Owner's intent to change the use of the RCRA landfill, apply for building permit(s), or propose any site work that would affect the RCRA landfill.
3. **Notice of Limitation in Future Conveyances.** Each instrument hereafter conveying an interest in the area (4,011.54 acres), including the RCRA landfill subject to this

Environmental Covenant shall contain a notice of the activity and use limitations set forth in the Environmental Covenant and shall provide the recorded location of the Environmental Covenant.

4. **Monitoring.** The post-closure care and corrective action program detailed in the *Revised Hazardous Waste Facility Permit Renewal Application – Permit No. HW-063(D)* dated August 20, 2010, as amended, must be implemented to ensure compliance with Law and Rules.
5. **Periodic Reporting.** Semi-annually, the Owner shall submit to EPD a report as specified in Conditions III.H.3. of Hazardous Waste Facility Permit HW-063(D) and the EPD approved post-closure care and corrective action plan, which includes, but is not limited to: groundwater monitoring report results, maintenance and inspection activities, certification of non-residential use of the RCRA landfill, and documentation stating whether or not the activity and use limitation in this Environmental Covenant are being abided by.
6. **Activity and Use Limitation(s).** The area (4,011.54 acres), including the RCRA landfill shall be used only for non-residential uses, as defined as any real property or portion of a property not currently being used for human habitation or for other purposes with a similar potential for human exposure, at which activities have been or are being conducted that can be categorized in one of the 1987 Standard Industrial Classification (SIC) major groups 01-97 inclusive (except the four-digit codes 4941, 8051, 8059, 8062-3, 8069, 8211, 8221-2, 8351, 8661 and 9223). Non-residential property includes all of the contiguous block(s) and lot(s) controlled by the same owner or operator that are vacant land, or that are used in conjunction with such business; and defined in and allowed under the Camden County's zoning regulations as of the date of this Environmental Covenant. Any residential use on the area (4,011.54 acres), including the RCRA landfill shall be prohibited. Any activity on the area (4,011.54 acres), including the RCRA landfill that may result in the release or exposure to hazardous wastes, hazardous constituents, hazardous waste constituents or the constituents of concern that were contained as part of the post-closure care and corrective action program, or create a new exposure pathway, is prohibited. With exception of work necessary for the maintenance, repair, or replacement of engineering controls, activities that are prohibited in the capped areas include, but are not limited to the following: drilling, digging, placement of any objects or use of any equipment which deforms or stresses the surface beyond its load bearing capability, piercing the surface with a rod, spike or similar item, bulldozing or earthwork.
7. **Groundwater Limitation.** The use or extraction of groundwater beneath the area (4,011.54 acres), including the RCRA landfill for drinking water or for any other non-remedial purposes shall be prohibited.
8. **Permanent Markers.** Permanent markers on each side of the RCRA landfill shall be installed and maintained that delineate the restricted area as specified in 40 CFR 261.14(c) and 40 CFR 264.310(b)(6). Disturbance or removal of such markets is prohibited.
9. **Right of Access.** In addition to any rights already possessed by EPD and/or the Camden County Planning and Building Department, the Owner shall allow authorized representatives of EPD and/or Camden County Planning and Building Department the right to enter the area (4,011.54 acres), including the RCRA landfill at reasonable times for the purpose of evaluating the post-closure care and corrective action program to take samples,

to inspect the RCRA landfill, to inspect records that are related to the post-closure care and corrective action program, and to determine compliance with this Environmental Covenant.

10. Recording of Environmental Covenant and Proof of Notification. Within thirty (30) days after the date of the Director's signature, the Owner shall file this Environmental Covenant with the Recorders of Deeds for each County in the area (4,011.54 acres), including the RCRA landfill is located, and send file stamped copy of this Environmental Covenant to EPD within thirty (30) days of recording. Within that time period, the Owner shall also send a file-stamped copy to each of the following: (1) Camden County Planning and Building Department, (2) each person holding a record of interest in the area (4,011.54 acres), including the RCRA landfill subject to the covenant, (3) each person in possession of the real property subject to the covenant, (4) each municipality, county, consolidated government, or other unit of local government in which real property subject to the covenant is located, and (5) each owner in fee simple whose property abuts the property subject to the Environmental Covenant.
11. Termination or Modification. The Environmental Covenant shall remain in full force and effect in accordance with O.C.G.A. § 44-16-5, unless and until the Director determines that the area (4,011.54 acres), including the RCRA landfill is no longer subject to the post-closure care and corrective action program requirements under Hazardous Waste Facility Permit HW-063(D), whereupon the Environmental Covenant may be amended or revoked in accordance O.C.G.A § 44-16-1 *et seq.*
12. Severability. If any provision of this Environmental Covenant is found to be unenforceable in any respect, the validity, legality, and enforceability of the remaining provisions shall not in any way be affected or impaired.
13. No Property Interest Created in EPD. This Environmental Covenant does not in any way create any interest by EPD in the area (4,011.54 acres), including the RCRA landfill that is subject to the Environmental Covenant. Furthermore, the act of approving this Environmental Covenant does not in any way create any interest by EPD in the RCRA landfill in accordance with O.C.G.A § 44-16-3(b).

Representations and Warranties.

Grantor hereby represents and warrants to the other signatories hereto:

- a) That the Grantor has the power and authority to enter into this Environmental Covenant, to grant the rights and interests herein provided and to carry out all obligations hereunder;
- b) That the Grantor is the sole owner of the Property and holds fee simple title which is free, clear and unencumbered;
- c) That the Grantor has identified all other parties that hold any interest (e.g. encumbrance) in the Property and notified such parties of the Grantor's intention to enter into this Environmental Covenant;
- d) That this Environmental Covenant will not materially violate, contravene, or constitute a material default under any other agreement, document or instrument to which Grantor is a party, by which Grantor may be bound or affected;

- e) That the Grantor has served each of the people or entities referenced in Activity 10 above with an identical copy of this Environmental Covenant in accordance with O.C.G.A. § 44-16-4(d).
- f) That this Environmental Covenant will not materially violate or contravene any zoning law or other law regulating use of the Property; and
- g) That this Environmental Covenant does not authorize a use of the Property that is otherwise prohibited by a recorded instrument that has priority over the Environmental Covenant.

Notices.

Any document or communication required to be sent pursuant to the terms of this Environmental Covenant shall be sent to the following persons:

Georgia Environmental Protection Division
Branch Chief
Land Protection Branch
2 Martin Luther King Jr. Drive SE
Suite 1154 East Tower
Atlanta, GA 30334

Union Carbide Corporation
P.O. Box 4393
Houston, TX 77210

Camden County Planning and Building Department
107 Gross Road
Suite 2
Kingsland, GA 31548

Grantor has caused this Environmental Covenant to be executed pursuant to The Georgia Uniform Environmental Covenants Act, on the 27 day of January, 2011.

UNION CARBIDE CORPORATION

[Signature]
Timothy A. King
Authorized Representative for Union Carbide Corporation
Union Carbide Corporation
1254 Enclave Parkway
Houston, TX 77077

Dated: 1/27/11

[Signature]
WITNESS: Peggy A. Given

UNION CARBIDE CORPORATION AS HOLDER

[Signature]
Timothy A. King
Authorized Representative for Union Carbide Corporation
Union Carbide Corporation
1254 Enclave Parkway
Houston, TX 77077

Dated: 1/27/11

[Signature]
WITNESS: Peggy A. Given

CAMDEN COUNTY PLANNING AND BUILDING DEPARTMENT

[Signature]
[Name of Person Acknowledging Receipt]
[Title]

Dated: 3-22-11

[Signature]
WITNESS

**STATE OF GEORGIA
ENVIRONMENTAL PROTECTION DIVISION**

[Signature]
F. Allen Barnes
Director, Georgia Environmental Protection Division

Dated: 3-25-2011

[Signature]
Notary CAMDEN COUNTY
EXPIRES 16 FEBRUARY 2015

[Signature]
witness

CLERK'S NOTE: CONTINUE NEXT PAGE



[Signature]
Notary 3-25-2011

[INDIVIDUAL ACKNOWLEDGMENT]

STATE OF West Virginia
COUNTY OF Kanawha

On this 27th day of January, 2011, I certify that Timothy A. King personally appeared before me, and acknowledged that he/she is the individual described herein and who executed the within and foregoing instrument and signed the same at his/her free and voluntary act and deed for the uses and purposes therein mentioned.



Iris Jeanne Songer
Notary Public in and for the State of
West Virginia, residing at South Charleston
My appointment expires July 17, 2016

[CORPORATE ACKNOWLEDGMENT]

STATE OF West Virginia
COUNTY OF Kanawha

On this 27th day of January, 2011, I certify that Timothy A. King personally appeared before me, acknowledged that he/she is the Authorized Representative of the corporation that executed the within and foregoing instrument, and signed said instrument by free and voluntary act and deed of said corporation, for the uses and purposes therein mentioned, and on oath stated that he/she was authorized to execute said instrument for said corporation.



Iris Jeanne Songer
Notary Public in and for the State of
West Virginia, residing at South Charleston
My appointment expires July 17, 2016

[REPRESENTATIVE ACKNOWLEDGEMENT]

STATE OF _____
COUNTY OF _____

On this _____ day of _____, 20____, I certify that _____ personally appeared before me, acknowledged that he/she signed this instrument, on oath stated that he/she was authorized to execute this instrument, and acknowledged it as the _____ [type of authority] of _____ [name of party being represented] to be the free and voluntary act and deed of such party for the uses and purposes mentioned in the instrument.

Notary Public in and for the State of
Georgia, residing at _____.
My appointment expires _____.

CLERK'S NOTE: CONTINUE NEXT PAGE

EXHIBIT A

Legal Description for the Hazardous Waste Landfill

UCC-Woodbine (Camden County) Georgia

A parcel of land lying in Georgia Militia District 31, Camden County, Georgia containing 58.17 acres more or less, and being more particularly described as follows:

For a POINT OF REFERENCE commence at a point lying on the westerly line of said lands described in Reference Deed Book 262, Page 227, said point being described as the POINT OF BEGINNING of just mentioned lands; Thence South 16°50'37" West, along said westerly line, 171.97 feet; thence South 73°09'23" East, departing said westerly line, 635.80 feet to a 3 inch diameter, 6 foot high, metal fence post and the POINT OF BEGINNING of the herein described lands: Said POINT OF BEGINNING having a Northing of 346438.73 and an Easting of 851886.63, said coordinates expressed in U.S. Survey Feet and being referenced to the Georgia State Plane Coordinate System, East Zone, (1001), North American Datum of 1983, 2007 adjustment. Thence, from said POINT OF BEGINNING,

1. South 88°13'28" East, 804.79 feet to a 3 inch diameter, 6 foot high, metal fence post, having a Northing of 346413.79 and Easting of 852691.04;
2. thence South 06°25'21" East, 893.63 feet to a 3 inch diameter, 6 foot high, metal fence post, having a Northing of 345525.76 and an Easting of 852791.00;
3. thence North 86°24'59" East, 433.86 feet to a 3 inch diameter, 6 foot high, metal fence post, having a Northing of 345552.88 and an Easting of 853224.01;
4. thence South 20°37'29" West, 431.76 feet to a 3 inch diameter, 6 foot high, metal fence post, having a Northing of 345148.80 and an Easting of 853071.92;
5. thence South 53°25'54" East, 289.38 feet, to a 3 inch diameter, 6 foot high, metal fence post, having a Northing of 344976.39 and an Easting of 853304.34;
6. thence North 68°51'14" East, 542.03 feet to a 3 inch diameter, 6 foot high, metal fence post, having a Northing of 345171.93 and an Easting of 853809.87;
7. thence North 01°34'43" West, 780.53 feet to a 2 inch diameter, 6 foot high, metal fence post, having a Northing of 345952.16 and an Easting of 853788.37;
8. thence North 09°24'51" West, 460.73 feet to a 2 inch diameter, 6 foot high, metal fence post, having a Northing of 346406.68 and an Easting of 853713.01;
9. thence North 14°37'48" West, 345.87 feet to a 2 inch diameter, 6 foot high, metal fence post, having a Northing of 346741.34 and an Easting of 853625.65;
10. thence North 04°05'48" West, 381.17 feet to a 3 inch diameter, 6 foot high, metal fence post, having a Northing of 347121.54 and an Easting of 853598.42;
11. thence North 86°26'46" West, 1707.03 feet to a 3 inch diameter, 6 foot high, metal fence post, having a Northing of 347227.35 and an Easting of 851894.67;
12. thence South 00°35'04" West, 788.67 feet to the point of beginning.

BOOK PAGE

1562 00636

EXHIBIT B

Survey Plat for the Hazardous Waste Landfill

UCC-Woodbine (Camden County) Georgia

Recorded MAR 29 2011

Austin L. Waldron

Clerk Superior Court

A MAP SHOWING A BOUNDARY SURVEY

OF
THE HAZARDOUS WASTE LANDFILL LOCATED ON
THE UCC-WOODBINE PROPERTY
CAMDEN COUNTY, GEORGIA

Description:

A parcel of land lying in Georgia Militia District 31, Camden County, Georgia containing 58.17 acres more or less, and being more particularly described as follows:

For a POINT OF REFERENCE commence at a point lying on the westerly line of said lands described in Reference Deed Book 262, Page 227, said point being described as the POINT OF BEGINNING of just mentioned lands; Thence South 16°50'37" West, along said westerly line, 171.97 feet; thence South 73°09'23" East, departing said westerly line, 635.80 feet to a 3 inch diameter, 6 foot high, metal fence post and the POINT OF BEGINNING of the herein described lands; Said POINT OF BEGINNING having a Northing of 346438.73 and an Easting of 851886.63, said coordinates expressed in U.S. Survey Feet and being referenced to the Georgia State Plane Coordinate System, East Zone, (1001), North American Datum of 1983, 2007 adjustment. Thence, from said POINT OF BEGINNING, South 88°13'28" East, 804.79 feet to a 3 inch diameter, 6 foot high, metal fence post, having a Northing of 345525.76 and an Easting of 852691.04; thence South 08°25'21" East, 893.63 feet to a 3 inch diameter, 6 foot high, metal fence post, having a Northing of 345525.76 and an Easting of 852791.00; thence North 86°24'59" East, 433.86 feet to a 3 inch diameter, 6 foot high, metal fence post, having a Northing of 345552.88 and an Easting of 853224.01; thence South 20°37'29" West, 431.76 feet to a 3 inch diameter, 6 foot high, metal fence post, having a Northing of 345148.80 and an Easting of 853071.92; thence South 53°25'54" East, 299.38 feet, to a 3 inch diameter, 6 foot high, metal fence post, having a Northing of 344976.39 and an Easting of 853304.34; thence North 68°51'14" East, 542.03 feet to a 3 inch diameter, 6 foot high, metal fence post, having a Northing of 345171.93 and an Easting of 853809.87; thence North 01°34'43" West, 780.53 feet to a 2 inch diameter, 6 foot high, metal fence post, having a Northing of 345952.16 and an Easting of 853788.37; thence North 09°24'51" West, 460.73 feet to a 2 inch diameter, 6 foot high, metal fence post, having a Northing of 346406.68 and an Easting of 853713.01; thence North 14°37'48" West, 345.87 feet to a 2 inch diameter, 6 foot high, metal fence post, having a Northing of 346741.34 and an Easting of 853625.65; thence North 04°05'48" West, 381.17 feet to a 3 inch diameter, 6 foot high, metal fence post, having a Northing of 347121.54 and an Easting of 853598.42; thence North 86°26'46" West, 1707.03 feet to a 3 inch diameter, 6 foot high, metal fence post, having a Northing of 347227.35 and an Easting of 851894.67; thence South 00°35'04" West, 788.67 feet to the point of beginning.

NOTES:

- 1.) BEARINGS AND COORDINATES SHOWN HEREON REFER TO THE GEORGIA STATE PLANE COORDINATE SYSTEM, EAST ZONE (1001), NORTH AMERICAN DATUM OF 1983, 2007 ADJUSTMENT (NAD83/2007) AND ARE EXPRESSED IN U.S. SURVEY FEET.
- 2.) THIS SURVEY WAS PREPARED WITHOUT THE BENEFIT OF A TITLE ABSTRACT.
- 3.) THE LOCATION OF THE INTERIOR CELL BOUNDARIES AS SHOWN HEREON WERE NOT LOCATED AS PART OF THIS SURVEY BUT WERE TAKEN FROM PREVIOUS SURVEYS DONE BY THIS FIRM.
- 4.) NO INTERIOR IMPROVEMENTS WERE LOCATED BY THIS SURVEY.
- 5.) NO ATTEMPT WAS MADE BY THIS SURVEYOR TO LOCATE ANY JURISDICTIONAL WETLANDS OR ENVIRONMENTALLY SENSITIVE AREAS, IF ANY.
- 6.) THIS IS A SURFACE SURVEY ONLY. UNDERGROUND IMPROVEMENTS, SUCH AS FOOTERS OR UTILITIES, WERE NOT LOCATED.
- 7.) INTERIOR AND EXTERIOR PERIMETER TRAIL ROADS ALONG THE FENCE/BOUNDARY ARE NOT SHOWN.
- 8.) THE FENCE SHOWN HEREON IS 6 FEET ABOVE THE GROUND AND APPROXIMATELY 2 FEET BELOW THE GROUND, ACCORDING TO PERSONNEL ON SITE. THE FENCE WAS ERECTED AFTER THE SURVEY BY HENRY AND ASSOCIATES WAS PERFORMED AND THEREFORE IT IS THIS SURVEYOR'S OPINION THAT THE CORNERS SET FOR THE HENRY SURVEY WERE DESTROYED DUE TO THE TRENCHING FOR THE FENCE INSTALLATION.
- 9.) THE HORIZONTAL CONTROL POINTS UTILIZED IN THE CALIBRATION FOR THIS SURVEY WERE AS FOLLOWS:
N.G.S. P.I.D. DH4658, N 419349.730, E 842908.420, (NAD83/2007)
N.G.S. P.I.D. AA2804, N 421827.750, E 859222.640, (NAD83/2007)
N.G.S. P.I.D. BC2488, N 247539.430, E 879666.760, (NAD83/2007)
N.G.S. P.I.D. AB4019, N 247772.130, E 819007.760, (NAD83/2007)
- 10.) THE ERROR OF CLOSURE FOR THE TRAVERSE FROM WHICH THIS SURVEY WAS PERFORMED IS 1:40,000', AND WAS ADJUSTED USING THE COMPASS RULE.
- 11.) THE ERROR OF CLOSURE FOR THE THE SUBJECT PARCEL SHOWN HEREON IS 1:785,945'.
- 12.) THE STATE PLANE COORDINATES SHOWN HEREON WERE DERIVED USING GLOBAL POSITION SYSTEMS, REAL TIME KINEMATIC METHOD, UTILIZING A REAL TIME NETWORK BY EGPS SOLUTIONS, INC. THE EQUIPMENT USED WAS TRIMBLE R8 RECEIVERS.

CERTIFICATION TO THE CLERK OF SUPERIOR COURT, CAMDEN COUNTY, GEORGIA:

THIS IS TO CERTIFY THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF, THE PROVISIONS, RELATIVE TO THE ACT CREATED BY GEORGIA CODE SECTION 15-6-67 AMENDED (No. 1366-SENATE BILL No. 7.35), HAVE BEEN MET AND APPROVAL OF THIS PLAN BY THE APPROPRIATE LOCAL GOVERNING AUTHORITY IS NOT NECESSARY FOR RECORDING PURPOSES.

GEOMATICS CORP.

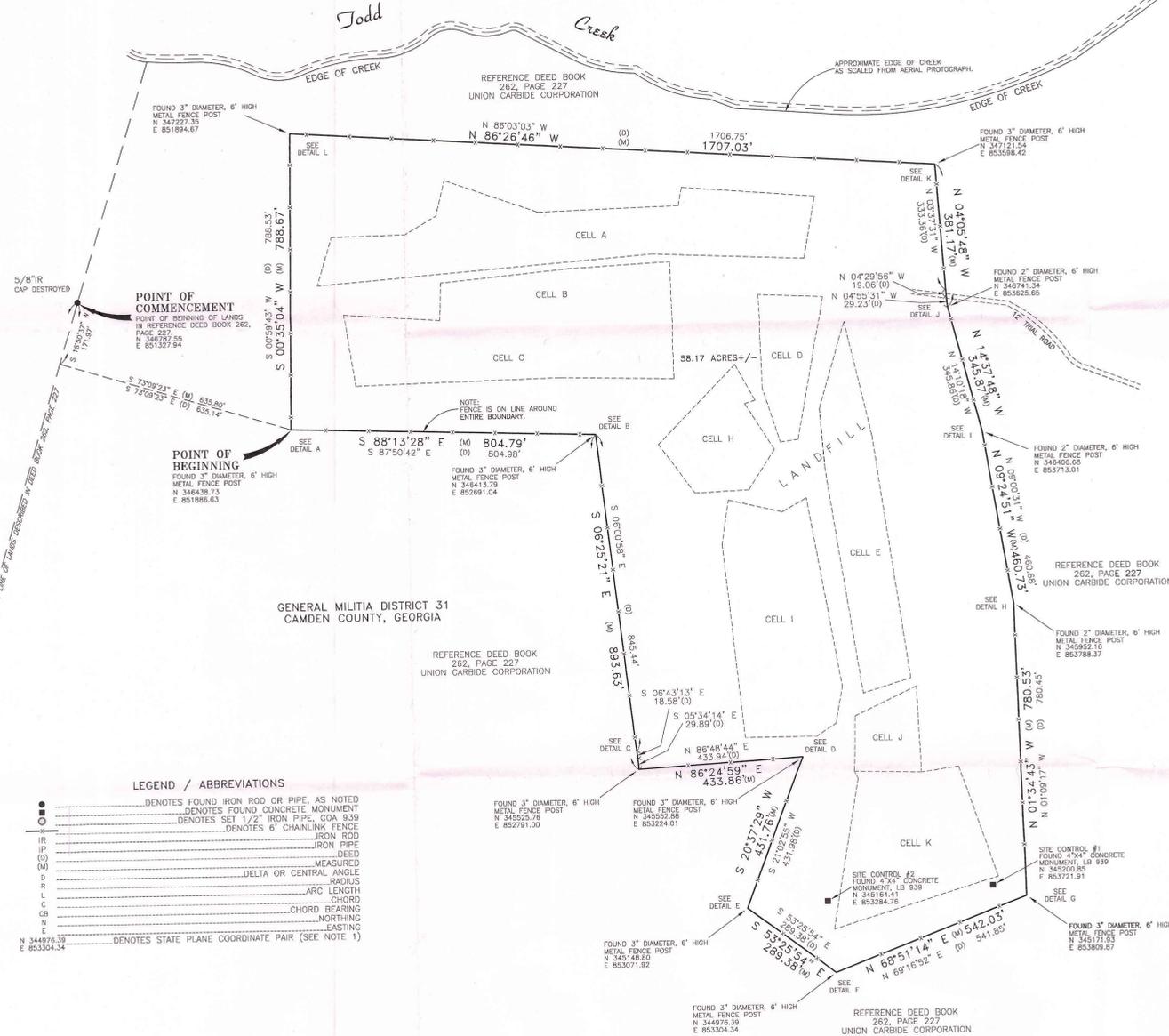
SURVEYING-MAPPING-GPS
2804 N. FIFTH STREET, UNIT 101
ST. AUGUSTINE, FL 32084
PHONE (904) 824-3086 FAX (904) 824-5759
840 SOUTH EIGHTH AVENUE, SUITE 221
JACKSONVILLE, FL 32205
PHONE (904) 384-0071
LICENSED BUSINESS
FLORIDA #6979 GEORGIA #939
SOUTH CAROLINA #3387 ALABAMA #794

PROJECT No: D-10-1560 UCC-WOODBINE HAZ-WASTE LANDFILL BOUNDARY MAP
SURVEY DATE: 12/22/2010
CAD FILE: 10-1560 UCC-WOODBINE Boundary.dwg
CHECKED BY: P. Ferrari
DRAWN BY: A. Wollen
FIELD WORK: Durden / Ferrari
FB: 10-01, PGS: 47-55

CERTIFIED TO:
*UNION CARBIDE CORPORATION

I HEREBY CERTIFY THAT THE ABOVE LAND WAS SURVEYED UNDER MY DIRECT SUPERVISION AND THAT THE IMPROVEMENTS AND CORNERS ARE LOCATED UPON SAME AS SHOWN AND THAT THERE ARE NO ENCROACHMENTS UPON SAID LAND, EXCEPT AS SHOWN.

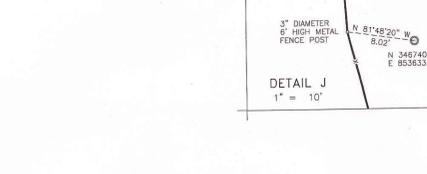
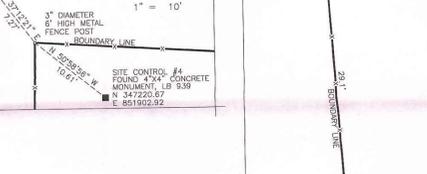
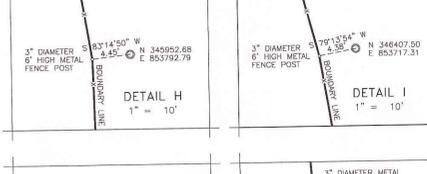
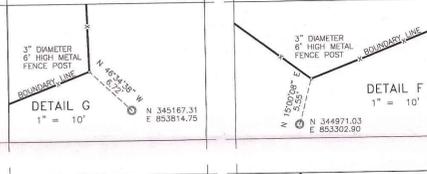
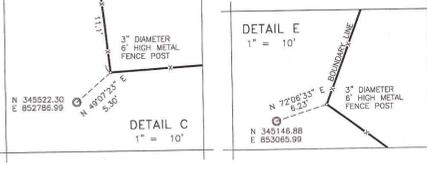
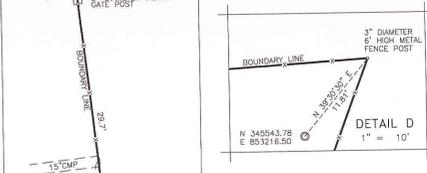
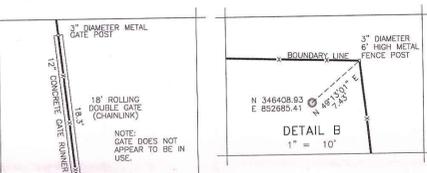
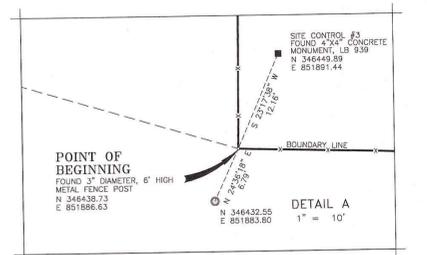
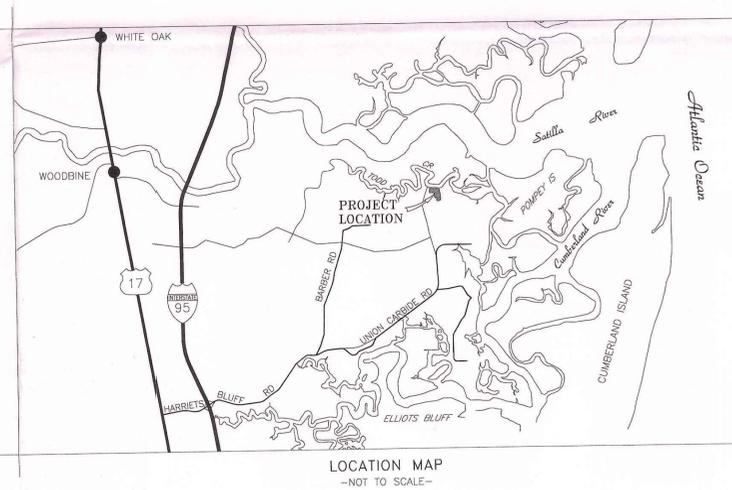
Pablo Ferrari, Georgia RLS #2820
Not Valid Without The Signature And Original Raised Seal Of A Georgia Registered Land Surveyor



CAUTIONARY NOTICE

- 1.) THE OWNER OR OPERATOR IS OBLIGATED TO RESTRICT DISTURBANCE OF THE SITE AS SPECIFIED IN 40 CFR, 264 SUBPART G.
- 2.) THE APPROXIMATE TWENTY ACRES OF LANDFILL CELLS CONTAIN THE FOLLOWING TYPE AND QUANTITY OF WASTE BURIED LESS THAN TWENTY FEET DEEP:
 - (a) CELLS A, B, C, F, & G: 2.8-2.9 MILLION POUNDS ALDICARB IN FINE FORM.
 - (b) CELLS A, B, C, F, & G: 37500 POUNDS ACETONE & METHYLENE CHLORIDE.
 - (c) CELLS E & I: ALDICARB RESIDUE IN EMPTY BOXES & BAGS.
 - (d) CELLS D, H, J, & K: NON-HAZARDOUS MATERIAL.

THE ABOVE CAUTIONARY NOTICE WAS TAKEN DIRECTLY FROM A PREVIOUS SURVEY CONDUCTED BY HENRY AND ASSOCIATES, DRAWING No. 0810-0031-01.



Final

Site Characterization of the Union Carbide Corporation Woodbine Site, Camden County, Georgia

Prepared for
Union Carbide Corporation

September 2014

CH2MHILL®

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Appendices

- A. Site Photographs
- B. Common Vegetation Species Onsite
- C. Known Occurrences of Priority Species in the Site Vicinity

Acronyms and Abbreviations

| | |
|-------|---|
| CAP | corrective action plan |
| GAEPD | Georgia Environmental Protection Department |
| GDNR | Georgia Department of Natural Resources |
| IBA | important bird area |
| LCC | Land Conservation Cooperative |
| MEC | munitions and explosives of concern |
| MRA | munitions response area |
| NPS | National Park Service |
| NWI | National Wetland Inventory |
| RCRA | Resource Conservation and Recovery Act |
| site | Union Carbide Corporation Woodbine site in Camden County, Georgia |
| UCC | Union Carbide Corporation |

SECTION 1

Introduction

This site characterization report describes the environmental and cultural resources of the Union Carbide Corporation (UCC) Woodbine site in Camden County, Georgia (site). This site characterization will be used to support environmental stewardship and development of environmental conservation alternatives for the site.

This document was prepared based on a review of resources including but not limited to:

- Previous site documentation by CH2M HILL and others
- Nature Serve Explorer Listed Species database
- Georgia Department of Natural Resources (GDNR) Cultural Resources Program
- State and federal conservation priority areas
- The Nature Conservancy Ecoregional Portfolio
- State and federal priority watershed data
- South Atlantic Land Conservation Cooperative (LCC) Conservation Blueprint
- National Wetland Inventory (NWI) maps
- Natural Resources Conservation Service soil survey

Section 2 provides an overview of the site history, and describes the site's regional setting and existing environmental and cultural features found onsite. Section 3 presents a discussion of conservation needs in the coastal Georgia region and a discussion of opportunities for site conservation and restoration. Section 4 provides a summary of key attributes and conservation values for the site, and Section 5 lists the references cited throughout the text. Representative site photographs are provided in Appendix A, Appendix B contains a list of common vegetation species that occur onsite, and a report from GDNR on known occurrences of high-priority species in the site vicinity is in Appendix C.

Site Characterization

2.1 Site Location

The UCC Woodbine site is a 4,012-acre parcel consisting of salt marsh, freshwater wetlands pine plantation, mixed hardwood forest, and lands formerly used for manufacturing, chemical storage, and munitions testing and disposal. The site is approximately 11.5 miles due east of the town of Woodbine in Camden County, Georgia, in the extreme southeastern part of the state. Figure 1 presents the site location, and Figure 2 is a U.S. Geological Survey quadrangle map of the site and surrounding area. The nearest major cities are Jacksonville, Florida (30 miles to the southwest) and Brunswick, Georgia (15 miles to the north).

The Satilla River borders the site to the north and Floyd Creek borders the site on the east. Todd Creek, a tidal stream, cuts a sinuous east-west path through the site; acreage to the north is almost entirely salt marsh while the southern area contains freshwater wetlands, uplands, and fringing salt marsh. Bayer CropScience owns property south and east of the facility, including an inactive wastewater spray irrigation field outparcel within the UCC Woodbine site.

2.2 Site History

The Southeast Georgia coastal area has a rich cultural history, with evidence of human occupation dating from the Late Archaic period (3,000 to 1,000 BC). Timucua Indians were active in the area when Spanish missionaries arrived in the 16th century (Rock 2006). The English eventually gained control of the region, and settlers migrated to the area after the American Revolution to establish rice plantations and later cotton plantations (Rock 2006).

The site contains remains of the **historic homestead of the Floyd family**, known as Bellevue Plantation. Charles Floyd, who settled the property in 1800, was a Revolutionary War soldier. His son, John Floyd, served in the War of 1812. In the late 1830s, John's son, Charles Rinaldo Floyd, was Brigadier General of the First Brigade, First Division Georgia Militia during the Second Seminole War. The home was constructed of tabby, a building material consisting of lime, sand, water and crushed oyster shells. Remnants of the tabby plantation home stands on the site, and the Floyd Family Cemetery in the eastern portion of the site is still visited annually by Floyd descendants.

From 1927 to 1942, the site was part of a tract known as the Sea Island Game Preserve at Cabin Bluff and used as a hunting preserve. In the early 1940s, a forest products company purchased the land for use as a tree farm and source of fiber.

In 1962, **Morton Thiokol Corporation purchased the property** for producing and testing solid rocket motors for the National Aeronautics and Space Administration. The site was chosen because of low-cost shipping access to the then Kennedy Space Center in Florida. Morton Thiokol Corporation later used the site for producing specialty chemicals and ordnance items. Two munitions response areas (MRAs) are onsite that contain munitions and explosives of concern (MEC), and the location of the two MRAs is shown on Figure 3.

In 1976, UCC purchased the approximately **7,193-acre property** from Morton Thiokol Corporation. A UCC subsidiary operated the facility from 1976 to 1986 as a **pesticide manufacturing facility**. In December 1986, UCC sold the manufacturing plant and some of the adjacent land to Rhone-Poulenc, which was later renamed Aventis CropScience and then Bayer CropScience. Industrial activities on the site ended around 2007 (TetraTech 2013), and Bayer CropScience closed and demolished the manufacturing facility in 2012. **UCC** retained ownership of the approximately **4,012-acre site**.

Most industrial activities on the site were on the southeastern portion of the current property or to the north, along Todd Creek. Since industrial activities ended, most of the associated buildings and structures have been demolished. A **58-acre closed Resource Conservation and Recovery Act (RCRA) landfill** (with

buffer area) is on the site near Todd Creek. The landfill cells are capped with clay, access to the site is restricted, and the landfill is monitored and maintained in compliance with RCRA Hazardous Waste Facility Permit No. HW-63(D) administered by the Georgia Environmental Protection Division (GAEPD). Other artifacts from the site's industrial history include former and closed solid waste management units, an abandoned asphalt airstrip and Loop Road, rocket test pit, and several unimproved service roads.

Descriptions of these features are in the *Focused Field Investigation Report* (CH2M HILL 2008), in the RCRA permit renewal documentation for the landfill (CH2M HILL 2011), and in the revised draft MEC corrective action plan (CAP; CH2M HILL 2014). Large portions of the site have no industrial history, and these areas comprise the primary subject of this site characterization.

2.3 Physiology, Geology, and Topography

The UCC Woodbine site is located in the Barrier Island District of the Atlantic Coastal Plain Physiographic Province (Clark and Zisa 1976). The Barrier Island District is a series of barrier islands and salt marsh soils deposited during Pleistocene sea level changes. Pleistocene sea levels advanced and retreated several times, forming a stepped progression of decreasing elevations toward the sea. These higher sea levels formed barrier island/salt marsh environments generally similar to the present coast. The former sea levels deposited shoreline complexes parallel to the present shoreline. There has been slight to moderate dissection of these former terraces by streams, leading to the development of marshes in poorly drained low areas.

The site is situated on the Princess Anne terrace complex. The terrace deposits consist of a mantle of undifferentiated surficial sands and the underlying Satilla Formation. The Satilla Formation consists of variably fossiliferous, shelly sands and clays of offshore, inner shelf origin; bedded and non-bedded barrier island deposits; and marsh deposits. The Satilla Formation exposed at sites of bank erosion consists of fine- to medium-grained, indistinctly bedded sand overlaying a layer of reddish humate-cemented sandstone. Humate is produced by the percolation of naturally occurring weak acids from the organic topsoil above the sands (Apex 1996).

Site hydrogeology is influenced primarily by the presence and proximity of sources (rainfall) and sinks (Todd Creek and ponds) and by the hydraulic conductivity of the unconsolidated sediments that comprise the surficial aquifer beneath the site. Freshwater wetlands at the site are hydrated by direct rainfall and groundwater.

Groundwater is the primary source of water supply in the Camden County area. The site is underlain, in descending order, by the surficial aquifer system (Holocene to Upper Miocene), the Brunswick aquifer system (Middle Miocene to late Oligocene), a confining unit (Oligocene), and the Floridan aquifer (CH2M HILL 2011). The primary hydrogeologic unit at the site consists of fine- to medium-grained, indistinctly bedded quartz sand approximately 40 to 55 feet thick, with minor discontinuous clay beds that typically occur 40 to 55 feet below ground surface (CH2M HILL 2011). The use of groundwater from the site for drinking water or other non-remedial purposes is prohibited by a deed restriction associated with the RCRA landfill (GAEPD 2011).

The waterways bounding the upland portions of the site, Todd Creek and Floyd Basin, have eroded steep banks. Culverts along the roadways control stormwater. The northern portion of the site is a large expanse of salt marsh interspersed with numerous tidal creeks and small islands. Several depressions and seasonally flooded areas are found throughout the upland areas. Elevations over the site range from 5 to 29 feet above mean sea level.

2.3.1 Soils

The four predominant soil types onsite are Bohicket-Capers association, Mandarin fine sand, Pottsburg sand, and Rutlege fine sand (Figure 4).

The Bohicket-Capers association consists of very poorly drained, very slowly permeable soils that formed in marine sediments in tidal marshes. These soils are flooded twice daily by sea water, and encompass approximately 2,210 acres of tidal marsh in the northern portion of the site.

The Mandarin fine sand is a deep, somewhat poorly drained, nearly level soil on slight ridges and broad flats. The subsurface soil is underlain by typically 15 inches of an organic hardpan layer. The permeability is rapid (6 to 20 inches per hour) except in the hardpan where the permeability is moderate (0.6 to 20 inches per hour). Approximately 1,081 acres of Mandarin soils are found in the central, south-central, and western portions of the site.

The Pottsburg sand has characteristics similar to the Mandarin soils. The main difference is the depth and thickness of the hardpan layer, which in the typical soil profile, is at a depth of 63 to 80 inches. Although not listed, the permeability of the hardpan layer is probably similar to the Mandarin soils. Approximately 327 acres of Pottsburg soils are found in the eastern and northeastern portions of the site.

The Rutlege fine sand is a very deep and very poorly drained soil located mostly on upland flats in coastal plains. The parent material consists of marine deposits. Depth to a root-restrictive layer is greater than 60 inches. Organic matter content in the surface horizon is about 6 percent. The permeability is rapid except in the hardpan, where the permeability is moderate. A seasonal high water table occurs at a depth of 0.0 to 0.5 foot. There are approximately 160 acres of Rutlege fine sand in the southern portion of the site.

Based on a site investigation in 2011, the upper 2 feet of the Mandarin fine sand throughout much of the upland area was plowed and furrowed for the pine plantation. Although the surface profiles in these upland areas are mixed, some of the profile characteristics were evident, especially in the deeper layers. Relic conditions of the Rutlege fine sand toward the center of the wetlands were undisturbed if not plowed. The surface dark layer was generally absent, but the relic deep hardpan material was observed (UCC and CH2M HILL 2011).

2.3.2 Regional Setting

The site setting is rural and largely undeveloped. The areas immediately surrounding the site are mostly pine plantation. The Sea Island Land Company owns the silviculture land to the west, and Cabin Bluff, a hunting and fishing retreat established in 1928, is south of the site (Figure 5).

The regional landscape is characterized by exceptional environmental and cultural resources, with the National Park Service (NPS) Cumberland Island National Seashore, Crooked River State Park, and Jekyll Island located within 10 miles of the site. **The Satilla River and associated watershed are classified as High Priority by the GDNR Comprehensive Wildlife Conservation Strategy Fishes and Freshwater Invertebrates team (GDNR 2005).** Designation as High Priority means these streams and watersheds are a high priority for a broad range of conservation efforts, such as ecosystem restoration, watershed protection plans, reforestation, land acquisition, or monitoring programs. **These streams were selected based on documented occurrences of high-priority aquatic species, high water quality rankings, and designation as exemplary streams in a study by The Nature Conservancy (GDNR 2005).**

Positioned along the **Atlantic Flyway, the area is especially significant for migratory and resident bird populations, as well as bats, dragonflies, and butterflies that use the Atlantic Flyway during migratory events (US Fish and Wildlife Service 2009).** Three important bird areas (IBAs) (Kings Bay Naval Air Station, Jekyll Island, and Cumberland Island National Seashore) are in close proximity to the site. IBAs are sites that provide essential habitat for one or more species of bird, and may be prioritized as Global, Continental, or State level, based on the relative significance of the site (American Bird Conservancy 2014). Birds have been shown to be effective indicators of biodiversity for other flora and fauna, so conservation of these sites is expected to ensure the survival of a correspondingly large number of other animals and plants (American Bird Conservancy 2014). 

Kings Bay Naval Air Station and Jekyll Island are classified as State IBAs, and Cumberland Island National Seashore is recognized as a Globally Significant IBA. Cumberland Island is a major stopping point on the transatlantic migratory flyway, with more than 335 species of birds recorded (American Audubon Society 2014). Cumberland Island provides habitats for priority birds including the red-cockaded woodpecker, painted bunting, Bachman's sparrow, Swainson's warbler, and swallow-tailed kite. Coastal intertidal habitats provide critical wintering areas for American oystercatcher, important wintering and spring migration areas for short-billed dowitcher and dunlin, and fall staging areas for red knot. Brown pelicans and various terns breed on offshore islands, while these coastal areas provide important nesting and foraging habitats for large numbers of herons, egrets, ibis, terns, and other species. Canvasback, mallard, American wigeon, and redhead winter in these coastal areas (American Audubon Society 2014).

Cumberland Island also is a United Nations-sanctioned International Biosphere Reserve. Biosphere reserves are sites that are internationally recognized areas of importance for conservation of biological diversity and sustainable use of natural resources. Under the 1964 Wilderness Act, 9,000 of the 36,000 acres held by NPS at Cumberland Island National Seashore are designated as wilderness.

Southeastern Georgia has abundant cultural and archaeological resources. Figure 6 depicts some of the major historical features of the area and shows the potential for archeological resources to occur in the area. Important historical features in the area include Plum Orchard and Dungeness Ruins on Cumberland Island, and historic districts in Woodbine, Jekyll Island, St. Marys, and Cumberland Island. Several archeological sites have been documented at the Kings Bay Naval Air Station, located south of the site.

2.4 Site Habitats and Land Cover Types

Today, the site is predominantly undeveloped private land, and most structures associated with its prior industrial history have been demolished. Land use and cover types at the site are depicted on Figure 7, and common vegetation associations are presented in Appendix B. Site habitats and ecological associations are described below.

2.4.1 Wetlands and Waterways

The Satilla River, a tidal river, flows along the northern boundary of the site. Todd Creek, which parallels the Satilla River and includes Floyd Basin, is a tidal creek. These two streams are connected hydrologically through an extensive tidal marsh, with a tidal range of approximately 6.5 feet (CH2M HILL 2011). Wharton (1978) classified this type of habitat as a coastal marine marsh tidal system.

Tidal rivers and creeks support a diverse invertebrate faunal assemblage, with studies indicating up to 20 species of amphipods, 16 species of nantid shrimp, 14 polychaete worm species, 16 crab species, 9 bivalve mollusks, and 9 gastropod mollusks inhabiting these areas (Wharton 1978). Macrophytic vegetation typically is absent from the channels of tidal rivers and creeks. Fish species vary with salinity, with higher salinity tending to result in greater numbers but fewer species of fish (Wharton 1978).

Wetland areas include salt marsh, cypress/hardwood swamp, and emergent and scrub shrub communities. Wetland areas on and near the site as mapped by the NWI are shown on Figure 8. Wetlands on a portion of the site also were field-delineated, and these are shown with NWI-mapped wetlands on Figure 9.

Salt Marsh

More than half the site, approximately 2,500 acres, is tidal salt marsh associated with the Satilla River and Todd Creek. Smooth cordgrass, saltgrass, and black needlerush are the dominant vegetation species in the tidal marsh. These plants segregate into distinct zones along salinity gradients, with cordgrass occurring mostly seaward and black needlerush occurring landward. Common animals include numerous species of frogs and snakes, alligators, garfish, and bowfin. Shorebirds and ducks frequent the salt marsh, with particularly high numbers found during winter. Osprey and bald eagles are common, with both species

observed nesting on or adjacent to the site. Marsh rabbits and rice rats typically are the most abundant mammals.

Cypress/Hardwood Swamp

A large and relatively high-quality pond cypress swamp onsite is known as Big Cypress Pond. Historically, the cypress/hardwood swamp habitat would have been more extensive onsite than it is today, but coverage has been reduced through tree harvest and conversion to pine plantations. Associated species include gums, red maple, longleaf, and slash pines with understory components of sweetbay, fetterbush, and wax myrtle. Smaller (less than 0.5 acre) remnants of this habitat, fragmented by silvicultural practices, occur throughout the area and are hydrologically connected to adjacent wetlands during high-water events. The cypress ponds are expected to be used by larger animals from the surrounding uplands, including wading birds, deer, and raccoons.

Before harvest, bay swamps would have been dominated by evergreen or semi-evergreen trees including sweetbay, loblolly bay, and swamp red bay. In recent years, many of the swamp red bays have died because of laurel wilt, a fungal disease that has caused widespread red bay mortality in the southeastern coastal plain. Bay swamps typically accumulate peat and do not have deep or extensive standing surface water. Understory species typically include wax myrtle, fetterbush, and azaleas. Ferns such as netted chain fern are the predominant herbaceous plants. Faunal composition would be similar to cypress ponds, but with fewer species associated with aquatic habitats. Typical animal species would include salamanders, toads, oligochaete worms, shrews, and marsh rabbits

Emergent Wetlands

The emergent freshwater wetlands are associated with excavations and occur as shallow depressions within the planted pine. These include areas of perched hydrology supported by a hardpan in the soil profile, and a high groundwater table. The borrow pit adjacent to the landfill and the wet weather pond near the southern boundary of the site are the largest manmade wetlands near the site. These areas contain some permanent pools of standing water with emergent wetland vegetation (typically sedges, bulrush, and grasses) and fringed with wetland trees and shrubs. These manmade, emergent wetlands are generally connected to adjacent wetlands during high-water events through outfalls and overflow structures.

The emergent/scrub-shrub wetlands may be remnants of cypress savanna or pitcher plant bogs that were disturbed by earlier human activity on the site. The presence of hooded pitcher plant in abundance suggests these areas historically were relatively open habitats. Vegetation species may have included scattered pond cypress or slash pine with a sparse shrub layer. The dominant herbaceous species would have included hooded pitcher plant, orchids, lilies, as well as numerous grasses and sedges. Currently, dominant vegetation includes wax myrtle, St. John's wort, and low growing shrubs.

2.4.2 Uplands

The major upland habitats on the site include bedded pine plantations, oak hammock and mixed hardwood forest, and upland old fields.

Pine Plantations

An estimated 900 acres of the site have been converted to loblolly pine plantation from the native vegetative types (CH2M HILL 2003). The native communities would have included oak hammock, mixed hardwood forest, and native pine flatwoods, characterized by an open canopy of longleaf pine and slash pine and diverse grasses and forbs. Densities in pine plantations are much greater than would occur in a natural setting. Pine plantations typically result in monoculture stands of the target species, and because of close tree spacing, understory and herbaceous vegetative succession is limited. These areas received intensive site preparation before pine seedlings were planted. Typically, this site preparation consisted of removing native vegetation removal (clear cutting), piling residual logging debris and slash into windrows, and creating raised planting beds to improve seedling survival and growth. Animals found in surrounding habitats would use the loblolly pine areas for foraging or shelter, at least occasionally. The quality of these

habitats is generally poor where the pines have been densely planted and subject to intensive site preparation.

Emergent and scrub shrub wetlands are scattered within the pine plantation. These patchy areas were likely too wet for successful site preparation, and seedlings were either not planted or did not survive the wet conditions. Here, natural recruitment of native tree species has not been sufficient to re-establish a viable forested ecosystem because of a lack of suitable seed sources, herbaceous competition, and/or altered site hydrology.

Oak Hammock and Mixed Hardwood Forests

Oak hammock and mixed hardwood forest are the upland forest communities onsite. Wharton (1978) classifies oak hammocks as upland maritime forest. Dominant canopy species in these communities are live oak, red cedar, and cabbage palm. Saw palmetto, wax myrtle, and yaupon holly are common shrubs, and herbaceous cover is limited. Much of the historic oak hammock cover type has been harvested and has been bedded and planted in loblolly pine; however, the remaining oak hammock is generally high quality. Mixed hardwood forests include slash pine in the canopy; these forests also include areas of mature planted pine that were thinned, allowing oaks and other hardwoods to grow interspersed with the remaining pines. Animals using these areas include gopher tortoise, eastern indigo snake, eastern diamondback, nine-banded armadillo, opossum, and gray squirrel.

Old Fields

Old fields are upland areas that were cleared for pasture or farming and later abandoned from those uses. Other old fields may be found where earthmoving occurred and the disturbed ground was not replanted to a specific type. No effort was made to replant these areas to a specific vegetation type, and they have developed into various successional communities from weedy fields to young scrub forests. These habitats contain herbaceous and woody species typical of the surrounding land types. Many of the animals described for the surrounding habitat types would occur in the old fields. Because of the relatively open habitat and high seed production associated with the typical plants, songbird use of old fields is higher than for other habitat types on the site.

2.4.3 Protected and Other Priority Species

A protected species investigation was conducted in 2004, which included a site reconnaissance and review of historical records (CH2M HILL 2004). Results of this investigation are summarized below and updated as appropriate (e.g., changes in species status or recent observations).

Animals

Nineteen federal or state-listed animal species may occur in the site area (Table 1). Of these, American alligator, wood stork, gopher tortoise, and eastern indigo snake are known to occur on the site (CH2M HILL 2011). Bald eagle, which is protected under the Bald and Golden Eagle Protection Act (16 United States Code 668 *et seq*), also has been observed onsite.

The American alligator inhabits the borrow pit used near the landfill, and wood storks, herons, and egrets use the borrow pit for forage and roosting. Juvenile wood storks have been observed foraging in the wet weather pond near the southern boundary of the site. This species also could forage along mudflats and shallows along Todd Creek. A bald eagle nest is on the land adjacent to and west of the site. This species could forage along Todd Creek and Floyd Basin and in the borrow pit by the landfill. Gopher tortoise are abundant between the airstrip and Todd Creek and are found on the peninsula near the Floyd Family Cemetery. The eastern indigo snake is likely to occur throughout the site, foraging in wetland areas and using gopher tortoise burrows for refuge in the upland areas.

The site may provide habitat for other protected species, as well (CH2M HILL 2004). Gopher tortoise burrows are known to provide habitat for over 60 species of vertebrates and 300 species of invertebrates (Jackson and Milstrey 1989). These include priority species eastern indigo snake, eastern diamond-back

rattlesnake, and gopher frog. The gopher tortoise is known as a “keystone species” because its existence is critical to the existence of many other species. The gopher tortoise also contributes to vegetative diversity by dispersing native seeds.

Potentially suitable habitat was identified for Bachman’s sparrow in the recently cutover areas on the western part of the site. The area was not suitable for the species when forested, as it lacked sufficient pine, but the species could use the early successional habitat present in the harvested areas.

The striped newt could occur in the oak hammocks between the airstrip and the landfill. This area historically had native pine forests and contains ephemeral depression ponds that offer potential reproductive habitat.

The wetlands in the southwestern part of the site could provide suitable habitat for the spotted turtle. These wetlands contain shallow standing water and have dense herbaceous cover, conditions favored by the turtle.

The tidal marsh along Todd Creek and the Satilla River on the northern portion of the site provides habitat that may be used by piping plover and gull-billed tern. The peregrine falcon may use this area during migration. The swallow-tailed kite may forage on the site. The Florida manatee may occasionally enter the channels of Todd Creek and the Satilla River.

Other priority species that may occur on site based on known occurrences in the site vicinity are glossy ibis, brown pelican, and black-crowned night heron (Appendix B).

Plants

Thirteen state-listed plant species may occur within the site (Table 2). No federally protected plants were identified as potentially occurring on the site.

The hooded pitcher plant occurs in the southwestern part of the site. This plant is relatively abundant in the edges of and adjacent to wetlands in and around the Loop Road. This species is designated as “unusual” in Georgia, indicating protection from commercial exploitation.

No other listed species were observed, but potentially suitable habitat was identified for hartwrightia, pond spice climbing buckthorn, ball-moss, dwarf witch-alder, and narrowleaf obedient plant. Table 2 identifies the site habitat areas where these species could occur. With the exception of the potential for narrowleaf obedient plant in the tidal marshes, the quality of the existing potential habitat observed for these species was relatively low onsite.

Tarflower, a plant on the Georgia Watch List (species deemed in need of additional knowledge to determine their conservation status), was identified in the southwestern and south-central parts of the site. This species was observed growing in considerable numbers along roadsides and on upland margins of wetlands in recently cutover areas.

2.5 Existing or Potential Historic or Archeological Resources

The site contains the Floyd Family Cemetery and the remnants of several tabby buildings, including Bellevue, the Floyd Family homestead. Bellevue also is known as the Anchor House because Charles Floyd, the seafaring patriarch of the Floyd family, constructed his home in the shape of an anchor. In addition, old structures are on the northern part of the site near Todd Creek, including a rocket test pit, that were used in the mid-1960s during the development and testing by Thiokol of a solid propellant rocket motor.

Dwight Kirkland conducted a surface survey on or near the site in 1979 and recorded nine archeological sites (Rock 2006). Results of this investigation were not available for inclusion in this site characterization report. The site is considered to have a moderate potential for the occurrence of archeological features (Figure 5).

2.6 Munition Response Areas

Two MRAs are located onsite, south of Todd Creek. MRA-1 comprises approximately 177 acres, and MRA-2 comprises approximately 114 acres. As shown on **Figure 3**, these areas are based on the proposed MRA boundaries as presented in the revised draft MEC CAP developed for these areas (CH2M HILL 2014). This MEC CAP was submitted to GAEPD in June 2014 and is under review. Both MRAs are heavily forested with planted pine and mixed hardwoods.



The revised draft MEC CAP recommended implementing an institutional control plan that includes restricting access to the MRAs, placing warning signs around the MRAs, and establishing an environmental covenant for the MRAs that includes activity and use restrictions for future owners of the MRAs. Details regarding the MRAs, other elements of the institutional control plan, and required actions to enter and perform intrusive activities within the MRAs (including development) are provided in the revised draft MEC CAP (CH2M HILL 2014).

TABLE 1

State and Federal Protected Animal Species with Potential to Occur Onsite*UCC Woodbine Site Characterization*

| Species | Common Name | Legal Status | Habitat | Comments |
|-----------------------------------|----------------------------|--|--|--|
| <i>Alligator mississippiensis</i> | American Alligator | GA: Threatened by similarity of appearance to a protected taxon US: Threatened by similarity of appearance to a protected taxon | Shallow brackish water, swamps, sloughs | Occurs onsite, in borrow pit adjacent to landfill and could occur along sloughs or backwaters of Todd Creek. |
| <i>Corynorhinus rafenesquii</i> | Rafinesque's Big-eared Bat | GA: Rare US: Not Listed | Mature pine flatwoods | No suitable habitat. |
| <i>Neofiber alleni</i> | Round-tailed Muskrat | GA: Threatened US: Not Listed | Shallow grassy ponds, marshes, and bogs | No suitable habitat. |
| <i>Trichechus manatus</i> | West Indian Manatee | GA: Endangered US: Endangered | Riverine, estuarine, and marine | May occur as an occasional in the Todd Creek/Satilla River channels. |
| <i>Aimophila aestivalis</i> | Bachman's Sparrow | GA: Rare US: Not Listed | Open pine forests and regenerating clear cuts | Limited potential habitat where trees have been harvested. |
| <i>Charadrius melodus</i> | Piping Plover | GA: Threatened US: Threatened | Beaches, mudflats, tidal ponds | May occur as an occasional on tidal mudflats along Todd Creek on the northern part of the site. |
| <i>Charadrius wilsonia</i> | Wilson's Plover | GA: Rare US: Not Listed | Barrier Islands, beaches | No suitable habitat. |
| <i>Elanoides forficatus</i> | Swallow-tailed Kite | GA: Rare US: Not Listed | Uneven forest canopies near open areas | May be transient user of the site. |
| <i>Falco peregrinus</i> | Peregrine Falcon | GA: Endangered US: De-Listed | Diverse open habitats | Potential transient use of marsh during migration. |
| <i>Mycteria americana</i> | Wood Stork | GA: Endangered US: Endangered | Shallow marshy and open water areas | Juveniles observed in wet weather pond. |
| <i>Picoides borealis</i> | Red-cockaded Woodpecker | GA: Endangered US: Endangered | Mature, open pine forests | No suitable habitat. |
| <i>Sterna nilotica</i> | Gull-billed Tern | GA: Threatened US: Not Listed | Marshes and coastal areas | Could use marsh on northern portion of site. |
| <i>Clemmys guttata</i> | Spotted Turtle | GA: Unusual US: Not Listed | Heavily vegetated shallow wetlands with standing or slowly flowing water | Limited potential habitat. |

TABLE 1
State and Federal Protected Animal Species with Potential to Occur Onsite
UCC Woodbine Site Characterization

| Species | Common Name | Legal Status | Habitat | Comments |
|----------------------------------|----------------------|---|---|---|
| <i>Drymarchon corais couperi</i> | Eastern Indigo Snake | GA: Threatened US: Threatened | Longleaf pine and turkey oak scrub | Occurs throughout the sandy portions of the site extending south from Todd Creek to the abandoned airstrip. |
| <i>Gopherus polyphemus</i> | Gopher Tortoise | GA: Threatened US: Candidate Species | Longleaf pine and turkey oak scrub | Common on the sandy portions of the site extending south from Todd Creek to the abandoned airstrip. |
| <i>Ambystoma cingulatum</i> | Flatwoods Salamander | GA: Threatened US: Threatened | Pine flatwoods and isolated herbaceous wetlands | Limited potential habitat. |
| <i>Notophthalmus perstriatus</i> | Striped Newt | GA: Rare US: Not Listed | Pine sandhills and flatwoods | Limited potential habitat between the landfill and the abandoned airstrip. |
| <i>Lucanis goodei</i> | Bluefin Killifish | GA: Unusual US: Not Listed | Vegetated ponds, sloughs, lakes; tolerant of brackish water | Could occur in borrow pit for landfill cap. |

TABLE 2
State Protected Plant Species with Potential to Occur Onsite
UCC Woodbine Site Characterization

| Species | Common Name | Legal Status | Habitat | Comments |
|----------------------------------|---------------------------|----------------------------------|--|---|
| <i>Asplenium heteroresiliens</i> | Wagner's Spleenwort | GA: Threatened US: Not Listed | Marl outcrops, limestone ledges, and Tabby construction | Was not observed on Anchor House, no other potentially suitable habitat exists. |
| <i>Balduina atropurpurea</i> | Purple Honeycomb Head | GA: Rare US: Not Listed | Wet pine savannas | No suitable habitat. |
| <i>Carex dasycarpa</i> | Velvet Sedge | GA: Rare US: Not Listed | Sandy acid woods and hammocks and stream banks | No suitable habitat. |
| <i>Epidendron conopseum</i> | Greenfly Orchid | GA: Unusual US: Not Listed | Moist to seasonally dry woods | No suitable habitat. |
| <i>Hartwrightia floridana</i> | Hartwrightia | GA: Threatened US: Not Listed | Mucky peat of pine flatwoods and sedge meadows and wet ditches | Limited potentially suitable habitat exists in the southwestern part of the site. |
| <i>Listea aestivalis</i> | Pond Spice | GA: Threatened US: Not Listed | Margins of swamps and sandhill depression ponds | Potentially suitable habitat exists in the central part of the site. |
| <i>Sageretia minutiflora</i> | Climbing Buckthorn | GA: Threatened US: Not Listed | Calcareous rocky bluffs, forested shell middens, and evergreen hammocks along streams and coastal marshes | Species could occur in the tidal marshes of Todd Creek and the Satilla River. |
| <i>Sarracenia minor</i> | Hooded Pitcher plant | GA: Unusual US: Not Listed | Open bogs, wet savannas, pine flatwoods | Occurs in wetlands on the western portion of Loop Road. |
| <i>Tillandsia recurvata</i> | Ball-moss | GA: Threatened US: Not Listed | Branches of live oak trees | Was not observed, potentially suitable habitat exists on the site. |
| <i>Fothergilla gardenii</i> | Dwarf Witch-alder | GA: Threatened US: Not Listed | Low, flat, swampy areas | Potentially suitable habitat exists in southwestern part of the site. |
| <i>Matelea alabamensis</i> | Alabama Spiny-pod | GA: Threatened US: Not Listed | Oak-Hickory forest | No suitable habitat. |
| <i>Matelea pubiflora</i> | Trailing Milkvine | GA: Rare US: Not Listed | Sand ridges in association with turkey oak and longleaf pine | No suitable habitat. |
| <i>Physostegia leptophylla</i> | Narrowleaf Obedient Plant | GA: Threatened US: Not Listed | Wet muck or peat in shallow water of river or swamp openings and margins of fresh and brackish tidal marshes | Potentially suitable habitat occurs in tidal marsh of Todd Creek and the Satilla River. |

Conservation Opportunities

3.1 Regional Setting

The site is located within an area designated as “Highest Priority for Shared Action” for conservation by the South Atlantic LCC based on factors including the area’s ecological and cultural resources and potential importance in climate change adaptation strategies. The LCCs are partnerships of governmental and nongovernmental entities that the United States Department of the Interior officially established in 2009. LCCs bring together applied science and resource management to identify shared conservation priorities and design landscape-scale conservation strategies to address these priorities, as described in the South Atlantic LCC’s Conservation Blueprint. GDNR and The Nature Conservancy are active contributors to the South Atlantic LCC. Figure 10 depicts the priority rankings for the broad area surrounding the site. High Priority conservation areas were identified because they provide critical services to the region, such as carbon sequestration, water quality improvement, fisheries support and habitat for rare plants and animals. Site conservation is consistent with the mission and goals of the South Atlantic LCC.

Between 2006 and 2008, the Trust for Public Land prepared a Greenprint for Camden County, Georgia, with funding from the National Oceanic and Atmospheric Administration through GDNR (Trust for Public Land 2008). A Greenprint is a tool that defines core values and a shared vision for a community, and presents recommendations for conserving land, linking communities, and preserving heritage. The core values described in the Greenprint include access to water, water quality preservation and enhancement, beauty/aesthetics, connectivity (corridors between habitats or communities), and historic preservation. The site provides each of these core values and offers the potential for still greater contribution with ecosystem enhancement or restoration.

3.2 Site Conservation Opportunities

The Georgia State Wildlife Action Plan (GDNR 2005) was established to help conserve flora and fauna (high priority species) and vital habitat (high priority habitat) before they become rarer and more costly to protect. One of the goals of the plan is to encourage activities that would lead to effective conservation of vegetation, wildlife, and their habitats on private lands. Several high priority habitats occur at the site, including bottomland forests, forested depressional wetlands, pine flatwoods, freshwater “prairies” (emergent and scrub-shrub wetlands), and maritime forests. In addition, several high priority animals and plant species either have been observed onsite or may occur with habitat restoration or enhancement (Table 3).

The need for conservation of remaining undeveloped lands, especially areas with diverse habitats and intact corridors, becomes more critical with increasing population. While some species thrive in “edge” environments (e.g., white-tailed deer, coyote), many species of concern are adversely affected by increased edge that comes with habitat fragmentation. Patches of land with a large core area can provide refuge for species where they are less likely to suffer predation, brood parasitism, human encroachment, or other negative factors (GDNR 2005). The site, if conserved, could provide such a haven.

TABLE 3
High Priority Animals and Plants Indigenous to UCC-Woodbine Area
UCC Woodbine Site Characterization

| | Species Name | Common Name |
|-----------------------------|-------------------------------------|------------------------------------|
| Amphibians | <i>Ambystoma cingulatum</i> | Flatwoods salamander |
| | <i>Rana capito</i> | Gopher frog |
| | <i>Notophthalmus perstriatus</i> | Striped newt |
| Birds | <i>Haliaeetus leucocephalus*</i> | Bald eagle |
| | <i>Mycteria americana*</i> | Wood stork |
| | <i>Ncytanassa vilacea</i> | Yellow-crowned night-heron |
| | <i>Nycticorax nycticorax</i> | Black-crowned night-heron |
| | <i>Passerina ciris</i> | Painted bunting |
| | <i>Pelecanus occidentalis</i> | Brown pelican |
| | <i>Plegadis facinellus</i> | Glossy ibis |
| | <i>Sternula antillarum</i> | Least tern |
| Fish | <i>Umbra pygmaea</i> | Eastern mudminnow |
| Mammals | <i>Trichechus manatus</i> | Manatee |
| Reptiles | <i>Drymmarchon couperi*</i> | Eastern indigo snake |
| | <i>Crotalus adamanteus*</i> | Eastern diamond-backed rattlesnake |
| | <i>Gopherus polyphemus*</i> | Gopher tortoise |
| | <i>Regina alleni</i> | Striped crayfish snake |
| Plants | <i>Calopogon multiflorus</i> | Many-flowered grass pink |
| | <i>Carex chapmanii</i> | Chapman's sedge |
| | <i>Carex gholsonii</i> | Gholson's sedge |
| | <i>Carex godferyi</i> | Godfrey's sedge |
| | <i>Coreopsis integrifolia</i> | Floodplain tickseed |
| | <i>Ctenium floridanum</i> | Florida orange-grass |
| | <i>Elyonurus tripsacoides</i> | Pan-american balsamscale |
| | <i>Epidendrum magnolia</i> | Greenfly orchid |
| | <i>Justicia angusta</i> | Narrowleaf Water-willow |
| | <i>Orbexilum virgatum</i> | Slender leather-root |
| | <i>Physostegia leptophylla</i> | Narrowleaf Obedient plant |
| | <i>Plantago sparsiflora</i> | Pineland Plantain |
| | <i>Platanthera chapmanii</i> | Chapmans yellow fringed orchid |
| | <i>Pycnanthemum floridanum</i> | Florida mountain-mint |
| | <i>Quercus chapmanii</i> | Chapman oak |
| | <i>Sarracenia minor var. minor*</i> | Hooded pitcherplant |
| <i>Tillandsia bartramii</i> | Bartram's air plant | |
| | <i>Zamia integrifolia</i> | Florida coontie |

* Observed at UCC-Woodbine site
 Source: GDNR 2014

3.3 Wetland Restoration

At least half of the wetland areas on site have been significantly degraded by silvicultural activities. Despite past disturbances, the site has excellent potential for successful and sustainable restoration (re-establishing

wetland functions to previously existing wetlands) and enhancement (improving functions of existing wetlands) because the hydric soils and much of the hydrophytic vegetation still remain. With its relatively remote location, the site's freshwater habitats are unaffected by groundwater withdrawals, which may otherwise compromise restoration efforts.

Figure 11 shows areas of hydric and partially hydric soils relative to identified wetland areas. Areas of hydric or partially hydric soils that are not currently functioning as wetlands may have potential for wetland restoration. Seed sources are present in the soils and in surrounding wetlands that would augment restoration plantings.

The goal of the wetland restoration effort would be to restore and preserve a mosaic of wetland ecosystems, including cypress swamps, cypress savannas, and wet flatwoods similar to those that existed before intensive silviculture and industrial activities altered the site. The central element of the plan would be to return portions of pine plantation back to a more historically representative wetland ecosystem. Most of the loblolly pines would be harvested and/or removed from the site in accordance with a forest management plan developed for the site. The forest management plan would address access and schedule for harvest activities, and describe environmentally sound practices to minimize potential impacts to sensitive areas, such as areas with wet soils, cultural resources, and habitats of rare plants and animals. Proceeds from the sale of timber could be used to fund restoration activities.

The windrows and bedded areas would be mechanically leveled at appropriately spaced intervals to restore natural surface flow hydrology. These breaks in beds and rows would be left 'rough' to increase the micro-topographic variations present in natural wetland system, thereby providing important niche habitats for wetland plants and invertebrates. Where necessary, herbicides may be used to control competing vegetation before planting with appropriate wetland tree species. A mixture of species adapted to various wetness regimes would be used in reforestation. These species would include water oak pond cypress, red maple, water tupelo, black gum, persimmon slash, and longleaf pines.

Site access roads act as barriers to hydrologic flow in some areas, and ditches associated with the roads, the abandoned airstrip, or other manmade improvements on the site also impede natural drainage patterns. These roads and other site disturbances would be removed, plugged, or filled to restore the natural hydrology on the site, except where necessary for monitoring or site management activities.

The emergent wetlands would be preserved and/or enhanced. Habitat around the borrow pits would be enhanced by planting woody species such as swamp tupelo and button bush to increase the species and vertical diversity. Wading bird colonies occupy vegetation on the edge of the borrow pit, and selective plantings of trees and shrubs may improve the nesting and rookery value of these sites for the birds.

The primary target wetland communities would be cypress/hardwood swamps, with transitional areas supporting wet prairie and savanna communities. Wetland restoration activities could return portions of the site to the conditions and plant communities found in these target areas. Where practicable, native upland plant buffers would be established around the wetlands. These buffers would reflect the local landscape and ecology, and serve to separate the wetland resources from developed areas. They also would be designed to enhance or provide a variety of aquatic habitat functions, including habitat for wildlife and other organisms, runoff filtration, moderation of water temperature changes, and detritus for aquatic food webs.

The animals expected to benefit most from wetland restoration are semiaquatic and aquatic species. As vegetation and species diversity evolves at the restored site, so would the overall complexity of the food web. For example, the variety of deep and shallow water systems would provide waterfowl, shorebirds, herons, and egrets with an abundance of plants, frogs, salamanders, and insects for food in early spring. A colony of wood storks occupies the borrow pit in the western portion of the site. These birds would benefit from wetland restoration, as additional wetlands provide roosting and feeding areas. The high priority

species striped newt and spotted turtle may also benefit, and improved habitat would benefit the eastern indigo snake, which forages in wetlands and is known to occur onsite.

3.4 Upland Habitat Enhancement

In addition to restoring wetland function and habitat quality, removing or thinning planted pine also would benefit upland habitats. This would increase light penetration so understory and groundcover vegetation can become established, increasing the diversity of habitats available to wildlife. Old fields can be tilled and planted in native grasses and wildflowers to improve habitat for pollinators. Gopher tortoises use these open areas extensively for forage. Where conditions allow, longleaf pine may be planted, and understory vegetation may be selectively removed to increase site diversity.

These efforts also would improve habitat for small mammals as well as songbirds, such as the painted bunting. The eastern population of this priority species declined by an estimated 60 percent between 1966 and 1995, attributed to loss and deterioration of habitat, increased predation, and nest parasitism (GDNR 2005). The shrubby forests and mix of dense vegetation and open grassy areas on barrier islands and the coastal mainland provide painted buntings with food sources and cover for nesting. These habitats are increasingly scarce in coastal Georgia, and upland enhancements at the site would improve habitat conditions for the painted bunting and other species.

3.5 Integrated Pest Management/Invasive Species Control

Control of non-native species and invasive native plant species would be important in site restoration efforts. Invasive plant species Chinese privet and Chinese tallow have been identified, and, as in much of the rural southeast, feral hogs occupy the site. Portions of the site were once part of a tract known as the Sea Island Game Preserve at Cabin Bluff and used as a hunting preserve. In recent years, hunting has not been allowed on the site, and deer and feral hog populations are high. Both species can damage plantings by browsing or rooting in the planted areas. Deer damage can be minimized, to some degree, by applying deterrents or repellents (e.g., weak sulfur sprays) to the planted trees during the first 2 years. The most effective control for feral hogs is removing the individuals by hunting or trapping to control the populations.

SECTION 4

Summary

The UCC Woodbine site comprises more than 4,000 acres of salt marsh, cypress/hardwood swamp and emergent wetlands, pine plantation, oak hammock, mixed hardwood forest, and old fields. The site contains known archaeological and cultural features, including a historic cemetery and the remains of a tabby plantation home from the early 19th century. It also offers potential for additional, and as-yet undiscovered archeological sites.

Although much of the site has been converted to pine plantation from native vegetation, several high-priority habitats and species have been identified on the site. Restoration of the pine plantation to more historically representative communities will improve ecological functioning of both wetlands and uplands and provide habitat for native plant and animal species. The site has a high potential for successful wetland restoration because hydric soils and hydrophytic vegetation are still present, and minimal maintenance is expected to be required after the hydrology is restored.

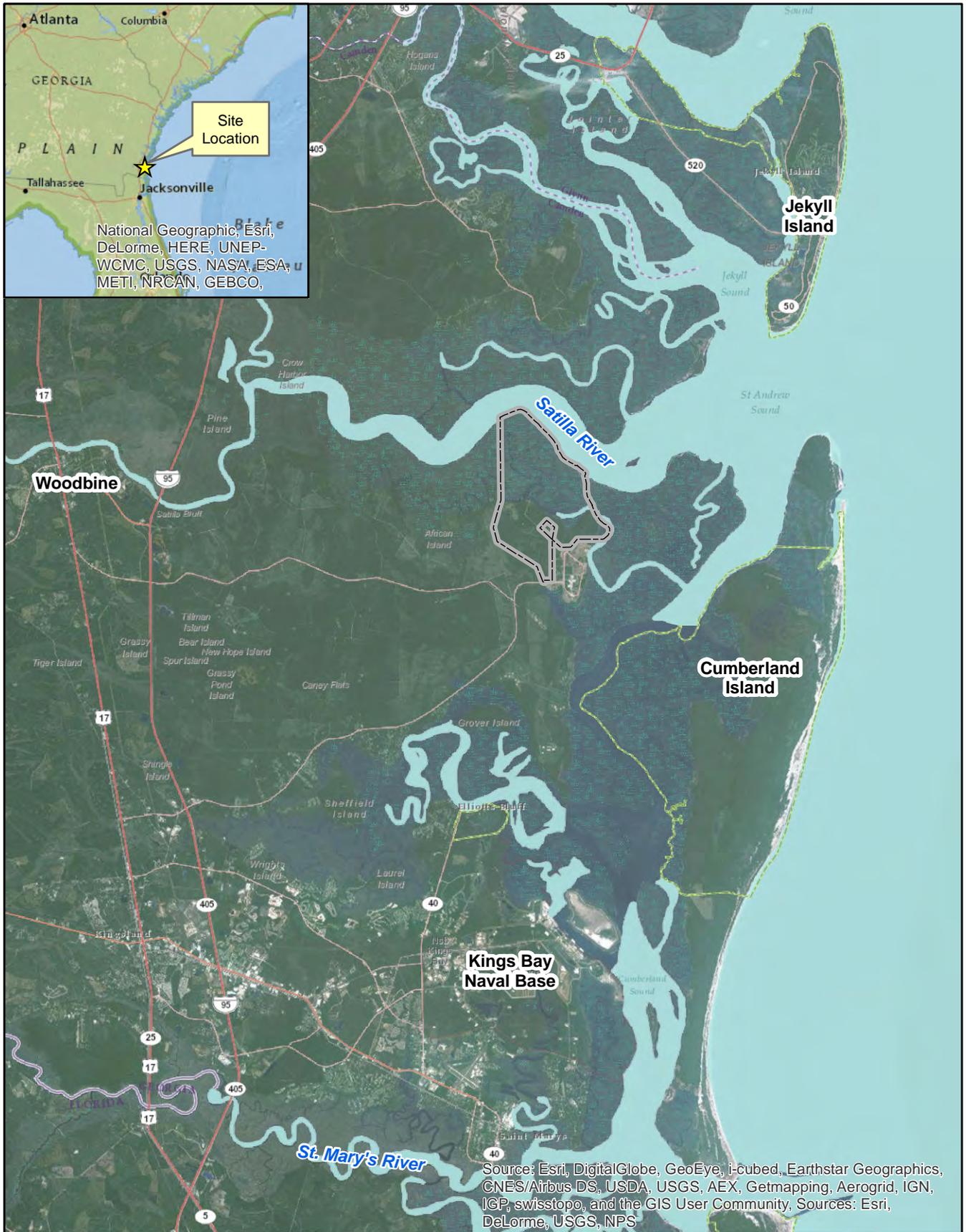
The diversity of the animal community also is expected to increase with improved vegetation diversity and restored hydrology. Diversity typically increases a system's resilience to stressors, a critical attribute in the context of a changing climate. The improved wetland and upland habitats would contribute to surrounding wildlife corridors, enhance area-wide ecological diversity, and provide water quality benefits to the High Priority Satilla watershed. The adjacent open space and natural areas would help protect and sustain the habitats onsite. With its coastal setting, diverse habitats and cultural features, and proximity to high quality lands such as Cumberland Island, the site represents an exceptional opportunity for conservation and enhancement in rapidly developing southeast Georgia.

SECTION 5

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Figures

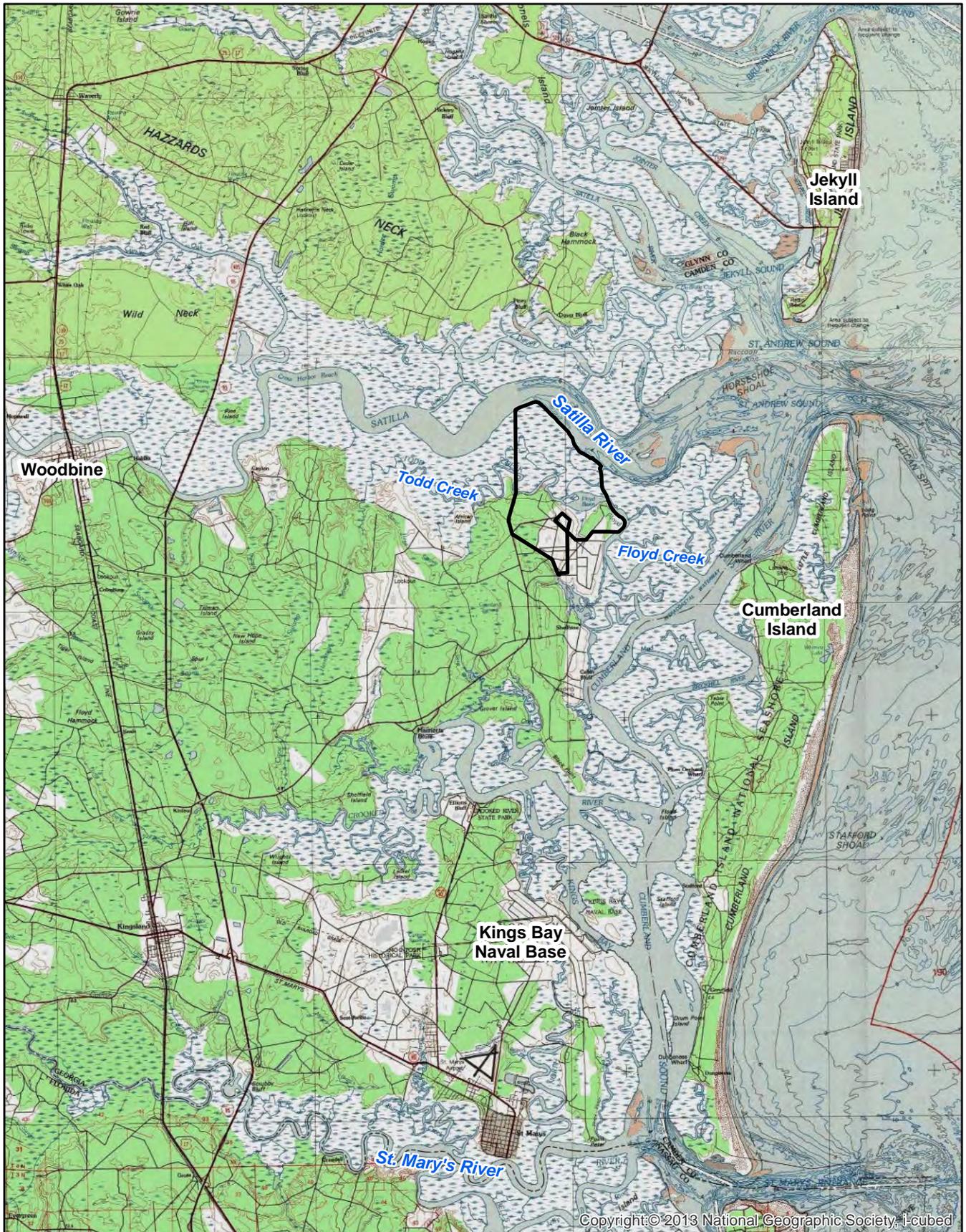


 Site Boundary

Aerial Date: March 13, 2011



FIGURE 1
 Site Location
 Union Carbide Corporation
 Woodbine Site Characterization
 Woodbine, GA



 Site Boundary

Background: USGS 7.5 Minute Series Maps (Topographic)
 Kingsland NE, GA
 Cumberland Island, GA

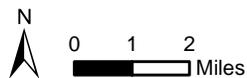
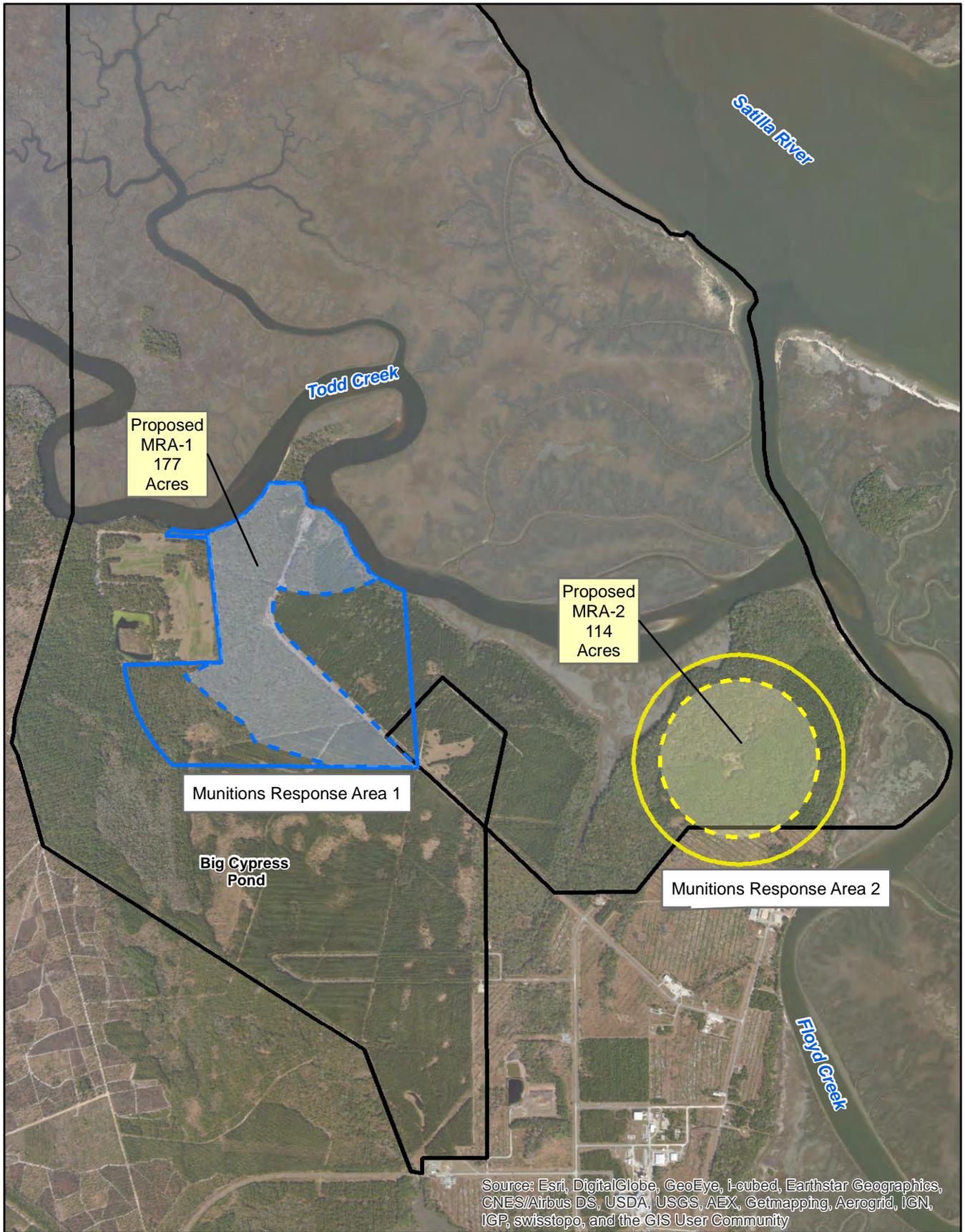


FIGURE 2
 USGS Quad
 Union Carbide Corporation
 Woodbine Site Characterization
 Woodbine, GA

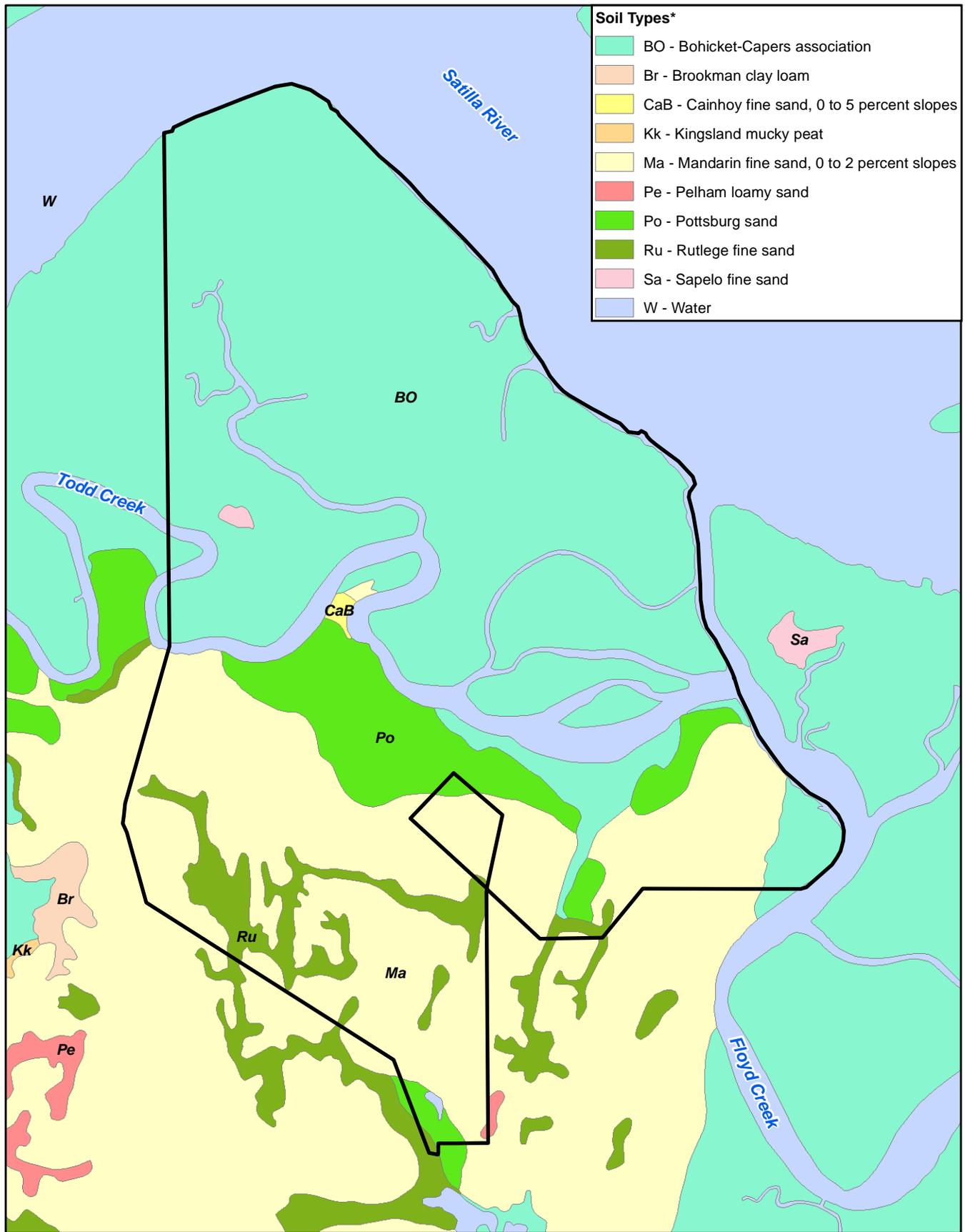


- Site Boundary
- Munition Response Area 1
- Munition Response Area 2
- Proposed MRA-1 Boundary
- Proposed MRA-2 Boundary



0 1,000 2,000
Feet

FIGURE 3
Munition Response Areas
Union Carbide Corporation
Woodbine Site Characterization
Woodbine, GA



Site Boundary

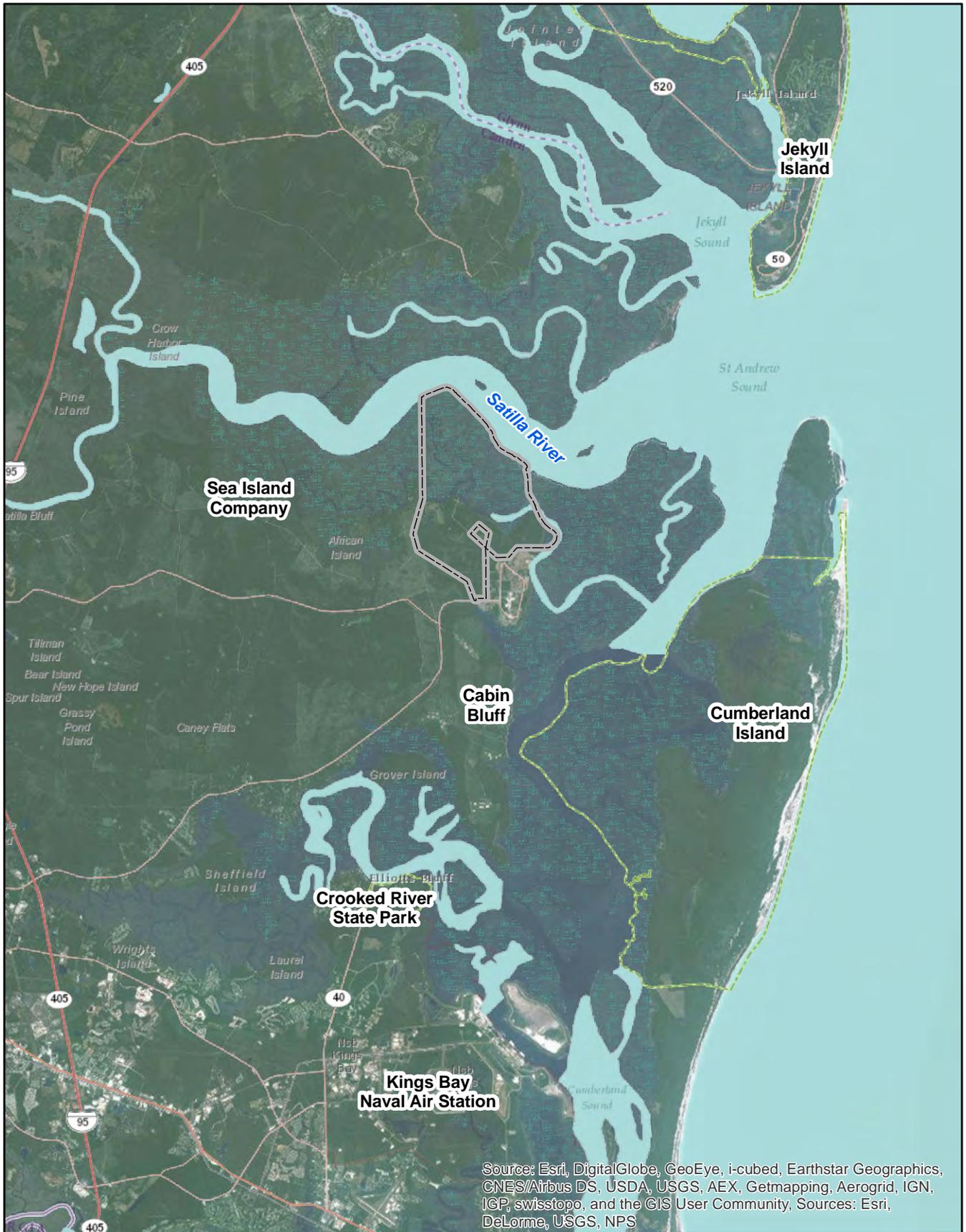
*Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey. Available online at <http://websoilsurvey.nrcs.usda.gov/>. Accessed 7/16/2014.



0 1,000 2,000 Feet

FIGURE 4
Soils Map

*Union Carbide Corporation
Woodbine Site Characterization
Woodbine, GA*



 Site Boundary

Aerial Date: March 13, 2011

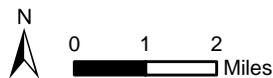
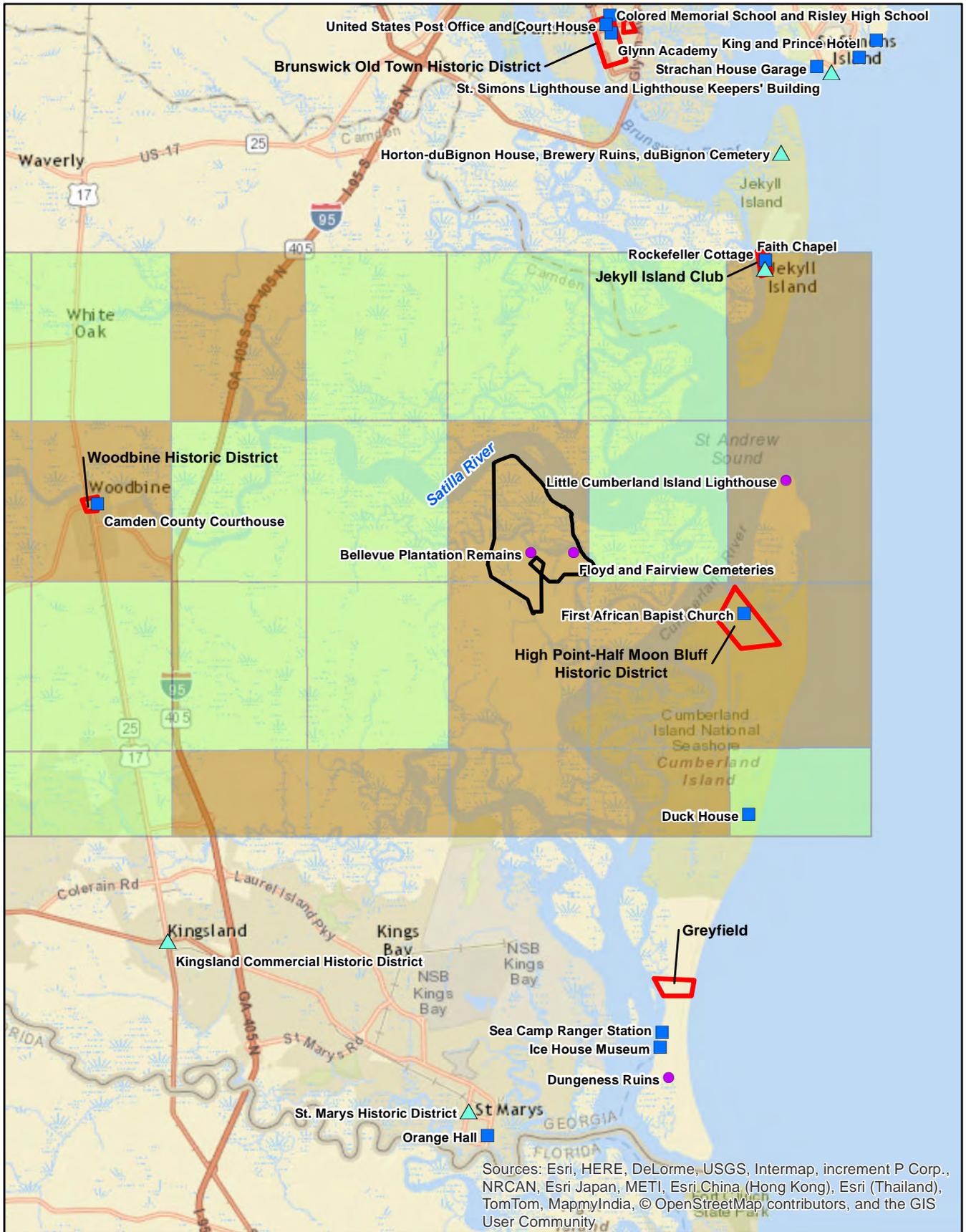


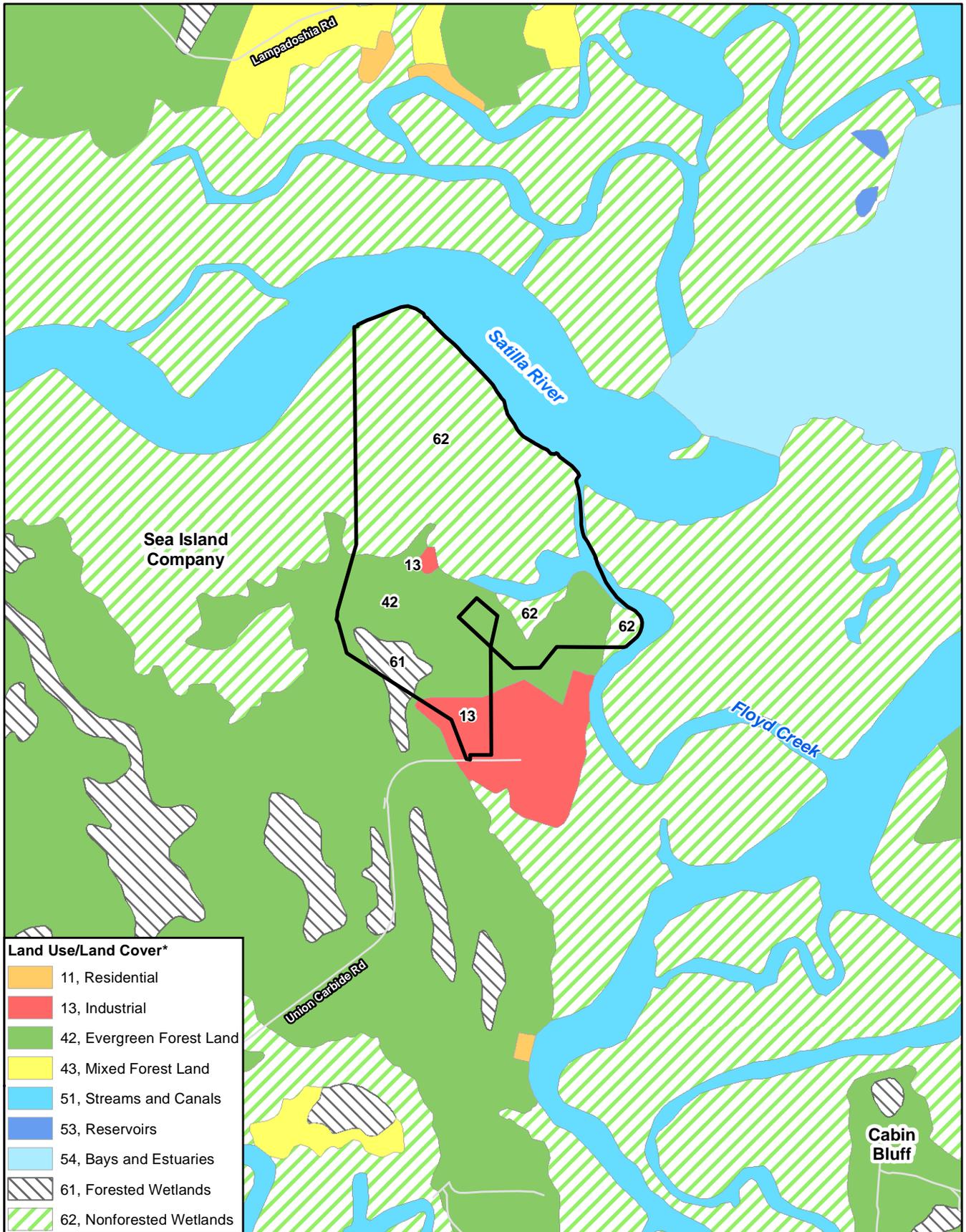
FIGURE 5
 Regional Setting
Union Carbide Corporation
Woodbine Site Characterization
Woodbine, GA



- Cultural Resource Structure
 - ▲ Cultural Resource District
 - Cultural Resource Building
 - Cultural Resource District
 - ▭ Site Boundary
- Archaeological Potential***
- Light Green: Low
 - Brown: Moderate
- *Source: Georgia's Natural, Archaeological and Historic Resources GIS
<http://www.itos.uga.edu/nahrgis/>



FIGURE 6
 Archeological and Cultural Resources
*Union Carbide Corporation
 Woodbine Site Characterization
 Woodbine, GA*



| Land Use/Land Cover* | |
|----------------------|---------------------------|
| | 11, Residential |
| | 13, Industrial |
| | 42, Evergreen Forest Land |
| | 43, Mixed Forest Land |
| | 51, Streams and Canals |
| | 53, Reservoirs |
| | 54, Bays and Estuaries |
| | 61, Forested Wetlands |
| | 62, Nonforested Wetlands |

Site Boundary Roads

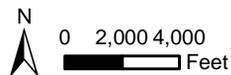
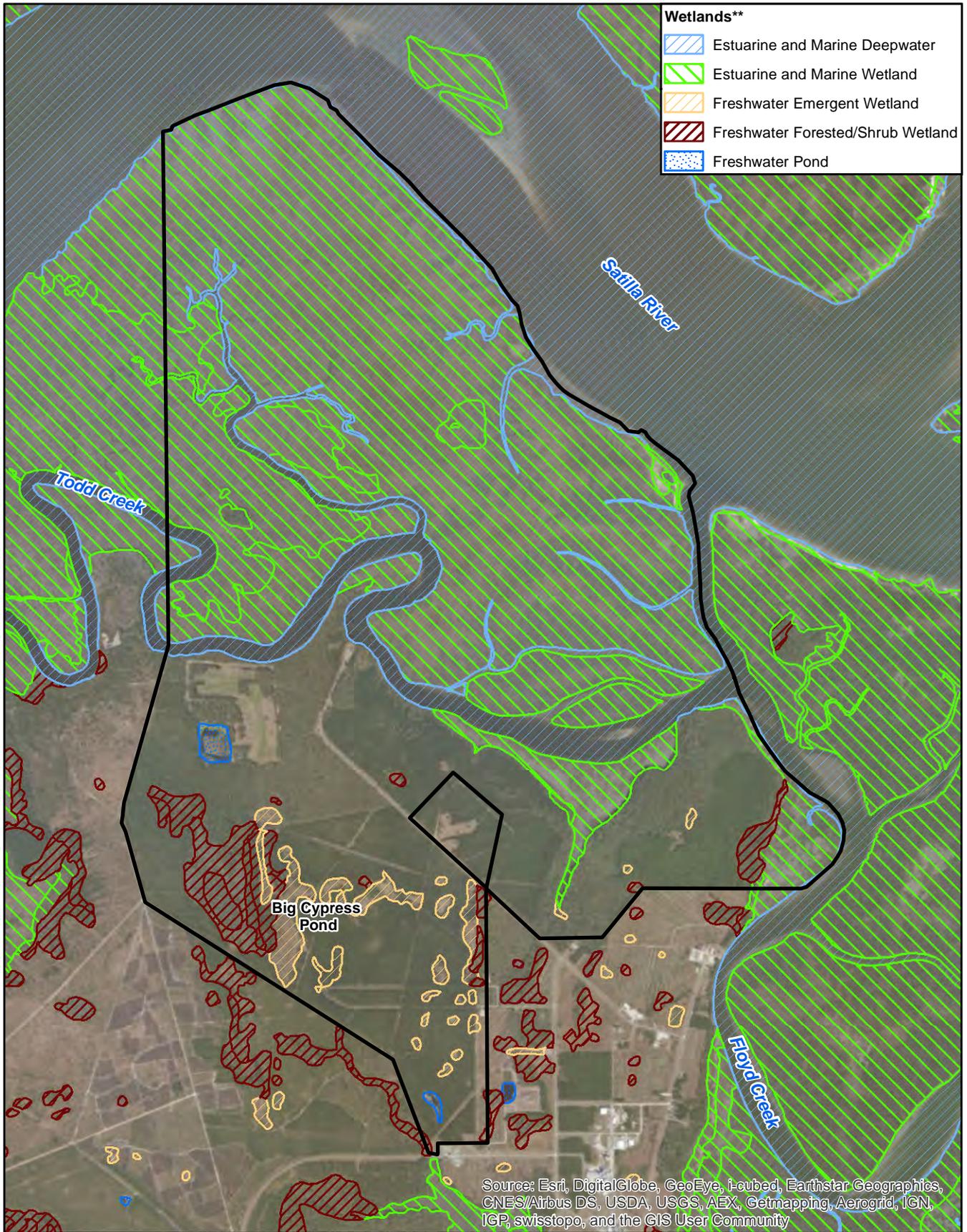


FIGURE 7
 Land Use / Cover
 Union Carbide Corporation
 Woodbine Site Characterization
 Woodbine, GA

*Land Use and Land Cover Source: (USGS)
 United States Geological Survey,
 Available online at <http://www.webgis.com/lulcdata.html>
 Accessed 7/18/2014.

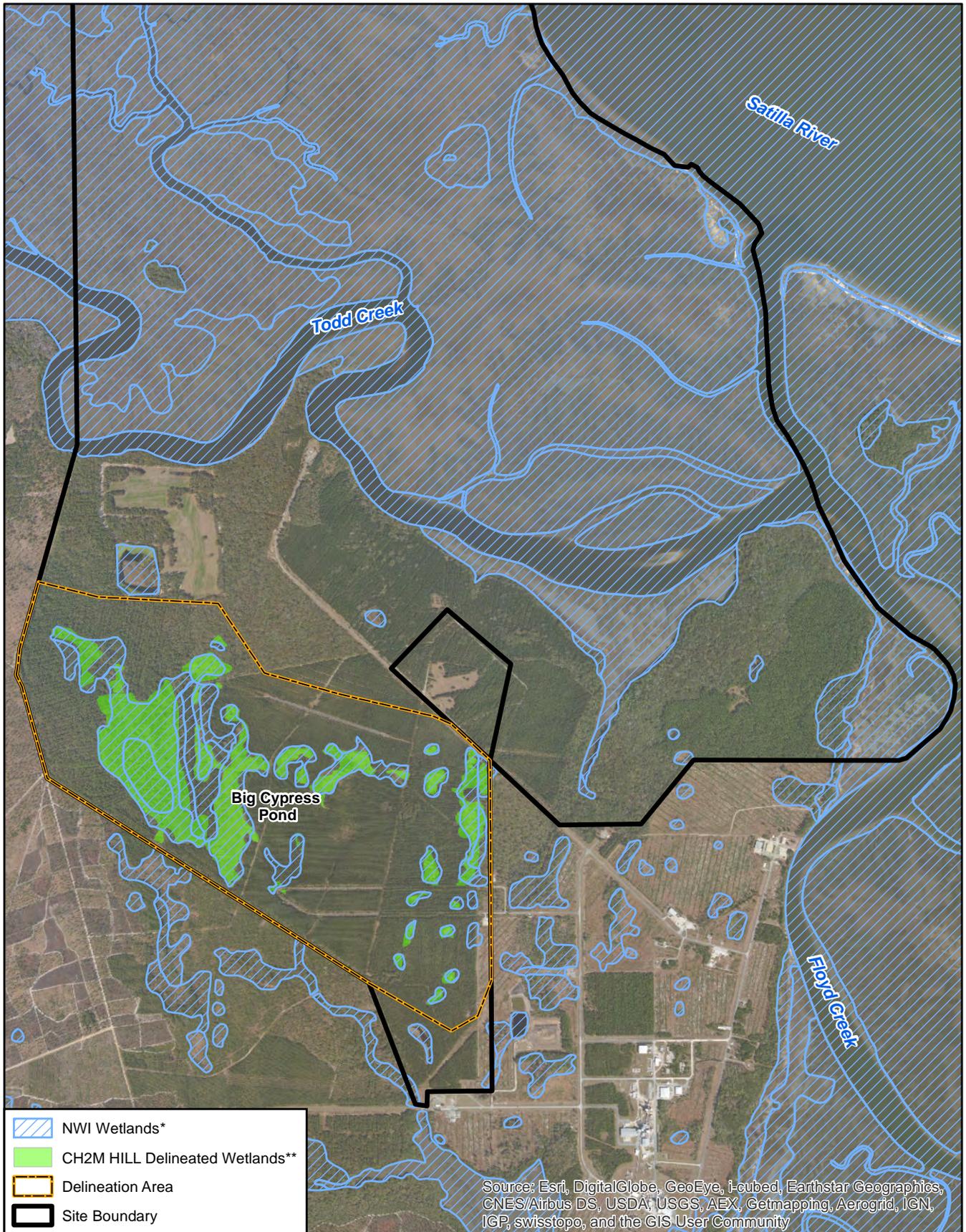


Site Boundary



*Wetlands Source: National Wetlands Inventory
US Fish and Wildlife Service

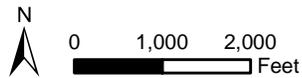
FIGURE 8
NWI Wetlands
*Union Carbide Corporation
Woodbine Site Characterization
Woodbine, GA*

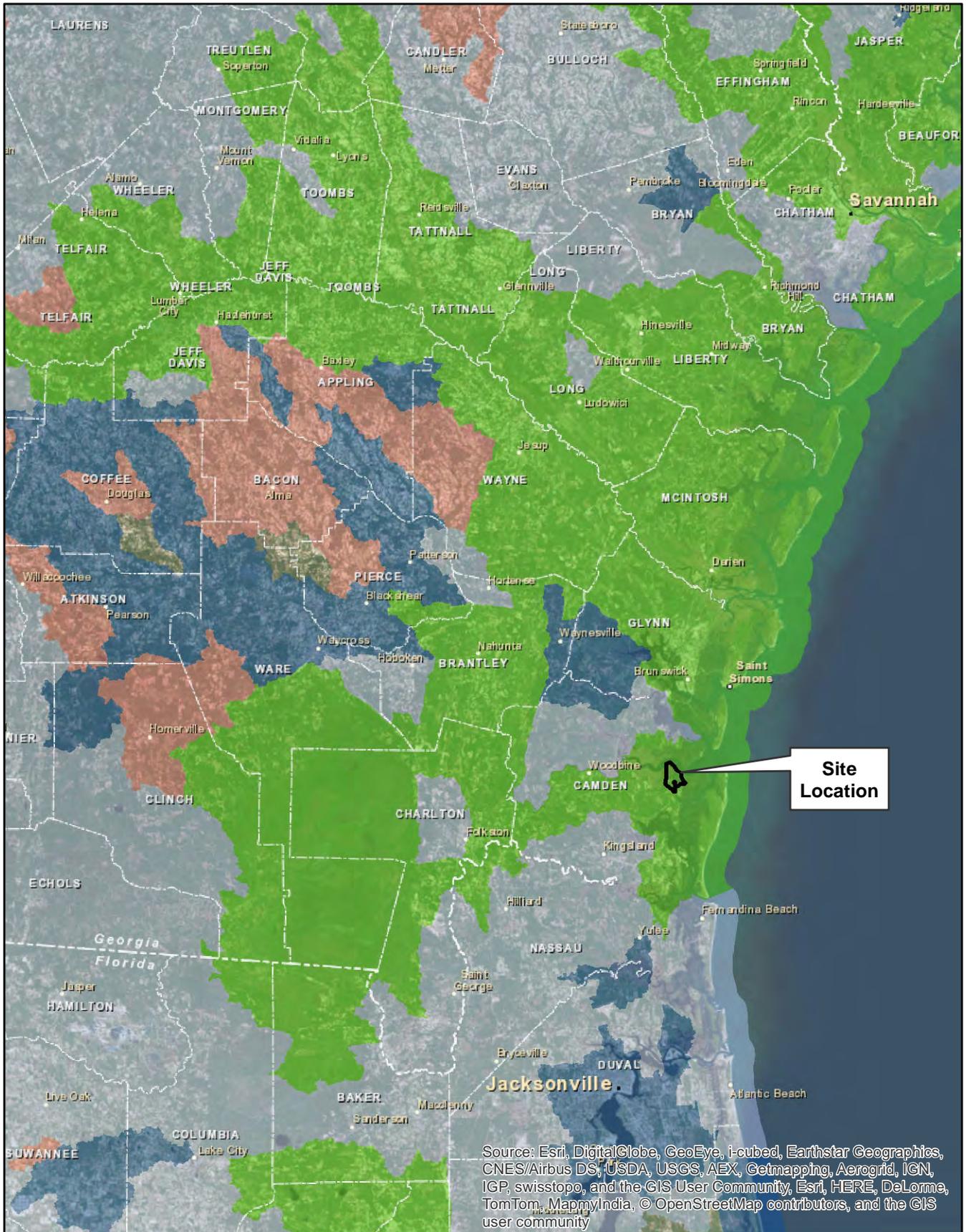


| | |
|--|---------------------------------|
| | NWI Wetlands* |
| | CH2M HILL Delineated Wetlands** |
| | Delineation Area |
| | Site Boundary |

FIGURE 9
 National Wetland Inventory and
 Field-Delineated Wetlands
Union Carbide Corporation
Woodbine Site Characterization
Woodbine, GA

*Wetlands Source: National Wetlands Inventory
 US Fish and Wildlife Service
 **CH2M Hill delineated wetlands in August 2011.





Source: Esri, DigitalGlobe, GeoEye, i-cubed, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community, Esri, HERE, DeLorme, TomTom, MapmyIndia, © OpenStreetMap contributors, and the GIS user community

South Atlantic Landscape Conservation Cooperative SALCC Draft Inland Blueprint 1.0*

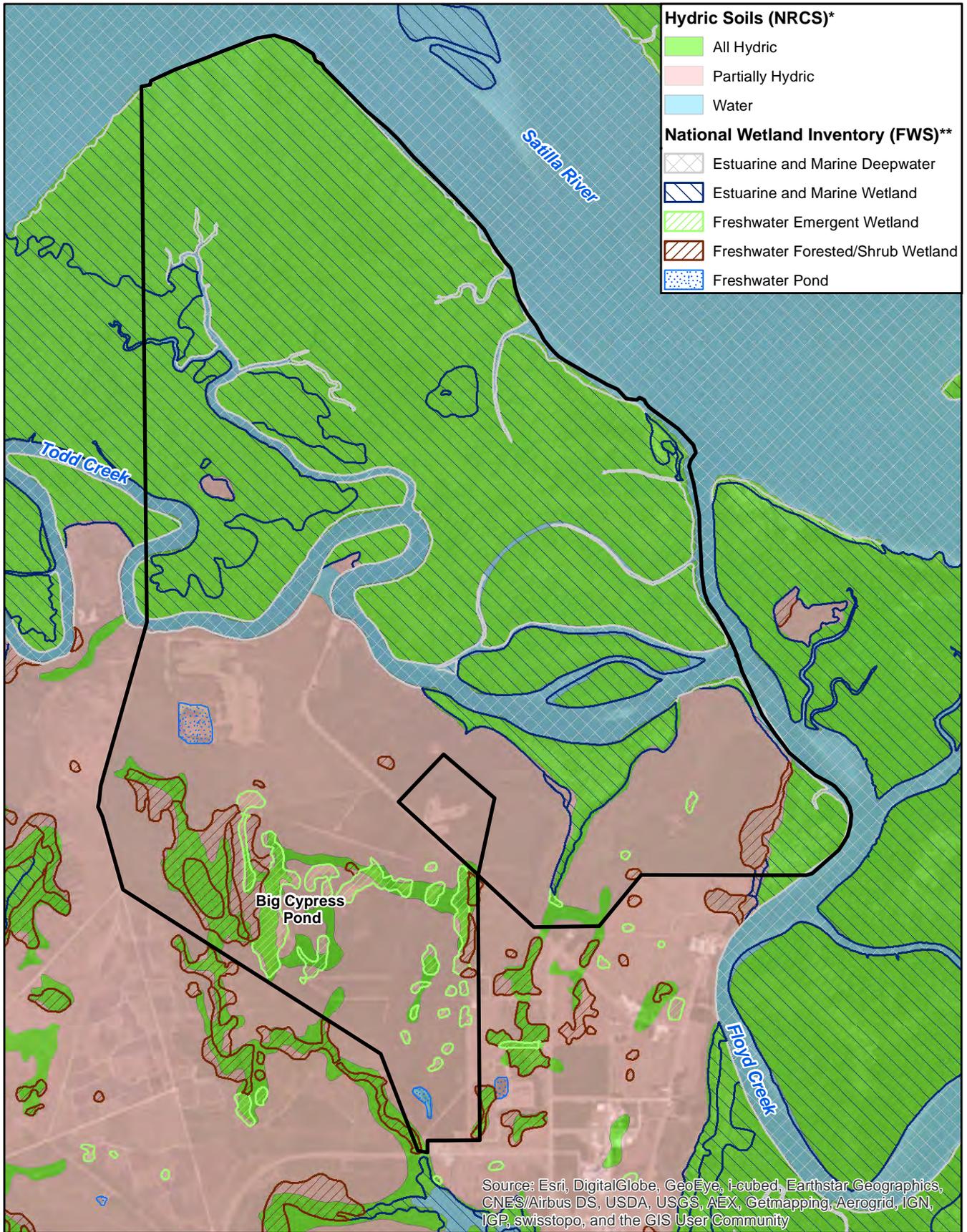
-  Site Boundary
-  Highest Priority
-  High Priority
-  Further Investigation
-  Low Priority

*Conservation Data Source:
 South Atlantic LCC
 January 2014

0 10 20
 Miles

FIGURE 10
 Conservation Priority Lands
Union Carbide Corporation
Woodbine Site Characterization
Woodbine, GA





Site Boundary

*Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic Database (SSURGO) Available online at <http://websoilsurvey.nrcs.usda.gov/>. Accessed 8/06/2014.

**Wetlands Source: National Wetlands Inventory US Fish and Wildlife Service

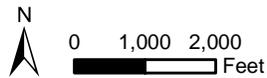


FIGURE 11
Wetlands and Hydric Soils
*Union Carbide Corporation
Woodbine Site Characterization
Woodbine, GA*

Appendix A
Site Photographs



Photograph 1. View North of Todd Creek



Photograph 2. Salt Marsh Along Todd Creek



Photograph 3. Access Road through Pine Plantation



Photograph 4. Remains of Bellevue Plantation House (Anchor House)



Photograph 5. Borrow Pit Near Landfill Used by Wading Birds



Photograph 6. Oak Hammock Near Floyd Family Cemetery



Photograph 7. Big Cypress Swamp



Photograph 8. Gopher Tortoise Along Central Access Road

Appendix B
Common Vegetation Species Onsite

Common Plant Associations at UCC Woodbine

UCC Woodbine Site Characterization

| | Species Name | Common Name |
|---------------------------------------|----------------------------------|-----------------------|
| Salt Marsh | <i>Distichlys spicata</i> | Saltgrass |
| | <i>Juncus romerianus</i> | Black needlerush |
| | <i>Spartina alterniflora</i> | Smooth cordgrass |
| Cypress/Hardwood Swamp | <i>Acer rubrum</i> | Red maple |
| | <i>Cephalanthus occidentalis</i> | Buttonbush |
| | <i>Cladium jamaicense</i> | Swamp sawgrass |
| | <i>Gordonia lasianthus</i> | Loblolly bay |
| | <i>Ilex cassine</i> | Dahoon holly |
| | <i>Ilex coriacea</i> | Large gallberry |
| | <i>Lyonia lucida</i> | Fetterbush |
| | <i>Magnolia virginiana</i> | Sweetbay |
| | <i>Osmunda cinnamomea</i> | Cinnamon fern |
| | <i>Osmunda regalis</i> | Royal fern |
| | <i>Persea borbonia</i> | Redbay |
| | <i>Proserpinaca pectinata</i> | Combleaf mermaidweed |
| | <i>Rhododendron viscosum</i> | Swamp rhododendron |
| | <i>Saururus cernuus</i> | Lizard's tail |
| | <i>Taxodium ascendens</i> | Pond cypress |
| <i>Woodwardia virginica</i> | Netted chain fern | |
| Emergent Wetlands | <i>Cephalanthus occidentalis</i> | Buttonbush |
| | <i>Juncus effusus</i> | Soft rush |
| | <i>Panicum hemitomon</i> | Maidencane |
| | <i>Polygonum hydropiperoides</i> | Swamp smartweed |
| | <i>Pluchea odorata</i> | Sweetscent |
| | <i>Rhexia alifanus</i> | Savannah meadowbeauty |
| | <i>Sarracenia minor</i> | Hooded pitcher plant |
| | <i>Scirpus cyperinus</i> | Wool grass |
| Pine Plantations | <i>Andropogon glomeratus</i> | Bushy bluestem |
| | <i>Panicum hemitomon</i> | Maidencane |
| | <i>Pinus taeda</i> | Loblolly pine |
| | <i>Pinus elliotii</i> | Slash pine |
| | <i>Smilax rotundifolia</i> | Roundleaf greenbrier |
| Oak Hammock and Mixed Hardwood Forest | <i>Ilex vomitoria</i> | Yaupon holly |
| | <i>Juniperus virginiana</i> | Red cedar |
| | <i>Liquidambar styraciflua</i> | Sweetgum |
| | <i>Myrica cerifera</i> | Wax myrtle |
| | <i>Quercus virginiana</i> | Live oak |
| | <i>Quercus nigra</i> | Water oak |
| | <i>Sabal palmetto</i> | Cabbage palm |
| | <i>Serenoa repens</i> | Saw palmetto |

Common Plant Associations at UCC Woodbine

UCC Woodbine Site Characterization

| | Species Name | Common Name |
|------------|---------------------------------|--------------------|
| Old Fields | <i>Andropogon glomeratus</i> | Bushy bluestem |
| | <i>Aronia melanocarpa</i> | Black chokecherry |
| | <i>Diospyros virginiana</i> | Common persimmon |
| | <i>Eupatorium capillifolium</i> | Dog fennel |
| | <i>Hypericum hypericoides</i> | St. Andrews cross |
| | <i>Lyonia ferruginea</i> | Rusty staggerbush |
| | <i>Panicum virgatum</i> | Switchgrass |
| | <i>Paspalum notatum</i> | Bahiagrass |
| | <i>Pteridium aquilinum</i> | Bracken fern |

Appendix C
Known Occurrences of Priority Species in the
Site Vicinity



MARK WILLIAMS
COMMISSIONER

DAN FORSTER
DIRECTOR

August 25, 2014

Martha Burlingame
PWS
CH2M HILL
3011 SW Williston Rd.
Gainesville, FL 32608

Subject: Known occurrences of natural communities, plants and animals of highest priority conservation status on or near Proposed Restoration of the Union Carbide Corporation Woodbine Facility, Camden County, Georgia

Dear Ms. Burlingame:

This is in response to your request of July 15, 2014. According to our records, within a three-mile radius of the project site, there are the following Natural Heritage Database occurrences:

- US *Drymarchon couperi* (Eastern Indigo Snake)
- US *Gopherus polyphemus* (Gopher Tortoise) approx. 1.0 mi. W of site
- US *Gopherus polyphemus* (Gopher Tortoise) approx. 2.5 mi. SW of site
- GA *Haliaeetus leucocephalus* (Bald Eagle) approx. 1.0 mi. SE of site
- GA *Haliaeetus leucocephalus* (Bald Eagle) approx. 1.0 mi. SW of site
- GA *Haliaeetus leucocephalus* (Bald Eagle) approx. 1.5 mi. E of site
- GA *Haliaeetus leucocephalus* (Bald Eagle) approx. 2.5 mi. S of site
- Nycticorax nycticorax* (Black-crowned Night-heron) approx. 2.0 mi. E of site
- Pelecanus occidentalis* (Brown Pelican) approx. 2.0 mi. E of site
- Plegadis falcinellus* (Glossy Ibis) approx. 2.0 mi. E of site
- US *Trichechus manatus* (Manatee) 0.2 mi. NW of site in tidal waters
- US *Trichechus manatus* (Manatee) approx. 0.5 mi. N of site in tidal waters
- US *Trichechus manatus* (Manatee) approx. 0.5 mi. NE of site in tidal waters
- US *Trichechus manatus* (Manatee) approx. 1.0 mi. N of site in tidal waters
- US *Trichechus manatus* (Manatee) approx. 1.0 mi. NW of site in tidal waters
- US *Trichechus manatus* (Manatee) approx. 1.5 mi. E of site in tidal waters
- US *Trichechus manatus* (Manatee) approx. 1.5 mi. W of site in tidal waters
- US *Trichechus manatus* (Manatee) approx. 2.0 mi. SW of site in tidal waters
- US *Trichechus manatus* (Manatee) approx. 2.0 mi. W of site in tidal waters
- US *Trichechus manatus* (Manatee) approx. 2.5 mi. S of site in tidal waters
- US *Trichechus manatus* (Manatee) approx. 2.5 mi. SE of site in tidal waters
- US *Trichechus manatus* (Manatee) approx. 2.5 mi. SW of site in tidal waters
- US *Trichechus manatus* (Manatee) approx. 2.5 mi. W of site in tidal waters

US *Trichechus manatus* (Manatee) approx. 3.0 mi. N of site in tidal waters
US *Trichechus manatus* (Manatee) approx. 3.0 mi. S of site in tidal waters
US *Trichechus manatus* (Manatee) approx. 3.0 mi. SE of site in tidal waters
US *Trichechus manatus* (Manatee) approx. 3.0 mi. W of site in tidal waters
Wading Bird Colony (Wading Bird Colony) approx. 1.5 mi. E of site
Wading Bird Colony (Wading Bird Colony) approx. 2.5 mi. E of site
Liquidambar styraciflua - Acer rubrum - (Nyssa biflora) / Woodwardia virginica Forest
(South Atlantic Coastal Nonriverine Swamp Forest) approx. 2.5 mi. S of site
Sabal palmetto - Quercus laurifolia - Quercus virginiana - Magnolia virginiana - Ulmus
americana Forest (Temperate Hydric Hammock) approx. 3.0 mi. SW of site
SATILLA RIVER MARSH ISLAND NA [GDNR] approx. 2.0 mi. E of site
Satilla River [High Priority Stream] approx. 1.0 mi. NE of site

* Entries above preceded by “US” indicates species with federal status in Georgia (Protected or Candidate). Species that are federally protected in Georgia are also state protected; “GA” indicates Georgia protected species.

Recommendations:

We have no records of high priority species or habitats within the project area. However, two federally listed species, *Trichechus manatus* (Manatee) and *Drymarchon couperi* (Eastern Indigo Snake), and a candidate species, *Gopherus polyphemus* (Gopher Tortoise), have been documented within three miles of the proposed project. To minimize potential impacts to these or other federally listed species, we recommend consultation with the United States Fish and Wildlife Service. For southeast Georgia, please contact Strant Colwell (912-265-9336, ext.30 or Strant_Colwell@fws.gov). Surveys for species of conservation concern should be conducted prior to commencement of construction.

A record of a nesting Bald Eagle (*Haliaeetus leucocephalus*) is within three miles of the proposed project. Although Bald Eagles are no longer considered an endangered species, they are still protected by the Migratory Bird Treaty Act, the Bald and Golden Eagle Protection Act and the Georgia Endangered Species Act. These Acts continue to protect bald eagles from potentially harmful human activities. For more information on how to prevent impacts to bald eagles that could violate the Eagle Act, download the National Bald Eagle Management Guidelines:

<http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf>

Construction/ demolition activities in the vicinity of water-bird rookeries should be approached with caution. Disturbance near the colony can lead to nest failure and possible abandonment. The nesting season extends from Mid-February to the end of July. Please avoid activities within 400 m (1300 ft.) from the periphery of rookeries during this time, if possible.

This project occurs near the Satilla River, a high priority stream. As part of an effort to develop a comprehensive wildlife conservation strategy for the state of Georgia, the Wildlife Resources division developed and mapped a list of streams that are important to the protection or restoration of rare aquatic species and aquatic communities. High priority waters and their surrounding watersheds are important for aquatic biodiversity conservation, but do not receive

any additional legal protections. We now have GIS ESRI shapefiles of GA high priority waters available on our website (<http://www.georgiawildlife.com/node/1377>). Please contact this office if you would like additional information on high priority waters.

It is difficult for us to provide specific recommendations on the Mitigation Bank based upon the information you provided. In general, we provide the following guiding questions when deciding on where to establish a mitigation bank. What is the dominant and projected landuse upstream of the mitigation bank and are those uses compatible with the long-term restoration and preservation goals of the bank? Does the bank include protection of upstream tributary streams? Will the actions of the restoration project be offset by impacts from other development projects in the watershed? Does the bank complement any other ongoing restoration or conservation projects occurring in the watershed?

We also recommend a survey for federally listed snails and mussels before the project begins. If the project will involve the physical disturbance of stream banks or stream substrates, additional coordination with the USFWS will be required. Upon completion of restoration activities, stream banks and riparian buffers should be reseeded with non-invasive, native plants.

Disclaimer:

Please keep in mind the limitations of our database. The data collected by the Nongame Conservation Section comes from a variety of sources, including museum and herbarium records, literature, and reports from individuals and organizations, as well as field surveys by our staff biologists. In most cases the information is not the result of a recent on-site survey by our staff. Many areas of Georgia have never been surveyed thoroughly. Therefore, the Nongame Conservation Section can only occasionally provide definitive information on the presence or absence of rare species on a given site. Our files are updated constantly as new information is received. **Thus, information provided by our program represents the existing data in our files at the time of the request and should not be considered a final statement on the species or area under consideration.**

If you know of populations of highest priority species that are not in our database, please fill out the appropriate data collection form and send it to our office. Forms can be obtained through our web site (<http://www.georgiawildlife.com/node/1376>) or by contacting our office. If I can be of further assistance, please let me know.

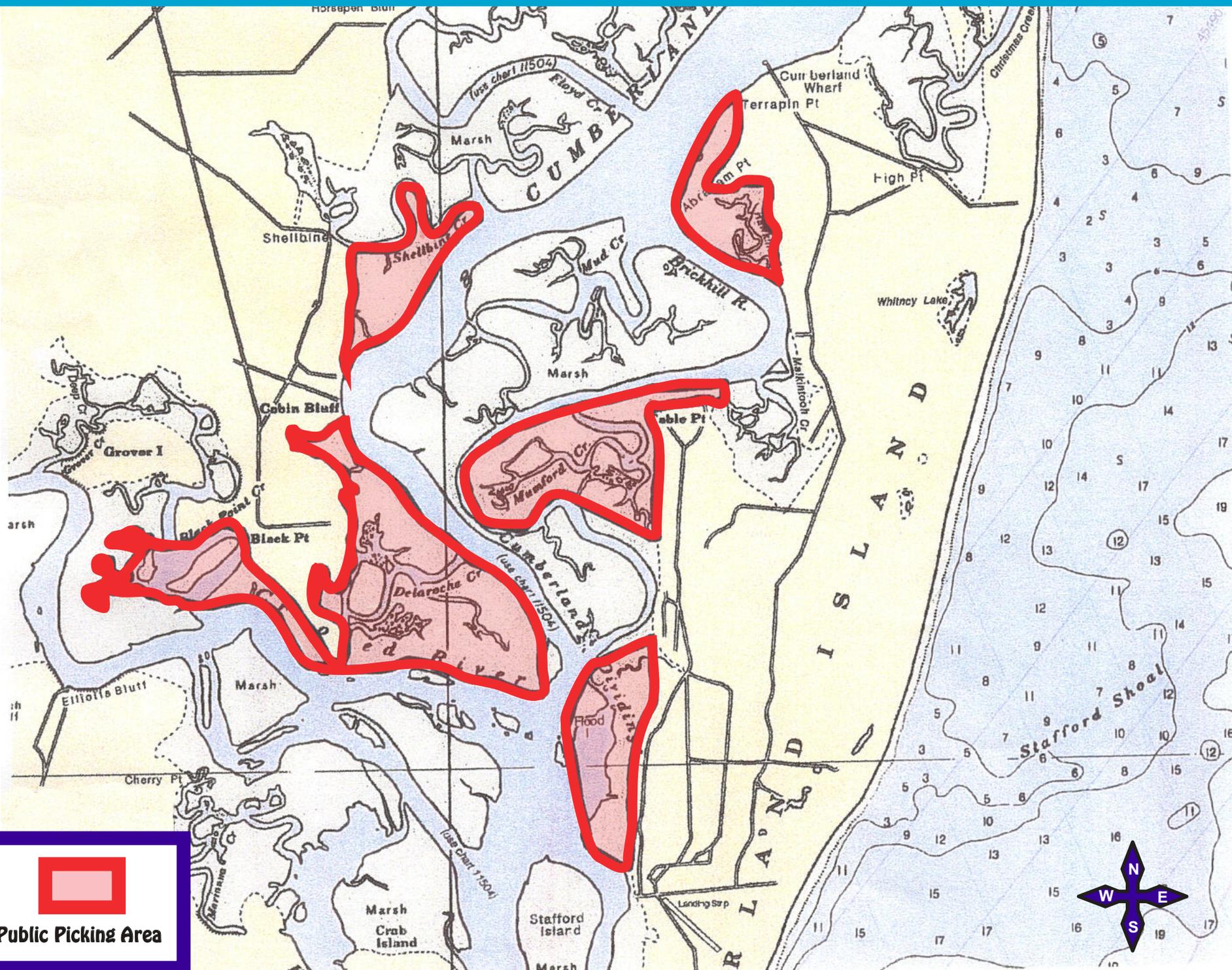
Sincerely,



Anna Yellin
Environmental Review Coordinator

Data Available on the Nongame Conservation Section Website

- Georgia protected plant and animal profiles are available on our website. These accounts cover basics like descriptions and life history, as well as threats, management recommendations and conservation status. Visit <http://www.georgiawildlife.com/node/2721>.
- Rare species and natural community information can be viewed by Quarter Quad, County and HUC8 Watershed. To access this information, please visit our GA Rare Species and Natural Community Information page at: <http://www.georgiawildlife.com/conservation/species-of-concern?cat=conservation>.
- Downloadable files of rare species and natural community data by quarter quad and county are also available. They can be downloaded from: <http://www.georgiawildlife.com/node/1370>.




Public Picking Area

GA DNR Shellfish Program

Shellfish

A Georgia Fishing License is required to take shellfish (oysters, clams) for non-commercial purposes. Shellfish must be harvested between the hours of 1/2 hour before official sunrise and 1/2 hour after official sunset. Shellfish may only be taken with handheld implements. Recreationally harvested shellfish may not be sold.

Shellfish Limits

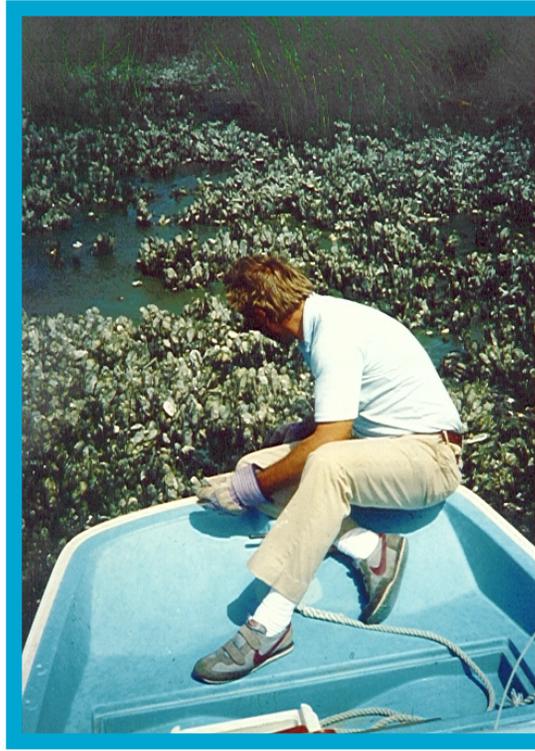
Oysters must measure no less than three inches from hinge to mouth, unless the oyster cannot be removed from a legal-sized oyster without destroying it. For clams, the maximum depth from one shell half to the other must be at least 3/4 inch thick.

Recreational quantity limits are up to two bushels of oysters and one bushel of clams per person per day, with a maximum limit of six bushels of oysters and one bushel of clams per boat per day.

Harvest Area Monitoring

DNR tests shellfish harvest waters monthly for harmful bacteria. When bacterial contamination is found, DNR will close the area until the contamination subsides.

For current harvest area status information call the Shellfish Sanitation Program at (912) 264-7218.



The consumption of raw or undercooked foods such as meat, fish, and eggs, which may contain harmful bacteria, may cause serious illness or death.



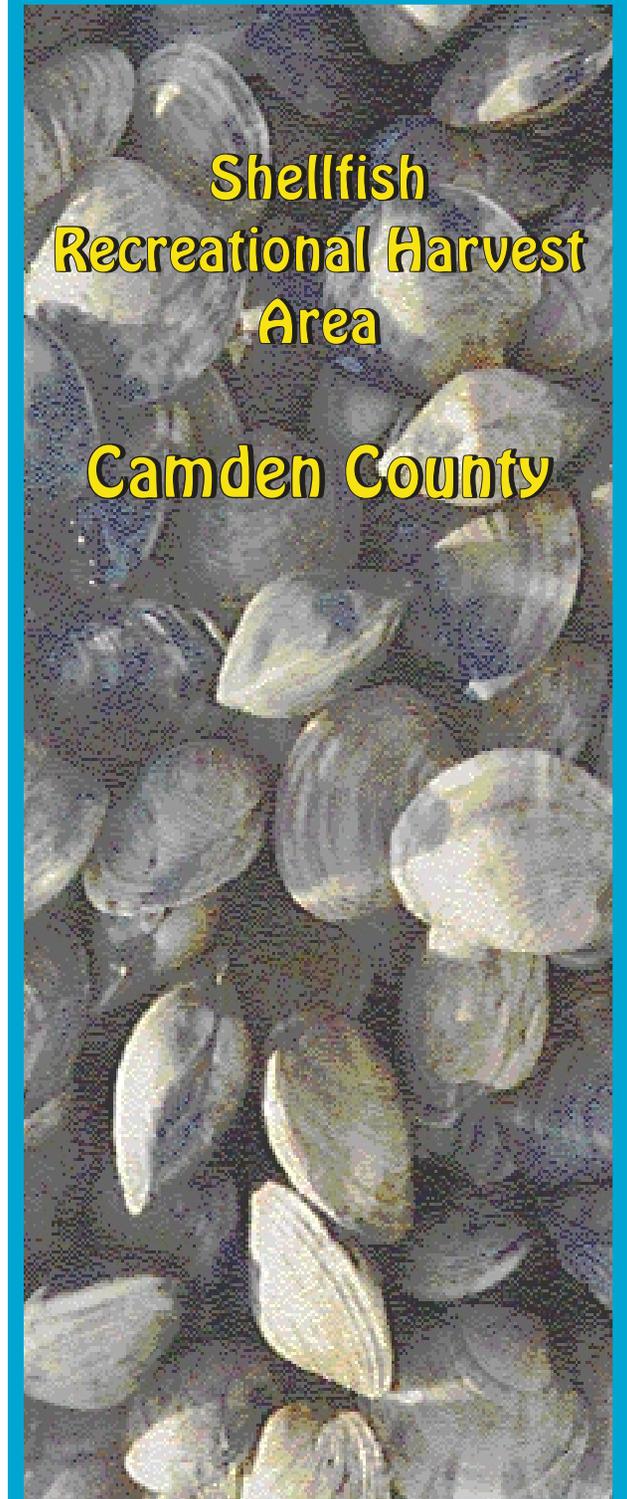
Department of Natural Resources Coastal Resources Division

One Conservation Way, Ste. 300
Brunswick, GA 31520
(912) 264-7218 Fax (912) 262-3143
<http://crd.dnr.state.ga.us>



Shellfish Recreational Harvest Area

Camden County



December 23, 2020

Daniel P. Murray
Manager, Safety Authorization Division
Federal Aviation Administration
800 Independence Avenue, SW
Washington DC 20591
Attn: Stacey Zee

**RE: Construct/Operate Commercial Space Launch Site, Spaceport Camden, Woodbine
Camden County, Georgia
HP-151117-001**

Dear Mr. Murray:

The Historic Preservation Division (HPD) has reviewed the additional information submitted concerning the above referenced project. Our comments are offered to assist the Federal Aviation Administration (FAA) in complying with the provisions of Section 106 of the National Historic Preservation Act of 1966, as amended (NHPA). **In order to complete our review and concur with your determination of effect, HPD is in need of additional information.**

The subject project consists of the construction of a spaceport complex, and its subsequent operation, in Woodbine. The construction of the spaceport was previously determined to have no adverse effect on multiple National Register of Historic Places (NRHP)-eligible historic properties, with two (2) conditions. Due to unknown impacts from the operation of the spaceport, a draft programmatic agreement (PA) was subsequently submitted. The current submitted information includes a revised assessment of effect due to a revised operator application. It is HPD's understanding that the proposed operation now includes small-lift launch vehicles rather than medium-large launch vehicles initially proposed.

As submitted, HPD is unable to concur with the FAA's assessment of effect without additional information. Based on the additional information provided by the FAA, other consulting parties, and discussions with the Advisory Council on Historic Preservation, it is HPD's understanding that the revision in vehicle type has increased the probability of launch failures due to the proposed small-lift vehicle type. Therefore, it appears to HPD that only a portion of the potential impacts have been considered and, considering the additional impact potential, that the area of potential effect (APE) should be increased in order to include historic properties that could be impacted. HPD recommends increasing the APE to include areas under the trajectory of a vehicle's failure that could be impacted by indirect and reasonably foreseeable effects, such as debris impacts, fire, and other rocket failure safety concerns. Subsequently, HPD recommends then assessing all known indirect and reasonably foreseeable effects, including not only light pollution, audible, and vibration, but impacts resulting from launch failures. Furthermore, due to a revised proposed project scope and additional impacts identified, HPD recommends continuing public participation efforts through re-engaging previously consulted organizations and engaging additional entities, as needed.

Mr. Murray
December 23, 2020
HP 151117-001
Page 2

We look forward to receiving revised identification and assessment efforts, once available. Please refer to project number **HP-151117-001** in any future correspondence regarding this project. If we may be of further assistance, please do not hesitate to contact me at (404) 486-6376 or jennifer.dixon@dca.ga.gov.

Sincerely,


Jennifer Dixon, MHP, LEED Green Associate
Program Manager
Environmental Review & Preservation Planning

cc: Sarah Stokely, ACHP
Kevin Lang, Little Cumberland Island
Betsy Merritt, NTHP
Beth Byrd, NPS
Queen Quet, Gullah/Geechee Sea Island Coalition



December 9, 2020

Mr. Daniel P. Murray
Manager
Safety Authorization Division
Office of Commercial Space Transportation
Federal Aviation Administration
800 Independence Ave., SW
Washington, DC 20591

Ref: *Spaceport Camden*
Woodbine, Camden County, Georgia
ACHP Project Number: 014190

Dear Mr. Murray:

On October 15, 2020, the Federal Aviation Administration (FAA) provided the Advisory Council on Historic Preservation (ACHP) with its draft assessment of effects (AOE) for the referenced undertaking. The finding of effect is submitted as part of the FAA's compliance with the Section 106 (54 U.S.C. § 306108) of the National Historic Preservation Act (NHPA) (54 U.S.C. § 300101 et seq.) and its implementing regulations, "Protection of Historic Properties" (36 C.F.R. Part 800). As the ACHP is participating in consultation, we are providing our comments regarding FAA's draft AOE. Overall, the draft AOE would benefit from including additional information to clarify to the Georgia State Historic Preservation Officer (SHPO), the ACHP, and the consulting parties how the FAA made its findings and determinations. The ACHP has identified certain issues that should be addressed in a revised AOE to facilitate the consideration of the full range of the undertaking's potential effects, and has provided recommendations regarding the next steps of the consultation process. We clarify as follows.

Consultation

As originally submitted, the Launch Site Operator License submitted by the Camden County Board of Commissioners (County) included small-and medium-launch vehicles. However, the County and FAA agreed to toll the application review in December 2019, at which time FAA notified the consulting parties that the Section 106 consultation and environmental reviews were on hold while the application was revised. In submitting its revised application, the County has limited its application to address only small-lift launch vehicles, without first-stage returns.

Since the undertaking has changed, the ACHP recommends FAA conduct a consultation meeting with the consulting parties to review the revised undertaking and explain the FAA's decision-making rationale as it relates to determinations, findings, and information presented in the draft AOE. While FAA states the AOE is a reanalysis of effects due to the modified undertaking, some consulting parties did not review the original assessment of effects prior to the undertaking's modification. Therefore, FAA should ensure that the AOE contains the necessary information regarding key points in the Section 106 process, such as the delineation of the area of potential effects (APE) and the analysis of visual effects. Further, the AOE

ADVISORY COUNCIL ON HISTORIC PRESERVATION

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includes technical information used in considering effects such as noise and vibration that may require additional information and discussion to explain to the consulting parties why FAA concluded these effects do not affect historic properties. Additional consultation would be useful to ensure that all consulting parties understand how the agency reached its conclusions.

Area of Potential Effects

Since the County resubmitted its revised application, FAA indicated that it will retain the same APE delineated for the original undertaking. It remains unclear how the original APE was delineated, and this information was not provided in the draft AOE. Further, there are concerns that the APE is narrowly defined, and would benefit from being expanded to include Little Cumberland Island, which is the location for an historic lighthouse. Such an expansion of the APE would incorporate potential effects from the operations of the launch facility, including any launch failures. FAA should clarify how it delineated the APE's five (5) mile radius around the site of the proposed spaceport, and determine if the APE should be expanded to include Little Cumberland Island.

Potential Adverse Effects due to Safety Concerns

Given that there is a higher probability of failures with small-lift launch vehicles, FAA should consider whether these failures would constitute a reasonably foreseeable effect (36 CFR § 800.5(a)(1)), particularly in regards to above-ground historic properties located under the trajectory of a vehicle's failure. We request FAA provide additional information to the consulting parties regarding the potential for launch failures, and whether these failures could affect historic properties.

Cumulative Effects

While the AOE explains the undertaking's potential direct and indirect effects, it would benefit from a thorough analysis of the cumulative effects. The ACHP notes FAA analyzed cumulative effects in the draft Environmental Impact Statement (DEIS) issued in March 2018 for the original proposed application. As provided in 36 C.F.R. § 800.5(a)(1), adverse effects may include reasonably foreseeable effects caused by the undertaking that may occur later in time, be farther removed in distance, or be cumulative. Accordingly, FAA should consider whether relevant portions of the cumulative effects analysis should be incorporated into the draft AOE, and if additional research is needed to identify cumulative effects from the undertaking.

Programmatic Agreement and FAA's Section 106 Responsibilities during Operations

Given that the layout and design elements of the launch facilities have yet to be finalized, FAA has proposed a Programmatic Agreement (PA) to set out the measures it will follow to identify and evaluate the National Register of Historic Places (NRHP) eligibility of additional properties that have not yet been surveyed, and to resolve any adverse effects to historic properties through avoidance, minimization, or mitigation measures. The PA should contain a design review process that will allow for continued consultation with the SHPO, the ACHP, and the consulting parties at various stages (i.e. 30/60/90% design) to determine if modifications are possible to avoid or minimize potential effects, particularly to the archaeological sites.

The FAA indicated the PA will only address potential construction effects, and, currently, no effects have been identified from the undertaking during operations. We encourage FAA to assess the potential for adverse effects during operations due to safety concerns and in the event of a launch failure. Further, it would be helpful for FAA to clarify its Section 106 responsibilities during operations of the launch site, as the ACHP is aware of other commercial space launch sites in the United States with PAs that include a

Section 106 consultation process for any activities or modifications to the space launch site that occur after construction and during operations. If Section 106 is required during operations of the space launch site such as a modification to the license and/or expansion of the APE, the ACHP requests that the draft PA include a consultation review process in the PA.

We look forward to receiving a revised AOE and participating in a future consultation meeting. Should you have questions regarding our comments, please contact Sarah Stokely at (202) 517-0224, or via e-mail at sstokely@achp.gov.

Sincerely,



Jaime Loichinger
Assistant Director
Federal Permitting, Licensing, and Assistance Section
Office of Federal Agency Programs

[NEWS \(/NEWS\)](#) | [HISTORY \(/NEWS/ARTICLES/HISTORY\)](#)

Thiokol Explosion: 50 Years Later, Families Seek To Be Remembered

February 4, 2021 8:30 AM

By: [Laura Corley, The Current \(/author/laura-corley-the-current\)](#)



https://www.gpb.org/sites/default/files/2021-02/thiokol1-ajcapga-state-archives-1_2.jpg

Efforts continue to honor legacies of 29 who died at Coastal Georgia munitions plant blast.

Credit: The Atlanta Journal-Constitution

Laura Corley, The Current

There are no Purple Hearts or Medals of Honor for the dozens killed and maimed while fighting the Vietnam War from Woodbine a half century ago.

Those killed and maimed weren't wearing uniforms like the thousands of Georgians deployed aboard during the war. They were mostly poor, Black women who worked for \$1.65 an hour assembling trip flares for the U.S. Army at the Thiokol Chemical Corp. munitions plant.

People were overjoyed at the prospects of a full-time job, a rare find for women and Black people in Coastal Georgia at the time.



Hattie Fogle was 19 when she went to work at Thiokol. It's taken decades for her to be able to talk about the explosion.

Credit: Laura Corley/The Current

Workers like Hattie Fogle, who was a 19-year-old single mother when she went to work for Thiokol, didn't know just how dangerous the job was until that gruesome day 50 years ago when a fire sparked an explosion so powerful that it shook the Earth for miles around.

The blast killed 29 of her coworkers including her brother and a sister-in-law. It maimed her cousin who lost an arm and was badly burned. It scarred the hundreds of others who survived.

"I can still feel a pain from it," Fogle said, adding that it's taken years to be able to talk about the catastrophe without weeping. "I'm able to voice it and not break down. You've got people that can't tell the

stories for themselves, so you have to be the one.”

The **50th anniversary ceremony (<https://thecurrentga.org/2021/02/03/scenes-video-thiokol-plant-explosion-50th-anniversary/>)** honoring victims of the Thiokol explosion is set for 10 a.m. Wednesday at Chris Gilman Stadium in Kingsland. It is being organized by the **Thiokol Memorial Project (<http://thiokolmemorial.org/>)**, a museum dedicated to one of America’s worst industrial accidents, but one that is largely unknown and unrecognized even in Georgia.

Ongoing nightmares about charred corpses, the physical agony of burn scars and missing limbs plus an exhausting 17-year court battle with the company and U.S. government kept the survivors from speaking much about the traumas they have endured. Yet as Georgia starts a new reckoning with racial injustice, the survivors have found their voice. They want their sacrifice on behalf of the war effort and workers’ rights finally honored after decades in which their stories and their struggles have been left out of history books.

“These people were poor. Many of them were people of color. Twenty-one women was killed that day. How could you miss that after all these years? Those children grew up without their mothers,” said Jannie Everette, whose 81-year-old mother is one of the Thiokol survivors. She has dedicated the past six years of her life to the small museum in downtown Kingsland to ensure that Georgians don’t forget the catastrophe.

America Goes To War

Residents of Coastal Georgia remember 1964 as the year Rev. Martin Luther King Jr. won the Nobel Peace Prize, President Lyndon B. Johnson signed the Civil Rights Act. It was also the year the U.S. leader and Georgia Gov. Carl Sanders visited Woodbine for the grand opening of what reporters at the time called the “first Georgia space plant.”



Visitors to Thiokol in 1964 look down into depths of giant static firing pit which is 120 feet deep. The pit was originally used to test rockets for space travel.

Credit: The Atlanta Journal-Constitution

The land, some 7,500 acres on Horse Pen Bluff, was a plantation before the development. The site offered deep water access to Cape Canaveral in Florida where the government was starting its space program. Thiokol was part of that endeavor with a \$23 million contract to make solid fuel rocket boosters for the National Aeronautics and Space Administration.

By 1969, communities like Woodbine had not seen much of the promised changes that the Civil Rights Act was meant to bestow. Land was being cleared to make way for Interstate 95. Good jobs were in short supply and Thiokol just began to hire women.

The Vietnam War was a full-blown conflict, chewing up hundreds of American lives each month. So when Thiokol won a contract to supply the U.S. Army with 750,000 trip flares and CS-gas at the Woodbine plant, Fogle remembers the community rippling with excitement about new, full-time opportunities, especially for women. Until the plant opened, she and her kin had been traveling to Brunswick for **piecemeal work at King Shrimp (<https://www.georgiaencyclopedia.org/articles/business-economy/king-and-prince-seafood>)**. Now, they had a chance to earn a paycheck and help their country.

“It was an opportunity for women to do better,” Fogle said. “I could go to work, come home and provide for my child. There were times when we went to the shrimp factory and if the shrimps weren’t there in my department, I went home early. So there was not a guaranteed 40-hour paycheck.”

Fogle went to work each day along with her brother, sister-in-law and two cousins. Each worked on the factory line where workers transformed raw explosive material into the deadly munitions that U.S. infantrymen would use to defend their own lives.

Fogle's specialty was putting the safety pins in the trip flares, a job that required using an air gun with a foot pump to insert the pin. One day, that air gun malfunctioned.

"The trip flare blew up in my hand and they had to catch me because I just, because we were told, If somebody hollers, 'Fire!' and you hear 'Boom,' run. Get out and they'll tell you when to come back in," she said. "But when you've got something in your hand and it goes off, the first thing I did was start running. ... We'd done that many times."

Survivors remember Thiokol didn't offer much in the way of safety training. They largely left matters up to the workers. So when sparks would fly, the women working the line almost reflexively evacuated while their male coworkers rushed in to extinguish the flames.

They all returned to work each time, treating the risk as part of the job.

"It was after the explosion that we found out just how dangerous the stuff we were working with was," Fogle said. "Thiokol didn't know the danger. The workers didn't know."

What Thiokol told its employees is what the U.S. Army had told the company: The magnesium trip flares contained a Class 2 explosive, a flammable material. Only later, when the factory had been reduced to cinders, did it become known that the army had failed to inform the company that the material had been upgraded to a Class 7 explosive, the most dangerous classification. The classifications determine how the materials are handled and stored.

The memo about the upgraded classification never made it to anyone at Thiokol. It had been written on a paper note that was discovered in a bottom drawer of an Army officer's desk sometime after the disaster.

"The thing that really did it was, this guy just didn't pass it on," said Arnold Young, a lawyer for HunterMaclean who sat in on the federal trials on behalf of a company that was not part of the lawsuit. "That's what caused the disaster ... It's like everything else in the world: somebody just simply screwed up."

Had Thiokol received the memo, it would have had to make many changes in the way it stored and handled the materials, a key cause of the explosion.

'I Still Feel Myself On Fire Sometimes'

Fires and evacuations were so routine at Thiokol, that when a small flame was spotted on the assembly line in Building M-132 shortly before 11 a.m. on Feb. 3, 1971, many employees on the factory's morning shift left their stations, but didn't move very far away from the building.

That mistake would prove fatal.

The flames quickly spread to ignition pellets used to build the munitions and then to the next door curing room where about 8,000 pounds of illuminants made of magnesium and sodium nitrate were being stored. Also in the curing room were 56,322 candles containing approximately 0.3 pounds of illuminant each; 18,472 ignition pellets, and 100 pounds of first fire and intermediate mix, according to court records.

Three to four minutes after the fire broke out, the building exploded with such magnitude that witnesses reported seeing a mushroom cloud from miles away.

The Earth shook up and down the Georgia-Florida coastline.





Fireman search for bodies in twisted wreckage of the Thiokol plant in Woodbine on Feb. 4, 1971.

Credit: Charles Bennett/The Atlanta Journal-Constitution

At the time, few towns in America had what we now know as Emergency Services, but Jacksonville Fire Department was among the first in the country to train its staff on basic life-saving measures like CPR. It **sprung into action to help save lives** (<https://www.youtube.com/watch?v=45yFoz-6Goo>) in the Thiokol blaze.

Meanwhile, workers who had cars at the plant drove the injured and dead to 14 different hospitals. Area funeral homes sent hearses to use as ambulances.

Interstate 95 had yet to be completed between Savannah and Jacksonville, and the convoy of vehicles had to traverse the dirt-packed Highway 17 to reach the plant and **ferry the wounded** (<https://www.jacksonville.com/news/reason/call-box/2017-04-01/call-box-how-old-st-marys-river-bridge>) to towns in Florida and as far away as Savannah.

More than 600 people from 16 municipalities along with the U.S. Navy, Air Force and Coast Guard responded to the emergency.

Fogle had worked the night shift at Building M-132, and was at home at the time of the explosion. The scenes of the aftermath she described witnessing were akin to a soldier's trek across a battlefield.

Bodies shrouded with white sheets were laid out in a row at Gilman Hospital in St. Mary's. Her cousin, Flossie Massey McVeigh, had been burned beyond recognition. Some of her coworkers writhed in agony, some missing limbs.

Her sister-in-law, Betty R. Dawson Burch, also was killed in the explosion.

Her brother, Charles Burch, escaped the plant with their uncle. But then he ran back to the burning building to search for his wife. When the fire had been extinguished, their uncle identified Charles' corpse by his shoes. His body had been trapped under a fallen beam. The young man had started working only a week earlier and had not even drawn a paycheck.

Fogle said she finds peace in knowing some efforts are being made to remember those who made the ultimate sacrifice.

"They were doing their civil duty," she said. "In every army, everybody has a part to play or a part to do. They were actually – we were actually – just doing our part."

A Long Legal Battle

The days and months after the explosion are a blur of pain and suffering for the survivors.

The families of Woodbine were left alone to bury their loved ones and nurse their relatives' horrific injuries. Few had any health insurance. The wounded had no way to continue earning a living.

The company resumed operations five months after the explosion while some survivors remained in hospital.



Cars lie smashed outside Thiokol Plant (left) and building is destroyed after powerful explosion and fire; debris, charred equipment shown inside the structure.

Credit: Hugh Stovall/The Atlanta Journal-Constitution

Later that year, lawyers came to town promising to do right by the workers. They filed a lawsuit against Thiokol on behalf of Flossie Massey and other Thiokol employees, dependents of Thiokol employees or next-of-kin, seeking \$550 million in damages.

That kicked off a 17-year legal drama that eventually led to changes in America's tort reform law, but did little to tamp the raw pain and sense of injustice among the Woodbine families.

The cases started in 1974, but it took three years for Savannah **Judge Alexander Lawrence** (<https://researchworks.oclc.org/archivegrid/collection/data/38477714>), to issue a ruling. Thiokol and the U.S. government shared liability for the deaths and maiming of the workers, but Thiokol's payments would be capped by the state's workmen's compensation law. The company's insurance paid out the survivors of the dead factory workers.

The government fought the ruling in appeals courts for the next five years.

Not all the families signed onto the lawsuits. Both them, and the plaintiffs, struggled with debt, and with the crushing realization that the world didn't care about what happened to them and their community. National events had moved on.

Then came the 1986 Space Shuttle Challenger explosion. Thiokol, which had sold off the plant in Kingsland, had pivoted its focus to the U.S. space program. The company, then known as Morton Thiokol Inc., had engineered the rocket booster which caused the fireball above Cape Canaveral.

In the national uproar after that disaster, the company **reached settlements with families** (<https://www.latimes.com/archives/la-xpm-1988-03-08-mn-614-story.html>) of the four dead Challenger astronauts within a year. It paid \$4,641,000 to settle the claims and the government paid \$3,094,000.

The adverse publicity about the company gave leverage to the lawyers of the Woodbine families in their settlement talks. Finally, the law suits ended with roughly \$20 million paid out to survivors. Like in most tort cases, 25% of the total went to the lawyers.

Work To Be Done

Those workers who fought for compensation received varied settlement amounts. Some more grievous injured won six-figure payouts. Others, only tens of thousands of dollars. That's despite not being able to work again after the explosion.

Many of the plant workers, however, received no compensation.

In the aftermath of the explosion, more than 300 of Thiokol's 500 workers went back to their jobs. They didn't join the lawsuits because they needed a way to make a living immediately, said Phyllis Rhone and Emma Gibbs, one of the first workers hired by Thiokol in 1969.

Thiokol Explosion: A First-hand account, 50 years later



Emma Gibbs, 76, recalls the explosion Feb. 3, 1971, at Thiokol Chemical Corp. munitions plant in Woodbine, Georgia. Twenty-nine people were killed and more than 50 were injured. Gibbs was working at the plant there on Horse Shoe Bluff, making trip flares for U.S. Army troops to use in the Vietnam War. The site is now where Camden Spaceport is planned.

Credit: The Current

“The war was still going on so we kept making things for them,” said Gibbs, who is now 76. “I didn’t have nowhere else to go and I had some children I had to take care of.”

Gibbs recalled the fear she and her coworkers felt upon returning.

“It was kind of eerie,” she said. “It was scary, because after that you best not even drop a pin on the floor because everybody would go run.”

Rhone, who was a single mother, said her aunt, **Celia A. Alberta** (<http://thiokolmemorial.org/celia-a-alberta-tribute/>), was hurt in the explosion and died of her injuries days after. She went back to the factory floor anyway.

“You do what you have to do,” Rhone said. “You just don’t think about it.”

Fogle said her mother forbade her from returning to work for Thiokol. She got a job at the Camden County High School cafeteria.

Fogle’s parents sued on behalf of her brother, but both died by the time the litigation ended. The compensation was divided among the siblings.

Her other brother, Louis Burch, sued on behalf of **his wife, Betty R. Dawson Burch** (<http://thiokolmemorial.org/betty-ruth-dawson-burch-tribute/>). Their son, Tony Burch, was just 8 months old when she was killed in the explosion. He was 17 by the time the lawsuit was settled.

Many victims and their families were so consumed by grief and trauma they were unable to manage their daily lives. Neither the company, nor any other government agency, offered the Woodbine families any counseling.

“If we would have had the help we needed to get through that, to help process the grief, it would have been a lot better for a lot of people,” Fogle said.

Fogle stayed silent about her trauma for decades. So did her neighbor, McVeigh, who wakes up at night in terror reliving the pain of being burned alive.

Honor And Remembrance

Everette, the head of the museum, was in high school at the time of the explosion. She was among the few residents of Woodbine who had a chance to escape the horrors of the past.

When she graduated, she joined the Army and then made a career working for the Department of Energy in Washington, D.C.



Jannie Everette at the Thiokol Memorial Project museum in Kingsland.

Credit: Laura Corley/The Current

Everette didn't think about the explosion every day, unlike her mother, Lucille Washington, who suffered permanent hearing damage, scars on her face and arms, and chronic back pain from her injuries sustained at the Thiokol plant.

Everette's life changed, though, when her mother traveled from Woodbine to her house in Maryland, and from the guest room she overheard her mother crying in agony.

“I pushed the door (open), and she was down on her knees, and she was saying, ‘Oh, Lord.’” Everette recalled. “I said, ‘You want me to take you to the hospital?’ She said, ‘No, no, no.’ She said that all of her coworkers, ‘they’ve been killed and hurt and nobody cared.’”



Thiokol Memorial Project’s Thiokol Memorial Museum in downtown Kingsland.

Credit: Laura Corley/The Current

After retiring from her government job in 2014, Everette moved back home to Woodbine. Since then, she founded the nonprofit Thiokol Memorial Project and dedicated her life to honoring the dead and the survivors of the explosion.

She championed efforts to have memorial markers installed at the former site of the plant on Horse Pen Bluff.

She opened a museum in downtown Kingsland where visitors can see artifacts, pictures, articles, video exhibits.

In 2018, she led lobbying efforts at the Georgia state capitol to erect a sign at Exit 7 on Interstate 95, at Harriet’s Bluff Road that reads, “Patriots of Thiokol Memorial Interchange.”

Still, Thiokol remains a little-known part of state and local history.

The explosion didn't appear on the Camden County history page on the [New Georgia Encyclopedia](https://www.georgiaencyclopedia.org/articles/counties-cities-neighborhoods/camden-county) (<https://www.georgiaencyclopedia.org/articles/counties-cities-neighborhoods/camden-county>) in its 2018 update. The encyclopedia was created and is maintained by the Georgia Humanities Council in partnership with the University of Georgia Press, the University System of Georgia/GALILEO, and the Office of the Governor.



Patriots of Thiokol Memorial Interchange at I-95 and Harriet's Bluff Road.

Credit: Laura Corley/The Current

European settlers, plantation owners and military history are among topics covered in a 500-page book about Camden County's history written in 1994. A third of a page is devoted to Thiokol's \$10 million dollar investment to build a plant here in 1961. Only two sentences are devoted to the explosion.

Fogle said she assumed that horrific day at Thiokol was largely missing from history because, "being a small town like this, maybe people just overlooked or, even they could have felt that these people were not worthy. I can't say whose fault it is that it fell between the cracks."

Rhone said she shares some of the blame.

"Even some of our kid's kids don't know anything about this," she said. "We bear some of the responsibilities because we don't tell them about this, you know, and it should be a part of the history. ..."

This happened right here.”

Everette said that mass tort litigation was rewritten as a result of the disaster at Thiokol.

“Nobody knew how to value the loss of life,” Everette said of the compensation suits from Thiokol workers. “The same legislation that was used for Thiokol was used for 9/11 victims. People didn’t like it, but that’s what the law was.”

Trouble With Traction

The 50th anniversary ceremony honoring victims of the Thiokol explosion is supported by the Georgia Council of the Arts and the National Endowment for the Arts. It will include a flag presentation and choral performances.

The Current will livestream the event from [its Facebook page \(https://www.facebook.com/TheCurrentGA\)](https://www.facebook.com/TheCurrentGA).

Public schools around Camden County will hold a moment of silence for the victims at the precise time of the blast. Rep. Earl “Buddy” Carter is scheduled to send one of his staff members to the ceremony organized by Everette this year. But the museum director Everette says normally she has a problem maintaining the interest of local elected officials.

That is particularly important since one of her goals is to recognize the survivors with a Congressional Medal of Honor for the work they did on behalf of the Vietnam War.

Everette said former U.S. Sen. David Perdue agreed to help with that effort. In the past, however, she said Carter had been noncommittal, despite emails to his office as far back as 2016 about the medals.

Carter told *The Current* that he has helped the Thiokol Memorial Project in its efforts to designate the museum as part of the National Parks Service. However, he did not remember any mention of the medals. When he spoke with *The Current*, he said he was glad to help achieve that goal. “We’ll be working on it,” he said.

Everette has not reached out to Georgia’s newly elected senators, Rev. Raphael Warnock and Jon Ossoff.

Late last week, Everette learned the U.S. Air Force had denied her request for a fly over during the 50th anniversary ceremony. The rejection came in the form of a call from a Utah area code followed by an email from the Virginia-based Aviation Support Branch.

Related News

“The official guidance for 2020 allows the Air Force to provide aerial event support for air shows, national-level sporting events and events held in honor of the five patriotic holidays,” according to the email. “Patriotic holiday events must have an established military presence, such as a military speaker, military formation, Honor/Color Guard presentation, the National Anthem, etc. Unfortunately, under these provisions, your event is ineligible.”

The denial came as a blow to Fogle and the survivors, who think back to their and their co-workers’ sacrifices as just as meaningful as the men and women who deployed to fight for their county.



[\(/news/2021/02/02/meet-the-conquering-heroes-who-helped-desegregate-macons-buses\)](/news/2021/02/02/meet-the-conquering-heroes-who-helped-desegregate-macons-buses)

Laura Corley is home-brewed investigative reporter who has covered public safety and government and education in her home state of Georgia since 2014.

[Meet The 'Conquering Heroes' Who Helped Desegregate Macon's Buses](/news/2021/02/02/meet-the-conquering-heroes-who-helped-desegregate-macons-buses) **[\(/news/2021/02/02/meet-the-conquering-heroes-who-helped-desegregate-macons-buses\)](/news/2021/02/02/meet-the-conquering-heroes-who-helped-desegregate-macons-buses)**

The boycott started with the goal of desegregating the buses and having the bus company hire Black bus drivers, and it lasted three weeks. The boycott ended with a ruling from Federal Judge W. A. Bootle ordering the desegregation of Bibb Transit Co. buses.

February 02, 2021 | By: [Jenna Eason \(/author/jenna-eason\)](/author/jenna-eason)



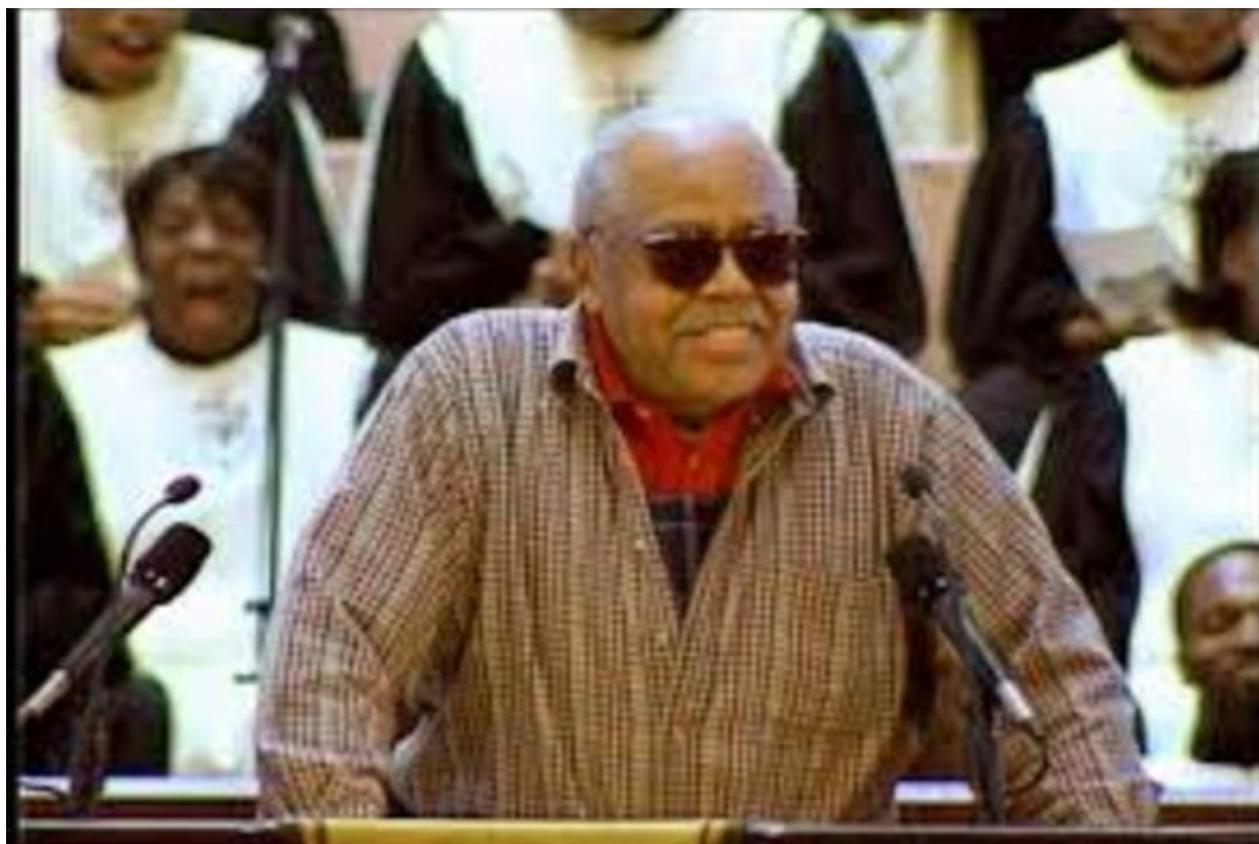
[\(/news/2019/02/08/historian-explores-gospel-roots-of-rock-and-soul-in-new-documentary\)](/news/2019/02/08/historian-explores-gospel-roots-of-rock-and-soul-in-new-documentary)

[MUSIC \(/NEWS/ARTICLES/MUSIC\)](/NEWS/ARTICLES/MUSIC)

[Historian Explores 'Gospel Roots Of Rock And Soul' In New Documentary \(/news/2019/02/08/historian-explores-gospel-roots-of-rock-and-soul-in-new-documentary\)](/news/2019/02/08/historian-explores-gospel-roots-of-rock-and-soul-in-new-documentary)

A new radio documentary will highlight the roots of gospel music during Black History Month. The four-part documentary is called "Gospel Roots of Rock..."

February 08, 2019 | By: [Elena Rivera \(/author/elena-rivera\)](/author/elena-rivera) and [Virginia Prescott \(/author/virginia-prescott\)](/author/virginia-prescott)



[\(/news/2019/02/01/remembering-atlanta-radio-legend-alley-pat-and-the-legacy-he-left-behind\)](/news/2019/02/01/remembering-atlanta-radio-legend-alley-pat-and-the-legacy-he-left-behind)

[HISTORY \(/NEWS/ARTICLES/HISTORY\)](/news/articles/history)

[Remembering Atlanta Radio Legend, Alley Pat, And The Legacy He Left Behind \(/news/2019/02/01/remembering-atlanta-radio-legend-alley-pat-and-the-legacy-he-left-behind\)](/news/2019/02/01/remembering-atlanta-radio-legend-alley-pat-and-the-legacy-he-left-behind)

“On Second Thought” began celebrating Black History Month by learning about the man who was nicknamed the “Mouth of the South,” James “Alley Pat”...

February 01, 2019 | By: [La'Raven Taylor \(/author/laraven-taylor\)](/author/laraven-taylor) and [Virginia Prescott \(/author/virginia-prescott\)](/author/virginia-prescott)



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General Assembly

House Resolution 346

A RESOLUTION

Dedicating certain portions of the state highway system; and for other purposes.

WHEREAS, 600 Woodbine Thiokol Chemical Plant workers fulfilled America's sacred obligation of supplying the United States military with vital munitions; and

WHEREAS, these dedicated patriots served as civilian contractors by manufacturing munitions and deterrent gases for use by the United States Army during the Vietnam War; and

WHEREAS, the munitions produced by these workers were utilized in three military arsenals and saved the lives of countless American soldiers; and

WHEREAS, the Thiokol Plant workers supported the liberation of the people of South Vietnam and sought to promote democracy through their efforts; and

WHEREAS, the workers at Thiokol Plant were an important part of American history by standing as exemplars of the modern workplace as one of the first in American industry that was racially integrated and consisted of both men and women; and

WHEREAS, the lives of 30 plant workers were tragically cut short in 1971 and 1973, but the tragic loss of these Georgians changed the quality of life for millions of Americans, resulting in improvements in transportation, emergency medical services, mass tort litigation, and plant safety; and

WHEREAS, it is abundantly fitting and proper that the ultimate sacrifice made by these 30 Georgians be recognized appropriately by dedicating an interchange in their memory.

NOW, THEREFORE, BE IT RESOLVED AND ENACTED BY THE GENERAL ASSEMBLY OF GEORGIA that the Interstate 95 interchange at Exit 7 in Camden County is dedicated as the Patriots of Thiokol Memorial Interchange.

BE IT FURTHER RESOLVED that the Department of Transportation is authorized and directed to erect and maintain appropriate signs dedicating the road facilities named in this resolution.

BE IT FURTHER RESOLVED that the Clerk of the House of Representatives is authorized and directed to make appropriate copies of this resolution available for distribution to the Department of Transportation.

IN HOUSE

Read and Adopted
March 05, 2019


William L. Reilly
CLERK OF THE HOUSE

IN SENATE

Read and Adopted
March 29, 2019


David A. Cook
SECRETARY OF THE SENATE